



TEAMCENTER

Easy Plan 2412 — Usage

Software Version Teamcenter 2412

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Table of Contents

- What's new in Easy Plan 2412..... 1-1**
- Easy Plan overview..... 2-1**
 - Overview of Teamcenter Easy Plan..... 2-1
 - What is Process Planning for BTO/BTS/CTO?..... 2-1
 - What is Process Planning for ETO?..... 2-2
 - What is Manufacturing-BOM Manager?..... 2-3
 - What is Teamcenter Manufacturing Access?..... 2-3
 - What is Teamcenter Easy Plan Deployment?..... 2-3
- Getting started with Easy Plan..... 3-1**
 - Search using the Find In command..... 3-1
 - Process Planning for BTO/BTS/CTO data structure..... 3-2
 - Plant BOP prerequisites and data requirements..... 3-6
 - Managing data..... 3-6
 - Configure data display in columns on Easy Plan pages..... 3-6
 - Check data in and out..... 3-8
 - Edit properties for a selected process or operation..... 3-9
 - Edit object properties in Microsoft Excel..... 3-10
 - Drag or copy elements across task page panels and tabs..... 3-12
 - Rules for dragging elements from BOM to BOP..... 3-15
 - Rules for copying elements from BOM to BOP..... 3-17
 - Rules for cloning, moving, and resequencing objects in the BOM or the BOP..... 3-19
 - Copy and paste reference documents to an operation..... 3-20
 - Add URL links to an operation..... 3-22
 - View URL links in an operation..... 3-23
 - Managing attachments..... 3-24
 - Attachments..... 3-24
 - Generate reports for Teamcenter objects..... 3-29
- Create and manage work packages..... 4-1**
 - Create work package..... 4-1**
 - Navigating planning tasks in work packages..... 4-1
 - Work package structure..... 4-10
 - Search for and open a work package..... 4-11
 - Create a work package..... 4-14
 - Create an ERM recipe work package..... 4-15
 - Find a work package or process..... 4-17
 - Search for objects in the BOE tree..... 4-19
 - Search for objects in the BOP tree..... 4-20
 - Work with saved searches..... 4-21
 - Process Planning for electronics..... 4-22

Manage work package.....	4-24
Author the BOE.....	4-24
Add a configurator context to a work package.....	4-28
Add a product structure to a work package.....	4-29
Update a work package EBOM revision.....	4-30
Create a product BOP.....	4-31
Plant BOPs.....	4-32
Reusing a work package based on object values.....	4-40
Apply a production program.....	4-40
Apply a production program structure and add variants and effectivity to it	4-43
Add structure.....	4-44
Product structures and data.....	4-44
Enterprise Recipe Management (ERM).....	4-56
Product manufacturing information (PMI).....	4-65

Manage MBOM..... 5-1

Common EBOM-MBOM workflow.....	5-1
Use basic EBOM and MBOM alignment commands.....	5-1
Expand and contract assembly levels.....	5-1
Pack and unpack to collapse or expand element lines.....	5-2
Pack or unpack nodes one level below an assembly.....	5-2
Remove elements from the EBOM or MBOM structure.....	5-2
Manage EBOM and MBOM columns.....	5-3
EBOM to MBOM assignment status icons.....	5-4
Find parts or assemblies in the EBOM or MBOM.....	5-5
Find an assigned MBOM or EBOM element.....	5-6
Set advanced accountability check rules.....	5-7
Identifying assignment statuses of packed EBOM lines.....	5-9
Review EBOM or MBOM details in a new tab.....	5-10
Match EBOM and MBOM table properties.....	5-11
Assign parts to the MBOM.....	5-12
Check out MBOM parts and assemblies.....	5-12
Assign and remove EBOM elements in an MBOM.....	5-13
Run assign and remove actions in the background.....	5-14
Understanding domain subassemblies.....	5-17
Pairing a usage EBOM with an MBOM.....	5-17
Add a serial or lot number to a part or tool.....	5-18
Change the quantity of parts.....	5-20
Add manufacturing specific components to MBOM.....	5-21
Use BOM recipes.....	5-25
Restructure the MBOM.....	5-31
Restructure an MBOM.....	5-31
Cut, copy, and paste MBOM elements.....	5-31
Replace parts and add or remove structure levels in an MBOM.....	5-32
Use, add, or remove substitute parts in an MBOM.....	5-34
Add or remove global alternate parts in an MBOM.....	5-36
Edit MBOM properties in Microsoft Excel.....	5-37
Align separate MBOM subassemblies to an EBOM.....	5-38

Aligning the EBOM to the MBOM.....	5-39
Access EBOM-MBOM alignment data.....	5-39
EBOM-MBOM Alignment page.....	5-41
Partially comparing in-scope elements with no assignment domains.....	5-43
Revise manufacturing parts or assemblies.....	5-44
Collaborate using Teamcenter Share.....	5-44
Share project files.....	5-44
Set up Teamcenter Share with Teamcenter Easy Plan.....	5-46
Share files from Teamcenter Easy Plan to Teamcenter Share.....	5-46
Share and send files from Teamcenter Easy Plan to Teamcenter Share.....	5-47
Replace files in Teamcenter Easy Plan with files imported from Teamcenter Share.....	5-48
Import files to Teamcenter Easy Plan from Teamcenter Share.....	5-49
Release an MBOM assembly or entire MBOM.....	5-50
Using integrated MBOMs.....	5-50
Integrated MBOM overview.....	5-50
Create an integrated MBOM work package.....	5-51
Author an integrated MBOM.....	5-53
Check assignments and add EBOM elements to an integrated MBOM.....	5-57
Add consumables to an integrated MBOM.....	5-58
Author a location-specific plant BOM.....	5-59
Restructure an integrated MBOM or plant BOM.....	5-60
Validate and release an integrated MBOM.....	5-61

High level work breakdown.....	6-1
Author a process plan.....	6-1
Search for a process without expanding the BOP in the high level planning page.....	6-3

Clone objects.....	7-1
View and analyze clone indication data.....	7-1
Clone a plant BOP.....	7-3
Clone or reference a plant BOE while creating an alternative plant BOP.....	7-4
Clone a process using copy and paste during process planning.....	7-7
Clone a process during process planning or work instructions authoring.....	7-8
Search for and clone existing process objects.....	7-9
Propagate changes to a master operation or process to its clones	7-11
Clone objects from classification.....	7-13
Clone functional groups and process area objects during process planning.....	7-15
Clone a process from a template while working in small product mode.....	7-16
Clone a full BOP to use in small product mode.....	7-18

Manage BOP.....	8-1
Product assignment.....	8-1
Product BOP functional planning.....	8-1
Plant BOP process area planning.....	8-9
Viewing and analyzing consumption status data.....	8-53
Create or update a DIPA in a work package.....	8-62

Open a full or partial BOP in Teamcenter Visualization.....	8-64
Line balancing and detailed timing.....	9-1
Open the Line Balancing page and confirm the variant rule.....	9-1
Monitor KPIs in the Line Balancing dashboard.....	9-1
View working and waiting times for process stations and process resources.....	9-3
Resolve cycle checks in the Line Balancing page.....	9-4
Create process resources.....	9-5
Process resources and operators.....	9-5
Assign operations from Product BOP to stations.....	9-14
Operations.....	9-14
Plan plant BOP operations.....	9-21
Create activities and define roll-up time on operations.....	9-25
Time management.....	9-25
Balance the line.....	9-33
Edit operation frequency.....	9-33
Reorder the activities.....	9-33
Edit or delete activities.....	9-34
View production program information.....	9-35
View object details.....	9-36
View operation details.....	9-37
Manage station comments during line balancing.....	9-37
Author production program and evaluate balancing by variants.....	9-39
Product configurations.....	9-39
Layout planning.....	10-1
Overview of Teamcenter Manufacturing Access.....	10-1
Teamcenter Manufacturing Access prerequisites.....	10-1
Run Teamcenter Manufacturing Access in the Author workspace.....	10-1
Study overview.....	10-2
Business processes involving Teamcenter Manufacturing Access.....	10-3
Create, load, revise, and release study.....	10-4
Sync and publish isolated studies from Study Manager.....	10-4
Use Teamcenter tools to manage study.....	10-5
Use NX tools to manage study.....	10-18
Simulation verification.....	11-1
Open TcMA from Process Simulate.....	11-1
Use Teamcenter Manufacturing Access while validating a process.....	11-1
Starting Process Simulate (connected) from the desktop.....	11-2
Create study in Process Simulate.....	11-3
Study Manager overview.....	11-3
Modifying session settings information in Study Manager.....	11-4
Check out studies from Study Manager.....	11-5
Create a study in Process Simulate.....	11-6
Edit a study in Process Simulate.....	11-7
Remove study from Process Simulate	11-9

Open a study using the Study Manager command.....	11-9
Apply an SVR to a study in Study Manager.....	11-10
Set Study Manager status.....	11-11
Resource Search viewer.....	11-12
Manufacturing feature search from Process Simulate.....	11-17
Load study.....	11-23
Locate a study using Study Manager.....	11-23

Reporting..... 12-1

Work instructions authoring.....	12-1
Getting started with work instructions.....	12-1
Authoring work instructions.....	12-6
Authoring a process plan with work instructions.....	12-18
How do I?.....	12-75
Authoring a process plan without work instructions.....	12-88
Author a container in the product BOP.....	12-88
Generate reports for processes or operations.....	12-89
Author a process without work instructions.....	12-90
Author an operation without work instructions.....	12-91
Assign parts to an operation without work instructions.....	12-92
Clone a process without work instructions.....	12-93

Using the 3D panel viewer..... 13-1

Displaying content in the gallery viewer.....	13-2
View 3D models.....	13-4
View image captures and thumbnails.....	13-5
View part or assembly summary properties.....	13-6
Select multiple objects in the Viewer panel.....	13-7
Select objects by volume.....	13-8
Show or hide multiple assembly, part, or process lines in the Viewer panel.....	13-11
Verify MBOM consumption of many parts.....	13-12
Rename graphic 3D screen shot visuals.....	13-13

Managing effectivities..... 14-1

Delete occurrence effectivities on operations and processes.....	14-1
Validate occurrence effectivity for an operation.....	14-1
Add occurrence effectivities to MBOM container elements.....	14-3
Edit and delete occurrence effectivities from MBOM container elements.....	14-4
Set effectivity for released MBOM elements.....	14-5
Set effectivity for released BOP line revisions.....	14-7
Understanding effectivity, equivalent assignment scope, and validation preferences.....	14-9
Manage equivalent assignment scopes across EBOMs and MBOMs.....	14-12
Assign equivalent scopes from multiple EBOM assemblies to a single MBOM install assembly.....	14-13

Assign equivalent scopes from multiple EBOM assemblies to similar MBOM installation assemblies.....	14-16
Calculating net effectivity settings from Manufacturing Process Planner.....	14-18
Update equivalent assignment scopes.....	14-19
Enable net effectivity.....	14-21
Create a BMIDE extension.....	14-21
Configure accountability check settings.....	14-22
Validate effectivity of modified EBOM elements in MBOM.....	14-24
Manage occurrence effectivities on operations and processes.....	14-27
Run process data validation checks.....	14-27

Work with change notices..... 15-1

ECNs, MCNs, CRs, and ECNs.....	15-1
Create an MCN based on an ECN.....	15-2
Create an MCN from a proposed change request.....	15-3
Connect changes from multiple ECNs into one MCN.....	15-4
Divide changes from a single ECN to multiple MCNs.....	15-6
Using the Change Summary panel.....	15-8
Verify EBOM-MBOM notices in the Change Summary panel.....	15-13
Associate a work package with a change notice.....	15-14
Track manufacturing structure changes associated with change notices.....	15-17
Using assignment comparison controls.....	15-17
Run an EBOM to MBOM accountability check.....	15-20
Run a partial EBOM to MBOM accountability check	15-21
Run an EBOM to integrated MBOM accountability check.....	15-23
Run a product BOP to plant BOP accountability check.....	15-26
Run an MBOM to BOP accountability check.....	15-29
Align domain subassemblies using change management.....	15-33
Propagate EBOM to MBOM changes without change notices.....	15-34
Locate processes, operations, and product reviews affected by change notices.....	15-35
Remove or restore redundant impact indications.....	15-37

Variants..... 16-1

Variant support.....	16-1
Configure classic variants.....	16-1
Edit variant conditions for an operation.....	16-1
Set the variant condition for operations.....	16-2
Product Configurator variants.....	16-3
Analyze variant formulas defined for an operation.....	16-3
Define variant formulas for operations.....	16-4
Copy defined variant formulas to another operation.....	16-6
Configure variants for a process station.....	16-8
Define and save variant rules in Easy Plan.....	16-9
Configure data with a variant rule defined at the sub-level.....	16-11
Configure variants for MBOM elements.....	16-12

Set multiple configurator contexts within a structure.....	16-14
Filter by product variant.....	16-15
Compare and propagate variants in the plant BOP.....	16-16
Analyze variant time distribution.....	16-16
Submit to workflow.....	17-1
Submit objects to a workflow.....	17-1
Submit a work package to a workflow.....	17-2

1. What's new in Easy Plan 2412

Below are new features, existing features that were not previously documented, and features that were in earlier patch releases and are now integrated with Easy Plan 2412.

General enhancements

You can now:

- **Apply a saved variant rule (SVR) to a study in Study Manager.**
- **Drag or copy resources to assign them to process stations.**
- **Propagate changes to a master operation or process to its clones.**
- **Open a full or partial BOP in Teamcenter Visualization.**
- **Change from the process resource view to the process station view on the **Process Planning** page.**
- **Review EBOM or MBOM details in a new tab.**

Alternative plant bill of process (BOP) capabilities

When managing alternative plant BOPs, you can:

- **Compare mismatches between a plant BOP master and a plant BOP alternative.**
- **Clone or reference a plant BOE while creating an alternative plant BOP.**

Change management features

You can now identify the impact of manufacturing engineering change notices (ECNs) on multiple work packages on the **Manufacturing Impact of Change** page. Impacted work packages that can now be retrieved include root level work packages (**CROSSKART WP1** below), and changes to work packages at the sub-assembly level of an engineering bill of materials (EBOM) (**GS CROSSKART WHEEL ASM WP1** below). Impact to single product structure work packages (**CROSSKART SINGLE PRODUCT**) is also supported.



Manufacturing Impact of Change | CROSSKART WHEEL ECN1

Work packages impacted by the engineering change notice

Impacted by the Change					
	Work Package	Owner	EBOM	MBOM	Active Change Notice
⚠	CROSSKART WP1	ep_eto (ep_eto)	GS_CROSSKART_DC/A;1	047641/A;1-CROSSKART MBOM1	
⚠	GS CROSSKART WHEEL ASM WP1	ep_eto (ep_eto)	GS_TIRE & WHEEL CK/A;1-TIRE & WHEEL CK	047655/A;1-Tire & Wheel Asm MBOM	
⚠	CROSSKART SINGLE PRODUCT ...	ganesh-bto (ganesh-bto)	GS_CROSSKART_DC/A;1		

Impacted by the Change	
	Work Package
⚠	CROSSKART WP1
⚠	GS CROSSKART WHEEL ASM WP1
⚠	CROSSKART SINGLE PRODUCT ...

Other change management enhancements include the capability to:

- **Create an MCN from a proposed change request.**
- **Connect changes from multiple ECNs into one MCN.**
- **Divide changes from a single ECN to multiple MCNs.**

Work instructions authoring (WIA) improvements

Work instructions authoring (WIA) new features allow you to:

- **Add, edit, and sequence** data collection definitions (DCDs) at the process station level.
- **Create or add DCDs while authoring work instructions.**
- **Apply different configurator contexts to the structures in a work package.**
- **Apply a production program structure and add variants and effectivity to it.**

Enterprise Recipe Management (ERM)

Easy Plan now allows you to manage calculated formulas and recipes, for example, food, chemical, and pharmaceutical products. You can:

- **Create an ERM recipe work package** (collaboration context) to define general or master recipes.

- **Author a general ERM recipe** to organize processes, operations, equipment, and materials for generalized use, based on a variety of plant locations and situations.
- **Author an ERM master recipe** to organize resource unit procedures, operations, equipment, and materials for use in a plant, based on specific batch sizes.
- **Review, edit, or replace an ERM recipe.**
- **Print or submit an ERM recipe to a workflow.**

Product Manufacturing Information (PMI)

Enhancements to **Product manufacturing information (PMI)** include the following.

Note

PMI requires a license and is not supported in any version of the Teamcenter 14.2 release.

- You no longer need to update assigned PMI and product views when there is no direct change to PMI objects. Assigned PMI is now automatically updated for:
 - General configuration and revision changes to the parent assembly.
 - *Defined in or parent context* changes (changes to EBOM assembly nodes to which assembly PMI is connected).

	PMI Description	Nominal Va...	Upp...	Lo...	Defined In
⊗	Linear Dimension (17)	0.0593589	0.01	-0.01	Ka3EC672651-C01_A/A;1-EC
⊗	Linear Dimension (21)	3.52547000000...	0.02	-0.02	Ka3EC672651-C01_A/A;1-EC
⊗	Linear Dimension (23)	1.78656000000...	0.02	-0.02	Ka3EC672651-C01_A/A;1-EC

- You can now use consumption and impact state comparison to **compare and update impacted PMI indications** such as assigned and changed PMI values, and to update impacted PMI and related product views.
- PMI now offers better support for **occurrence effectivities**.

Line balancing

You can now do the following on the **Line Balancing** page:

- **Create a cobot** as a process resource type.
- **Monitor key performance indicators** in the line balancing dashboard.

Note

We have updated the **Cycle Time** icon in Easy Plan 2412. If the line takt time is not available (NA), the **Cycle Time** icon is now orange.



In previous releases when the line takt time was NA, this icon was gray.

- **Resolve cycle checks in the Line Balancing page.**
- **Change the Process Planning page from a process resource view to a station view.**
- **On the Balancing panel, you can click the Station or Resources tab to display the working and waiting tabs for the selected station or resources.**

Integrated MBOMs and plant BOMs

You can now create location-specific plant bills of material (BOMs) for use with integrated MBOMs (formerly called *global MBOMs*). You can now:

- **Author a location-specific plant BOM** from an engineering BOM.
- **Restructure an integrated MBOM or plant BOM** by adding, creating, and moving structures from an engineering assembly to a manufacturing assembly.

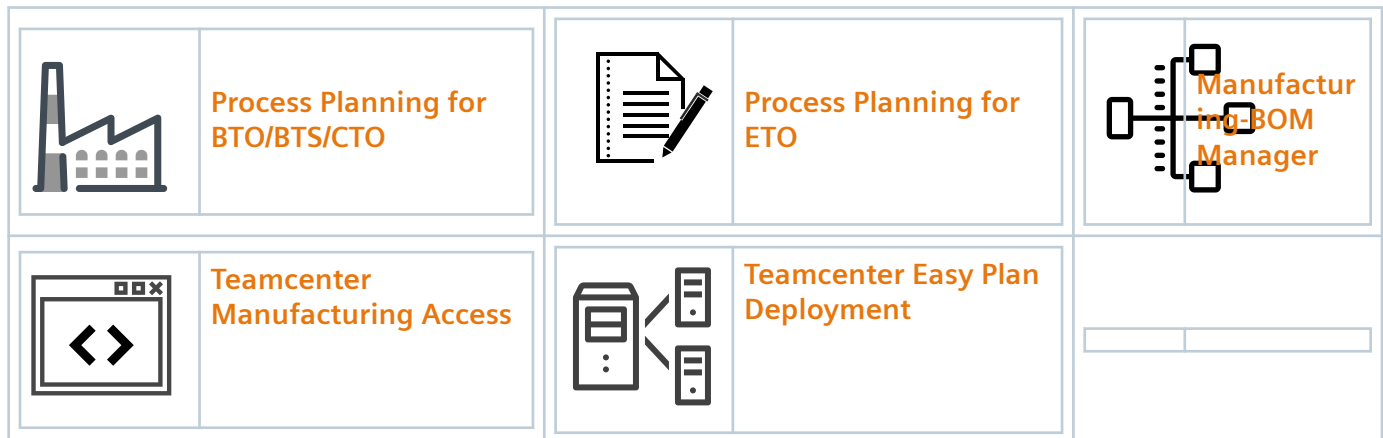
2. Easy Plan overview

Overview of Teamcenter Easy Plan

Teamcenter Easy Plan solutions help you manage and optimize your manufacturing data with task oriented and easy to use manufacturing web solutions, all while staying connected with engineering and execution. Since Teamcenter Easy Plan works in the Active Workspace client for Teamcenter, Teamcenter Easy Plan solutions help you leverage existing product and process information as well as share cross-departmental workflows. This allows you to plan and optimize your manufacturing BOM and process plan, capture shop floor feedback, and manage changes effectively. Teamcenter Easy Plan solutions work in the Active Workspace client for Teamcenter.

Benefits

- Enable intuitive user experience and ease of use for process planning.
- Standardize and reuse best practices.
- Develop process plans that reflect plant level production scenarios.
- Strong configuration and change management for manufacturing data.
- Provide clear and up-to-date operator instructions.
- Optimize cycle time and production rates.



What is Process Planning for BTO/BTS/CTO?

Manufacturing engineers use Process Planning for BTO/BTS/CTO to perform assembly planning tasks, from high level to detailed planning. It is designed for build-to-order (BTO), build-to-stock (BTS), and configure-to-order (CTO) domains, such as automotive and white goods (large home appliances) industries, as well as other industries.

Electronics engineers use Process Planning for BTO/BTS/CTO for the systems integration of the electronics process planning tasks of Teamcenter Easy Plan and those of Valor Process Preparation Software. The systems integration is available as a dedicated, optional feature of Process Planning for BTO/BTS/CTO.

Use Process Planning for BTO/BTS/CTO to:

- Author the bill of equipment (BOE).
- Create the process plan based on the plant structure, and define the material flow.
- Author operations and assign parts and tools to the operations.
- Author detailed time analysis.
- Perform line balancing in the plant BOP.
- Create alternative process plans.

Although not a mandatory part of the solution, there is an optional capability for central assembly planning based on the enterprise BOP, including the creation of product BOP, allocating operations to the plant BOP, and authoring additional plant-specific content.

What is Process Planning for ETO?

Process Planning for ETO is used to do process planning and create work instructions for the shop floor. It lets you author the plan and the documentation for the manufacturing bill of material (MBOM) assemblies. It also lets you write instructions and assign visual illustrations to those processes and operations. Process Planning for ETO is designed for engineer-to-order (ETO) domains, with a focus on the aerospace and defense industries.

Process Planning for ETO uses structures that are contained in an existing or just-created work package:

- *Product* structures that consist of parts that make up the physical elements needed to assemble the product.
- *Process* structures that contain processes and operations that define the assembly process.

Unlike the Process Planning for BTO/BTS/CTO solution, which is based on the plant structure, a process structure for Process Planning for ETO is based on the MBOM structure and used to document the instructions for each assembly.

Once the work package is defined, you can perform the following tasks:

- Author the work instructions for an MBOM assembly, including texts and visuals, which generates a process plan.
- Author and detail the generated process plan.

What is Manufacturing-BOM Manager?

Manufacturing-BOM Manager is a task-based solution for defining and managing the manufacturing bill of material (MBOM) and reconciling the engineering changes coming in the engineering bill of material (EBOM). Manufacturing-BOM Manager implements changes easily without delays, and performs validations to ensure accuracy.

Manufacturing-BOM Manager gives you:

- Easy accountability and reconciliation between EBOM and MBOM
- Guided change management
- Configuration using variants and effectivity
- 3D visualization of EBOM and MBOM

What is Teamcenter Manufacturing Access?

Teamcenter Manufacturing Access provides solutions for various manufacturing planning tasks and business processes. It is designed as a cross-industry tool; use it in any environment where Process Simulate is used. Teamcenter Manufacturing Access gives you the following:

- One unified environment for Process Simulate users, who are no longer required to use a Teamcenter rich client to access data.
- The ability to create studies in the Teamcenter rich client.
- The ability to search for and load studies in the Teamcenter rich client, Process Simulate, and NX Fixture Planner.
- The ability to search Teamcenter and insert classified and non-classified resources (items) into the current Process Simulate session.
- The ability to search Teamcenter and insert manufacturing features into the current Process Simulate session.

What is Teamcenter Easy Plan Deployment?

The installation and configuration information for all Teamcenter Easy Plan solution workspaces and components is contained in a single deployment deliverable.

- Common installation steps for all workspaces and components using Teamcenter Environment Manager (TEM).
- Workspace-specific and component-specific installation steps using TEM.
- Common installation steps for all workspaces and components using the Deployment Center.

- Workspace-specific and component-specific installation steps using the Deployment Center.
- Configuration information specific to each workspace and component.

3. Getting started with Easy Plan

Search using the Find In command

Search for many elements in panels related to bill of materials (BOM) structures, bill of process (BOP) structures, and bill of equipment (BOE) structures, using Easy Plan's standard **Find In** command.

The **Find In** command is available in BOM, BOP, and BOE panels on many task-based pages, including the **Process Planning**, **High Level Planning**, **Work Instructions Authoring**, and **Product BOP Authoring** pages. Your search helps you to locate common panel elements, such as parts, assemblies, and manufacturing representations in a manufacturing bill of materials (MBOM), or processes and operations in a BOP.

Procedure

1. Open the page containing the panel or panels to be searched.
2. In the panel that you want to search, select a single element that contains child elements, and click **Find** .

The **Find In** dialog box is displayed, with the panel title appended. For example, the dialog box title is **Find in Assembly** if you are searching in the **Assembly** panel.

Note

If the **Find In** dialog box is open, and you try to open **Find In** from another panel, the first panel closes. To open the **Find In** dialog box for another panel, you must click **Find**  again.

3. To search only within the single element that you selected, select the **Find within** ☐ check box.

Note

By default, the search is set to find a specific keyword or text string.

If you select the root node in the panel structure, the **Find within** ☐ check box is not available.

4. For more options, click **Advanced Search**, and select a different search option.
 - **Item ID** (default) searches for a full or partial name or item ID.
 - **Item Revision** searches for a full or partial item revision name using several options, including **Name**, **Item ID**, **Revision**, and **Alias ID**.
 - **Quick** searches by **Name** and **Item ID**.

Note

Advanced search options are defined in the Active Workspace preference **AWBSavedQueries**.

5. In the **Find in** dialog box, type the search term that you want to find, and click **Search**.

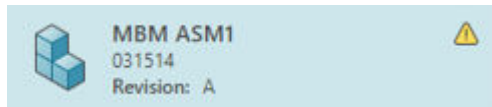
Tip

As in any standard search, you can use asterisks or wild cards to obtain multiple similar results. For example, type **bolt_*** to locate **bolt_1**, **bolt_2**, and so on.

6. In the **Results** list, select any preferred part or assembly.
Each selection highlights the selected object in the panel from which you conducted the search.

Tip

If any search results are outside the scope of the page content being viewed, a warning icon is displayed:



When you select the result, the selection does not synch with any object in the process tree. A best practice is to limit the search within the scope of your page content.

7. (Optional) To perform commands related to search objects:
 - a. Select objects in the search results.
 - b. Select commands in the panel from which you conducted the search, or in other panels.
8. Close the panel.

Process Planning for BTO/BTS/CTO data structure

If you are an administrator or have administrator rights, Process Planning for BTO/BTS/CTO can use process objects or specific object types to create the plant BOP process structure:

BOM Line	Item Type
000651/A;1-DEMO ASSY PLANT (View)	Plant BOP
000652/A;1-BIW (View)	Process Line
000656/A;1-SUB LINES (View)	Process Line
000661/A;1-PAINT (View)	Process Line
000662/A;1-PAINT SHOP (View)	Process Area
000663/A;1-TRIM1 (View)	Process Line
000665/A;1-TRIM2 (View)	Process Line
000667/A;1-CHASSIS (View)	Process Line
000668/A;1-FRONT SUSPENSION (View)	Process Area
000669/A;1-ST 10 (View)	Process Station
000670/A;1-ST 10 - LH (View)	Process Resource
000671/A;1-LOAD FRONT AXLE TO SUB CONVEY	MEOP
000672/A;1-INSTALL FRONT SUSPENSION LH BRACKET	MEOP
000673/A;1-INSTALL FRONT SUSPENSION LH BRACKET	MEOP
000674/A;1-ST 20 (View)	Process Station
000685/A;1-ST 30 (View)	Process Station

- **Product BOP**

The product bill of process (BOP) object contains all operations to build a product organized in functional groups

- **Functional Group**

A functional group can refer to a specific functional group object type or a process, such as an MEProcess object, that is used as a functional group. For example, you could create a functional group named **Car Interior**.

- **Plant BOP**

The plant BOP is an enterprise bill of process (BOP) object type that represents all processes or operations that are performed at a specific plant to build a product. This object is equivalent to the Plant type in Process Planning for BTO/BTS/CTO.

- **Process Line**

The Process Line enterprise BOP object type is a child of the plant BOP. This object is equivalent to the Line type in Process Planning for BTO/BTS/CTO.

- **Process Area**

The Process Area enterprise BOP object type is a child of the Process Line. This object is equivalent to the process area type in Process Planning for BTO/BTS/CTO.

- **Process Station**

The Process Station enterprise BOP object type is a child of the Process Area. This object is equivalent to the Station type in Process Planning for BTO/BTS/CTO.

- **(Optional) Process Resource**

The Process Resource enterprise BOP object type is child of the Process Station. It is used to group operations in a station that are assigned to a specific active resource such as a worker or robot. For example, **Station 10** could contain these two process resources: **Left side worker** and **Right side worker**. This object is equivalent to the Process Resource type in Process Planning for BTO/BTS/CTO.

- **MEOP (operation)**

Each process station contains MEOP (operation) objects that describe the high-level tasks to be performed and can be sequenced. For example, the **Station 10** process station could contain this operation: **Add Instrument Panel**. This object is equivalent to the operations type in Process Planning for BTO/BTS/CTO.

- **Ept0LibraryActivity (Activity)**

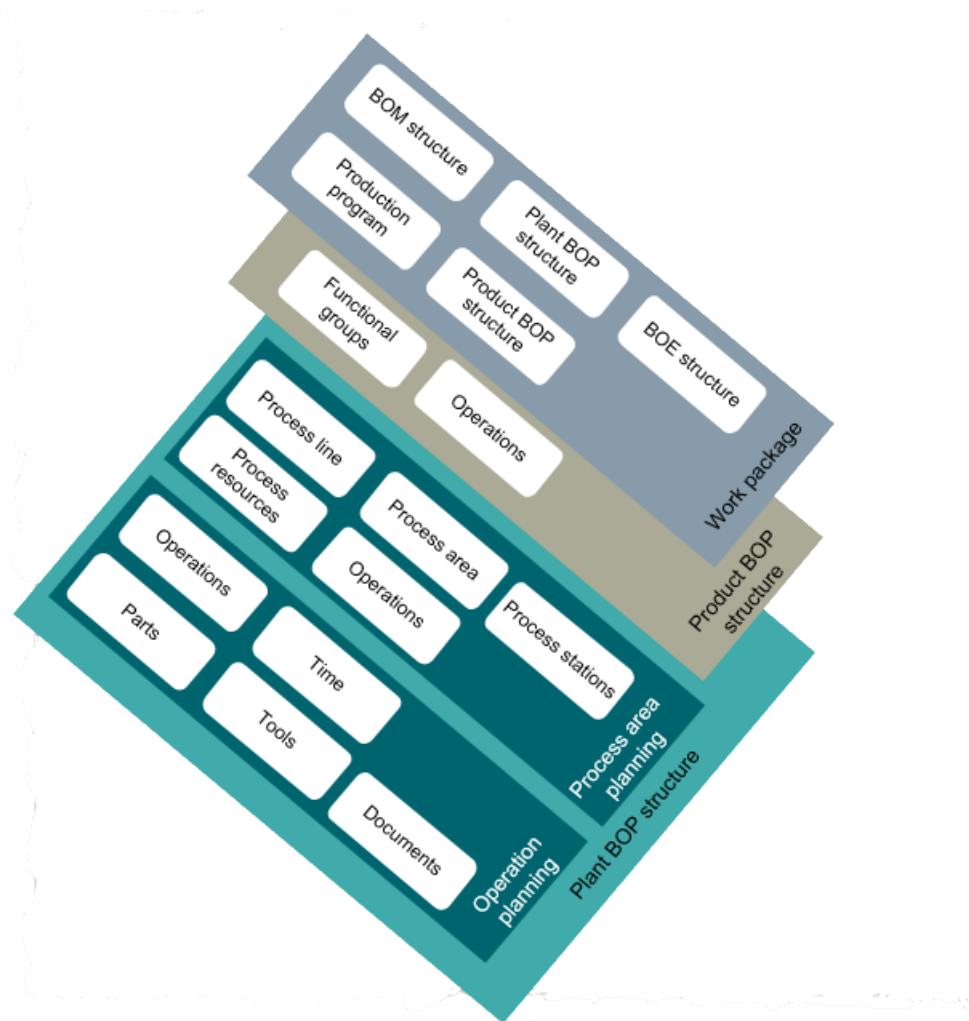
Each activity contains activity objects that describe the more detailed tasks to be performed in the station and can be sequenced. For example, you could create these activities to describe how to insert an instrument panel into a car: **Maneuver Lift Assist Holding Instrument Panel through Car Door**, **Secure Instrument Panel to Car**, and **Remove Empty Lift Assist from Car**. This object is equivalent to the Activity type in Process Planning for BTO/BTS/CTO.

- **Documents**

Reference documents can be added to operations and activities.

To create these object types, select the desired parent object in Manufacturing Process Planner, then follow a similar procedure as was defined for **creating the plant BOP object**.

Process Planning for BTO/BTS/CTO data is organized in four layers based on role and level of detail.



Work package	The product, product BOP, plant BOP, plant, and production program (variants) are gathered together into one work package (collaboration context).
Product BOP	At this level, functional groups are used to categorize operations according to the area of the product they assemble. A product BOP is optional; you do not have to include one in the work package.
Plant BOP process area planning	At this level, the plant is divided into work areas, such as lines, zones, and stations, that are used to build the product. Also, station operations are created and allocated to process stations and process resources.
Plant BOP operation planning	At the lowest level, operation content is planned. This includes the activities, parts, and tools that are needed to perform the operation.

Process Planning for BTO/BTS/CTO can use enterprise bill of process (BOP) object types:

- **Product BOP**

The product BOP object contains all operations to build a product, organized in functional groups. A product BOP is optional; you do not have to include one in the work package.

- **Functional Group**

A functional group can refer to a specific functional group object type or a process object that is used as a functional group. For example, you could create a functional group named **Car Interior**.

- **Plant BOP**

The plant BOP object contains all operations performed at a specific plant to build a product.

- **Process Area**

The plant BOP contains a hierarchy of process areas, such as process lines, process areas, or process station objects. The lowest level of this hierarchy is the process station where the work is performed.

- **(Optional) Process Resource**

A process resource object is used to group operations in a station that are assigned to a specific active resource such as a worker or robot. For example, **Station 10** could contain these two process resources: **Left side worker** and **Right side worker**.

- **Operation**

Each process station object contains operations that describe the high-level tasks to be performed. Operations can be sequenced. For example, the **Station 10** process station could contain the operation **Add Instrument Panel**.

- **Time object**

Each operation contains time objects that describe the more detailed tasks performed by the operation. Time objects in an operation can be sequenced. For example, you could create these activities to describe how to insert an instrument panel into a car: **Maneuver Lift Assist Holding Instrument Panel through Car Door**, **Secure Instrument Panel to Car**, and **Remove Empty Lift Assist from Car**.

Note

Each level in the structure is represented by objects that contain properties. Two typical properties are **What** (the name) and **Time**. However, each object type could contain different standard and custom attributes.

Plant BOP prerequisites and data requirements

Prerequisite

Process Planning for BTO/BTS/CTO runs on top of Active Workspace and must be connected to a Teamcenter database. See the *Active Workspace Deployment* documentation for details.

Data requirements

- Access to data is controlled by a user ID assigned to each user. The user ID grants access to portions of the database based on the user's assigned groups and roles. A Teamcenter administrator must set up the user ID prior to using Process Planning for BTO/BTS/CTO.
- You can author data in the Teamcenter rich client as well as Process Planning for BTO/BTS/CTO. Plant BOP data created in the Teamcenter rich client can be used seamlessly in Process Planning for BTO/BTS/CTO, as long as the required object hierarchy is followed. Based on your business processes, Process Planning for BTO/BTS/CTO data can include product, process, plant, and production program information, or you may begin with an empty database.
- To assign parts to operations in Process Planning for BTO/BTS/CTO, you must have one product structure in the work package.
- To assign tools to operations in Process Planning for BTO/BTS/CTO, you must have one plant structure in the work package. You must also use Manufacturing Process Planner to assign the station from the plant structure to the process station in the plant BOP before you assign tools to operations.

Managing data

Configure data display in columns on Easy Plan pages

You can add, remove, and rearrange data columns on Easy Plan task pages.

Prerequisites

Each table uses a preference to control the properties displayed in it. Each preference has the format: EP_<tab name><grid name>ColumnConfiguration. Each column is one property of the objects displayed in the table.

Set each preference you want to configure for data display per its values listed in this section. In addition, you must add each preference you want to configure to the **AWC_Startup_preference** in the Teamcenter rich client.

See the *Preferences* section in the *Active Workspace Administration* documentation for a description of preferences and how to set them.

The **EP_AssignedWorkareaTabColumnConfiguration** preference defines properties in Process Planning for BTO/BTS/CTO and Process Planning for ETO tables. This preference controls the **Workarea** table columns that display objects assigned to a selected operation. Values for **EP_AssignedWorkareaTabColumnConfiguration** include:

- **ImanItemBOPLine.object_string**
- **ImanItemBOPLine.bl_rev_object_name**
- **ImanItemBOPLine.bl_rev_object_desc**

Here is a list of preferences you can use to control properties related to parts and the bill of equipment displayed in Easy Plan tables:

- **EP_BoeTreeTableColumnConfiguration**—controls the bill of equipment (BOE) items that are displayed in table columns on the **Resources** tab.
- **EP_StationPagePlanningTabOperationsColumnConfiguration**—controls the operation table columns in the process station object **Planning** tab.
- **EP_ProcessAreaPageProcessAreaGridColumnConfiguration**—controls the columns of the **Area** table on the process area object page.
- **EP_ProcessPageTabProcessAssignedToolsAreaColumnConfiguration**—controls the columns of the **Assigned Resources** table on the process area object page. Values include **ImanItemBOPLine.bl_rev_fnd0lcsClassNames** and **ImanItemBOPLine.bl_occ_type**.
- **EP_PartAssignmentTabProductAreaColumnConfiguration**—controls the columns of the **Product** table on the **Part Assignment** subtab.
- **EP_ProductTabTreeGridColumnConfiguration**—controls the column configuration of the **Product** panel on the **Process Area** page.

Note

Set the **EP_ProductTabTreeGridColumnConfiguration** preference if you have any version earlier than Teamcenter 12.4.0.2 installed. The application will display the entire manufacturing bill of materials (MBOM) in the **Product** panel on the **Process Area** page.

- **EP_TargetAssembliesTabTableColumnConfiguration**—controls the column configuration in the Target Assembly tab on the Process Sequence panel. The Process Sequence panel is displayed when end users perform high-level scoping for an MBOM at a specific level in the plant BOP.

Note

This feature requires Teamcenter 12.4.0.2 or later. You can use the **EP_TargetAssembliesTabTableColumnConfiguration** preference to set properties in the **Target Assembly** tab.

If you are running an earlier version of Teamcenter, you can set the **EP_ProductTabTreeGridColumnConfiguration** preference.

You can use this list of preferences to control columns displayed in Easy Plan Process Planning for ETO tables:

- **EP_ProcessPageTabProcessDetailsAreaColumnConfiguration** controls the process and operations table columns.
- **EP_PartAssignmentTabProductAreaColumnConfiguration** controls the product table columns

Procedure

1. Navigate to any task page in Easy Plan.
2. Click **Settings**  → **Arrange**.
3. Select one or more items in the **Available Columns** list and then click **Add**.
4. (Optional) Select an item in the **Displayed Columns** list, then click **Move Up** or **Move Down** to rearrange that column's location on the page.

Perform this step until all columns are located where you want them.

5. Click **Arrange**.
Easy Plan adds the data columns to the page, in the order in which you selected them.

Check data in and out

The **Check In** and **Check Out** feature ensures that only one user can edit data at once within a multi-user environment. When you check out data at an assembly level, the checkout locks the data so other users cannot modify it.

Note

You must have write access to check out data and edit it.

Procedure

1. If you have not done so already, **search for and open** an existing work package and **navigate** to the **Process Planning** or **Work Instructions Authoring** page.
If you attempt to load data that is checked out, an indication displays at the top of the screen, and lists the user to whom the data is checked out. You can check out the data after the user checks it in.
2. Select the assembly or process that you want to check out.
3. Click **Check Out** .
A recursive check out is performed. All items within the assembly are checked out, and the data is locked so that other users cannot edit it.

Note

If any part of the data you want to work with is checked out, a message is displayed and the check out action is canceled.

4. Author work instructions or perform process planning tasks as needed.
5. Click **Check in** .

Results

All items within the assembly are checked in, and the data is unlocked so that other users can access it.

Edit properties for a selected process or operation

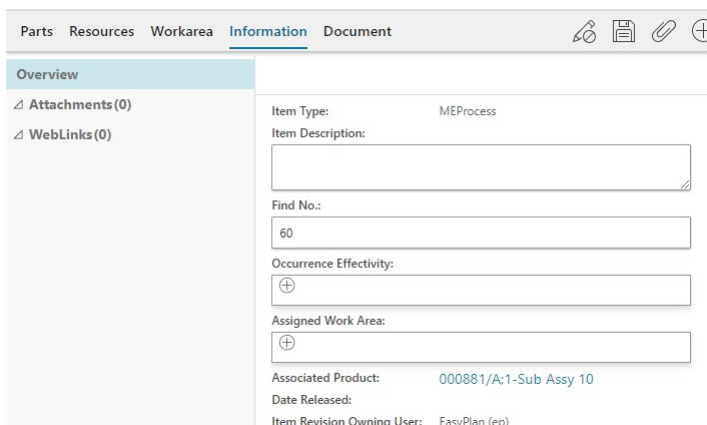
You can use the **Information** tab to edit properties for operations and processes.

Note

By default, the **Information** tab is read-only. Your Teamcenter administrator must enable this feature before you can use it.

Procedure

1. Open a work package that contains processes and operations.
2. On the **Work Instructions** tab, expand the structure and select the process or operation for which you want to edit properties.
3. Select the **Information** tab, and click **Start Edits** .



The screenshot shows the Teamcenter user interface with the **Information** tab selected. The left sidebar contains 'Overview', 'Attachments (0)', and 'WebLinks (0)'. The main area displays the following fields:

- Item Type:** MEProcess
- Item Description:** (Empty text box)
- Find No.:** 60
- Occurrence Effectivity:** (Dropdown menu with a plus icon)
- Assigned Work Area:** (Dropdown menu with a plus icon)
- Associated Product:** 000881/A:1-Sub Assy 10
- Date Released:** (Empty field)
- Item Revision Owning User:** EasyPlan (ep)

Process Planning for ETO highlights each field in which you can edit properties.

4. Edit property information for the object.

Note

Your Teamcenter administrator may enable different properties for editing than the ones shown in this example. Contact your Teamcenter administrator if you have any questions.

5. Click **Save**  or **Cancel Edits** .

If the object has a status of Released and you save it, Process Planning for ETO automatically prompts you to create a new item revision. Click **Revise** or **Cancel**.

Edit object properties in Microsoft Excel

You can export properties from a manufacturing bill of materials (MBOM) or process area as a Microsoft Excel (.xslm) spreadsheet file. You can then modify the properties in Excel and import the file back in to update the original structure.

Procedure

1. If you have not done so already, **search for and open** an existing work package that contains processes and parts and do one of the following:
 - Select the work package and in the **TASKS** list, click **EBOM-MBOM Alignment**  task.
 - **Navigate** to the **Process Planning** or **Work Instructions Authoring** page.
2. Do one of the following:
 - If you are working in the **EBOM-MBOM Alignment** page, in the **MBOM** panel, select the structure that contains the properties that you want to modify in Excel.
 - If you are working in the **Process Planning** or **Work Instructions Authoring** page, in the **Process** tab or panel, select the process that contains the properties that you want to modify in Excel.
3. Do one of the following:
 - If you are working in the **EBOM-MBOM Alignment** page, in the **MBOM** toolbar, select **Excel Round-trip**  → **Export to Excel** .
 - If you are working in the **Process Planning** or **Work Instructions Authoring** page, in the **Process** toolbar, select **Show Menu**  → **Excel Round-trip**  → **Export to Excel** .
4. In the **Export To Excel** dialog box, do the following.
 - a. In the **SETTINGS** group, select the **Allow Structure Changes in Excel** check box ☒ to make line properties editable in Excel.

Note

The **Include ID as Hyperlink** and **Include Outline Numbers** check boxes, if displayed, are not functional.

- b. In the **PROPERTIES** group, do one of the following.
- From the **Template** list, select an Excel template.
 - Select **Customize** and select a specific property that you want to review or modify from the list.

(Optional) Select a property and from the **SELECTED PROPERTIES** toolbar, do any of the following.

	Move Up	Move the selected row up in the list for quicker access in the future.
	Move Down	Move the selected row down in the list for quicker access in the future.
	Add Properties	Add additional properties to be edited in Excel by clearing any check boxes that you do not want to include from a list of all available properties and then clicking Add .

- c. Ignore the **Run in Background** ☒ check box, it is not functional.
- d. Click **Export**.
In your browser download location, an *.xism* file is generated.
5. Navigate to the file location and open the file in Excel.
6. Edit and modify properties as needed.

Warning

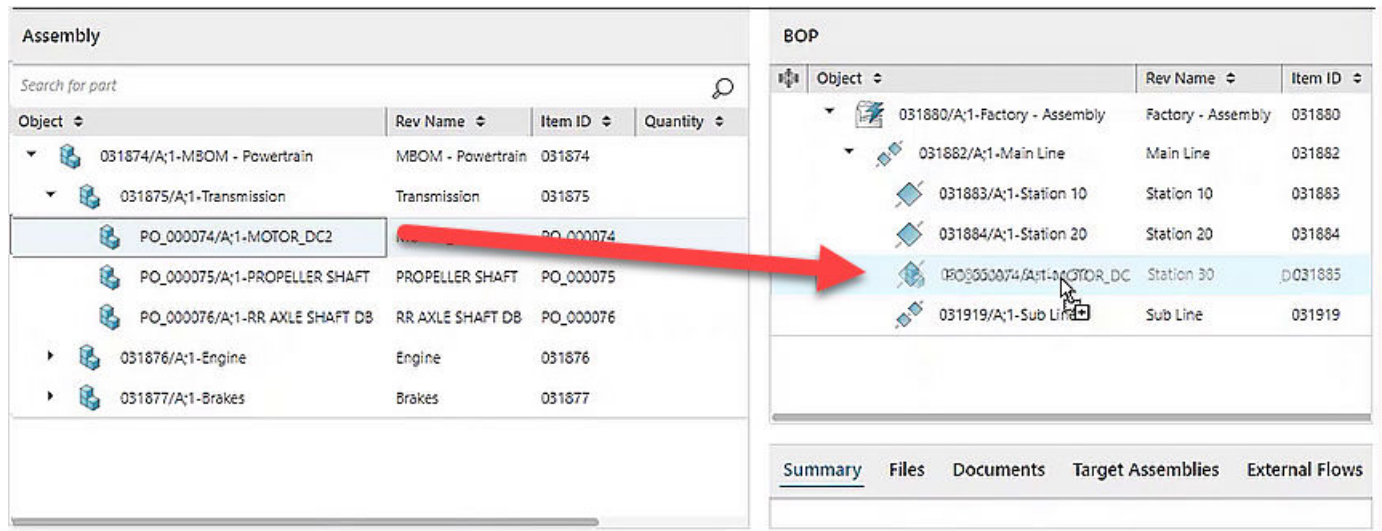
Although you can delete an object by deleting a row in Excel, restructure the order of objects by cutting and pasting lines in Excel, or add a new object by copying and pasting a line and defining a unique ID and name for the new line in the **Tc_ObjectID** and **Revision Name** columns, these actions may yield unexpected results and are not recommended.

7. Save and close the Excel file.
8. Do one of the following.
- From the **MBOM** toolbar, select **Excel Round-trip**  → **Import Changes** .
 - From the **Process** toolbar, select **Show Menu**  → **Excel Round-trip**  → **Import Changes** .
9. In the **Import Changes** dialog box, click **Choose File**, navigate to, select, and import the Excel file.
10. Select the **Overwrite Conflicts** ☒ check box and then click **Import**.
The process structure is updated with your modifications.
11. Close the **Import Changes** dialog box.

Drag or copy elements across task page panels and tabs

Using multiple task pages, you can drag or copy parts, resources, documents, and other files from a bill of materials (BOM) to a bill of process (BOP).

The **Copy**  and **Paste**  commands are available, respectively, from the BOM and BOP toolbars. In Easy Plan, the ability to drag files or objects to other objects works the same way as it does in other applications. For more details on dragging or copying elements, see [Rules for dragging elements from BOM to BOP](#) or [Rules for copying elements from BOM to BOP](#). For more details on resequencing and moving elements, see [Rules for cloning, moving, and resequencing objects in the BOM or the BOP](#).



Procedure

1. **Search for and open** a work package, and then **navigate** to the preferred task page (for example, **Process Planning**, **Work Instructions Authoring**, **High Level Planning**, or **Product BOP**).
2. Do any of the following to drag or copy elements across task page panels and tabs.

Tip

- BOMs and BOPs are named differently in different task pages, to reflect the specific task.
 - BOM items, usually parts and assemblies, are displayed in the upper-left **Target Assemblies** tab on the **Process Planning** page. However, they are contained in the **Assembly** panel on the **High Level Planning** page, or in the **Assembly** tab on the **Work Instructions Authoring** page.

In some cases, your organization may replace the **Target Assemblies** tab on the **Process Planning** page with a **Product BOP** tab.

- BOP items can include a standard BOP, consisting of processes and operations, or a plant BOP, with parts, processes, operations, resources, and other manufacturing-specific elements assigned to stations, lines, and resources. BOPs are displayed in the **Process** panel on the

Process Planning page or the **Work Instructions Authoring** page, but are shown in the **BOP** panel on the **High Level Planning** page.

- On the **Work Instructions Authoring** task page, to assign a file to multiple BOP items, drag or copy the file to appropriate items in the **Process** tab. To attach a file to a single BOP item, drag a single object onto the **Editor** panel.

a. If you are working on the **Process Planning**, **Work Instructions Authoring**, **High Level Planning**, or **Product BOP** task pages, you can:

- Drag one or more files from an external location, such as file explorer, to a BOP item, such as a process or operation.
- Copy one or more files from an external location, such as file explorer, to one or BOP items, such as processes or operations.
- Drag or copy parts (BOM items) from the appropriate BOM panel or tab on your task page to the appropriate items in the appropriate process panel or tab. For example, on the **High Level Planning** page, copy or drag parts from the **Assembly** panel to a station or line in the **BOP** panel.

Note

When you copy from BOM to BOP, the **Paste** command in the BOP does not include **Paste Before**, **Paste After**, or **Paste Into** options. These options are specific to other actions, such as operations to **clone**, **resequence** or **move objects**.

Also, for items copied from BOM to BOP, the option **Paste as Reference** pastes a copied part as a reference or occurrence of the original part, using the occurrence type `MEHandle` or a value mentioned in the preference `MERelationTypePartsHandled`.

b. If you are working on the **Process Planning** or **Work Instructions Authoring** page, you can copy **inspection definitions** from a bill of quality in Active Workspace, and then paste those inspection definitions to operations or execution steps in the **Process** panel or tab.

c. If you are working on the **Process Planning** page, you can also:

- Drag and copy work areas and resources from the **Resources** tab to one or more BOP items, such as operations, in the **Process** panel.

Note

In **Process Planning**, **Work Instructions Authoring**, or **Product BOP**, you can also copy classified resources from:

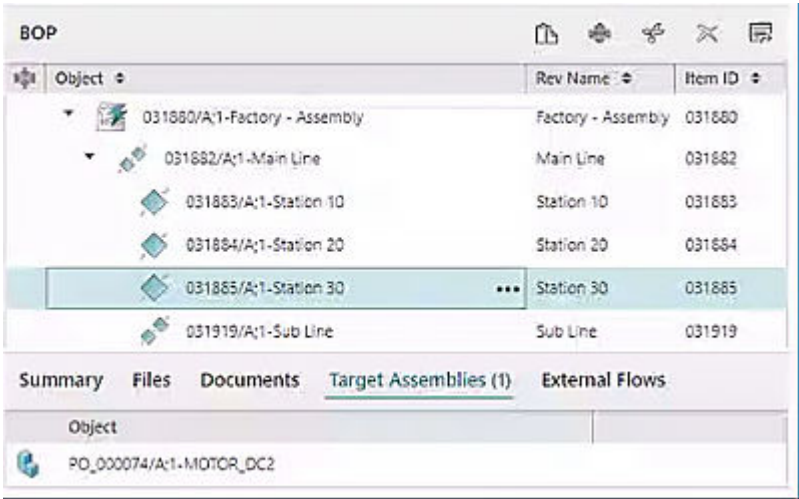
- Active Workspace to the **Resources** tab or panel.
- The **Classification** search to one or more BOP items in the **Resources** tab or panel.

- Drag or copy dynamic in-process assembly (DIPA) nodes and parts from the **Background Parts** tab to operations and resources in the **Process** panel of a plant BOP (not a classic BOP).

By default, pasted parts have the occurrence type `MEHandle`. Dragging or copying of DIPA nodes assigns those nodes to operations, but gives DIPA nodes the occurrence type

MEHandle and gives any parts under the DIPA the occurrence type MEConsumed so that parts beneath DIPA nodes are not associated.

Once the drag or copy action is completed, if items cannot be dropped or pasted to specific BOP objects, an error message is displayed. If the action is successful, items are quickly assigned to the BOP, and are then displayed in the appropriate information panel tab when you select the relevant item.



Note
By default, pasted parts have the occurrence type MEConsumed. If you enable **Show Allocation Indication**, you can review the allocation and consumption of items between BOM and BOP in the BOM panel.

Rules for dragging elements from BOM to BOP

General rules exist for dragging elements from BOM panels and tabs to BOP panels on task pages.

For more information on how to drag elements , see [Drag or copy elements across task page panels and tabs](#).

Rules for dragging to a plant BOP

Drag from:	On the High Level Planning page	On the Process Planning page	On the Work Instructions Authoring page (Process panel)	On the Work Instructions Authoring page (Editor panel)
BOM – MBOM, assembly, or target assembly	✓	✓	✗	✓
Resources – resources, equipment, tooling	NA	✓	NA	NA
Resources – work areas	NA	✓	NA	NA
Background parts (DIPA)	NA	✓	✗	✓
Documents	✗	✗	✗	✗
Files	✓	✓	✓	✓
Inspection definitions	✗	✗	✗	✗
Classified resources, from the Manufacturing Resource Library (MRL) window or Active Workspace folder	✗	✗	✗	✗

Rules for dragging to a classic BOP

Drag from:	On the High Level Planning page	On the Process Planning page	On the Work Instructions Authoring page (Process panel)	On the Work Instructions Authoring page (Editor panel)
BOM – MBOM, assembly, or target assembly	✗	✓	✗	✓
Resources – resources, equipment, tooling	NA	✓	NA	NA

Drag from:	On the High Level Planning page	On the Process Planning page	On the Work Instructions Authoring page (Process panel)	On the Work Instructions Authoring page (Editor panel)
Resources – work areas	NA	✓	NA	NA
Background parts (DIPA)	NA	NA	NA	NA
Documents	✗	✗	✗	✗
Files	✓	✓	✓	✓
Inspection definitions	✗	✗	✗	✗
Classified resources, from the Manufacturing Resource Library (MRL) window or Active Workspace folder	✗	✗	✗	✗

Rules for dragging to a product BOP

Drag from:	On the Product BOP page
BOM (MBOM)	✓
Resources – resources, equipment, tooling	NA
Resources – work areas	NA
Background parts (DIPA)	NA
Documents	✗
Files	✓
Inspection definitions	NA
Classified resources, from the Manufacturing Resource Library (MRL) window or Active Workspace folder	✗

Rules for copying elements from BOM to BOP

General rules exist for dragging elements from BOM panels and tabs to BOP panels on task pages.

For more information on how to copy elements , see [Drag or copy elements across task page panels and tabs](#).

Rules for copying to a plant BOP

Copy from:	On the High Level Planning page	On the Process Planning page	On the Work Instructions Authoring page (Process panel)	On the Work Instructions Authoring page (Editor panel)
BOM – MBOM, assembly, or target assembly	✓	✓	✓	✗
Resources – resources, equipment, tooling	NA	✓	NA	NA
Resources – work areas	NA	✓	NA	NA
Background parts (DIPA)	NA	✓	✓	✗
Documents	✓	✓	✓	✗
Files	✗	✗	✗	✗
Inspection definitions	✓	✓	✓	✗
Classified resources, from the Manufacturing Resource Library (MRL) window or Active Workspace folder	✓	✓	✓	✗

Rules for copying to a classic BOP

Copy from:	On the High Level Planning page	On the Process Planning page	On the Work Instructions Authoring page (Process panel)	On the Work Instructions Authoring page (Editor panel)
BOM – MBOM, assembly, or target assembly	✗	✓	✓	✗
Resources – resources, equipment, tooling	NA	✓	NA	NA

Copy from:	On the High Level Planning page	On the Process Planning page	On the Work Instructions Authoring page (Process panel)	On the Work Instructions Authoring page (Editor panel)
Resources – work areas	NA	✓	NA	NA
Background parts (DIPA)	NA	NA	NA	✗
Documents	✓	✓	✓	✗
Files	✗	✗	✗	✗
Inspection definitions	✓	✓	✓	✗
Classified resources, from the Manufacturing Resource Library (MRL) window or Active Workspace folder	✓	✓	✓	✗

Rules for copying to a product BOP

Copy from:	On the Product BOP page
BOM (MBOM)	✓
Resources – resources, equipment, tooling	NA
Resources – work areas	NA
Background parts (DIPA)	NA
Documents	✓
Files	✗
Inspection definitions	NA
Classified resources, from the Manufacturing Resource Library (MRL) window or Active Workspace folder	✓

Rules for cloning, moving, and resequencing objects in the BOM or the BOP

General rules exist for cloning, moving, and resequencing objects in the bill of materials (BOM) panels and tabs and in the bill of process (BOP) panels on task pages. The paste options available during cloning, moving, or resequencing differ depending on which object you clone, and the location into which you are cloning the object. The **Copy**  and **Paste**  commands are available, respectively, from the BOM and BOP toolbars. In Easy Plan, the ability to drag files or objects to other objects works the same way as it does in other applications. For more details on dragging or copying elements, see [Rules for dragging elements from BOM to BOP](#) or [Rules for copying elements from BOM to BOP](#).

Product BOP Authoring page—paste options

You can use these paste options when cloning objects on the **Product BOP Authoring** page.

Note

You can use the **Paste Into** option only when you select the top node of a structure.

Functional group

	Paste Into	Paste Before	Paste After
Product BOP root	✓	NA	NA
Functional group	✓	✓	✓
Process	NA	✓	✓

Plant BOP Authoring page—paste options

You can use these paste options when cloning objects on the **Plant BOP Authoring** page.

Note

You can use the **Paste Into** option only when you select the top node of a structure.

Process area, process line, or process station

	Paste Into	Paste Before	Paste After
Process area	✓	✓	✓
Process line	✓	✓	✓
Process station	NA	✓	✓

Copy and paste reference documents to an operation

Reference documents, such as internal work procedures, design drawings, or information for validation or resource guidance, can have a separate, external lifecycle than operations. You can copy and paste reference documents of different types from various locations to an operation. Since an operation can be reused in multiple assemblies, pasting reference documents is an efficient method of reusing them across work package assemblies and processes.

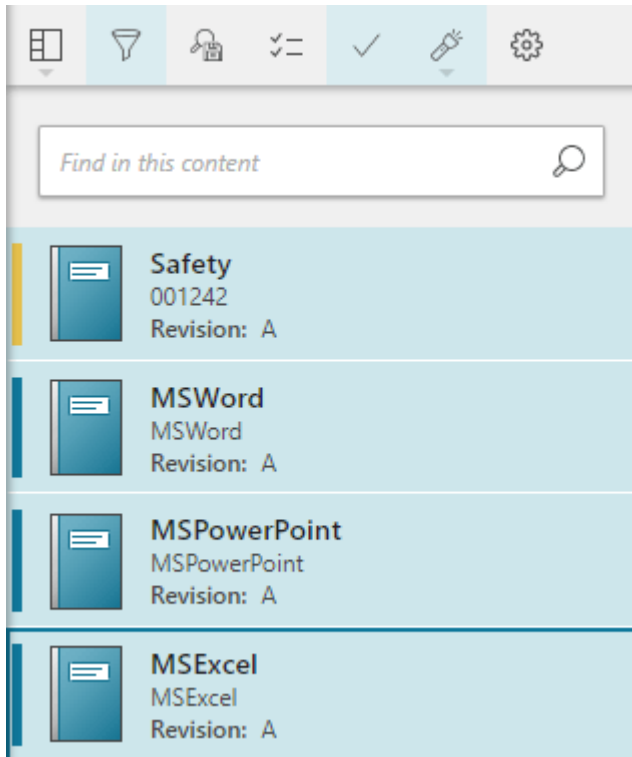
Note

If the operation or its parents are checked out by another user, the paste command is not available.

Procedure

1. If you have not done so already, **search for and open** an existing work package, or **create** a work package and then **navigate** to the **Process Planning** or **Work Instructions Authoring** page. By default, parts are displayed in the **Assembly** panel or tab but nothing is visible in the **Viewer** panel.
2. From your **Home**, **Favorites**, or **My Active Folders** page, search for documents by filtering your search to the **Documents** category.

For more information on using the **Search** box, see Active Workspace Fundamentals.
3. In the search results, do one of the following.
 - To select nonconsecutive documents in the list, press Ctrl and select each document that you want to copy to a specific operation.
 - To select consecutive documents in the list, press Shift and then select the first and last documents that you want to copy to a specific operation.

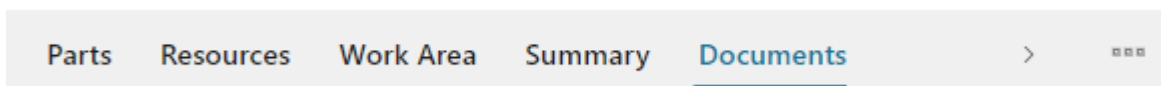


4. Right-click a selected document and choose **Copy**  to copy them all.
5. Navigate to the **Process Planning** or the **Work Instructions Authoring** page that contains the operation to which you want to add the documents, and in the **Editor** or **Process** panel, select the relevant operation.

Tip

You can open this page in another tab or window to make this process easier.

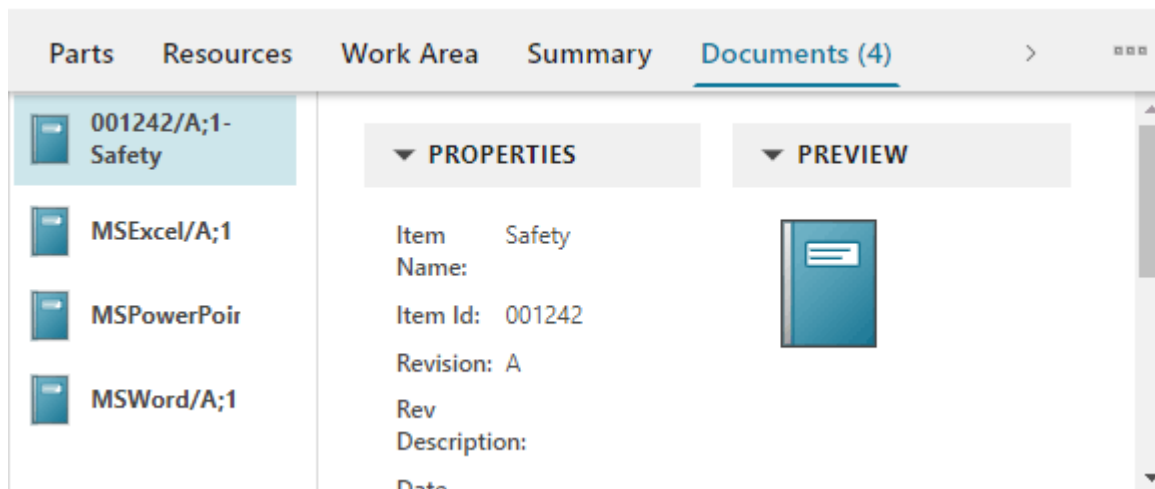
6. In the editor properties panel beneath the **Editor** panel, click the **Documents** tab.



7. Click **Show Menu**  → **Paste** .

Results

The documents are pasted to the operation and available for review in all processes that use that operation.



Add URL links to an operation

You can add a link to data outside of Process Planning. For example, you can link to a specification in another system.

Note

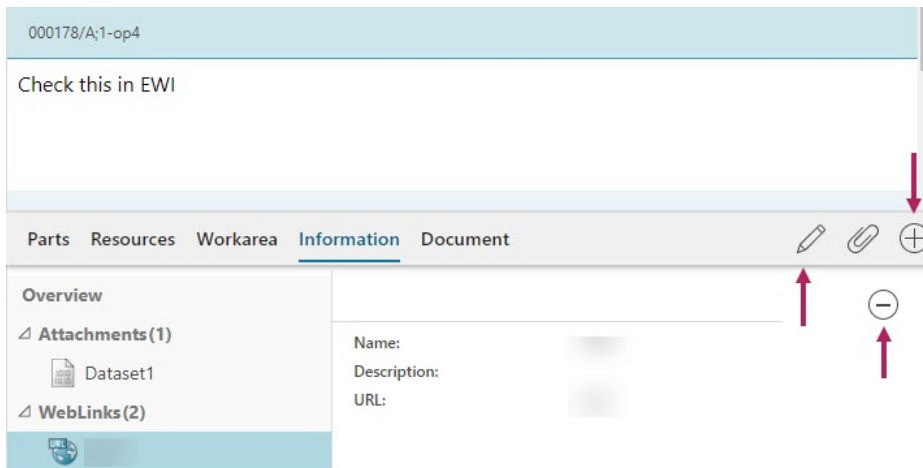
This procedure uses the **Work Instructions** tab for an example in the task, but you can use these same steps to add URL links to an operation in the **Process Planning** tab.

Procedure

1. Open a work package that contains processes and operations.
2. On the **Work Instructions** tab, expand the structure and select the operation to which you want to link data.
3. Click the **Information** subtab, select **WebLinks**, and click **Add**.

Note

If an operation has a status of Released and you add, edit, or delete URL a link, Process Planning prompts you to create an item revision for the operation. Click **Revise** or **Cancel**.



The **Create WebLink** dialog box is displayed.

4. Type in properties for the **Name**, **Description**, and **URL** fields, and click **Create**. Process Planning creates the URL link.

Note

To edit a URL link, in the **Information** tab under **WebLinks**, select a link and click **Start Edit**.
To delete a URL link, in the **Information** tab under **WebLinks**, select a link and click **Delete**.

View URL links in an operation

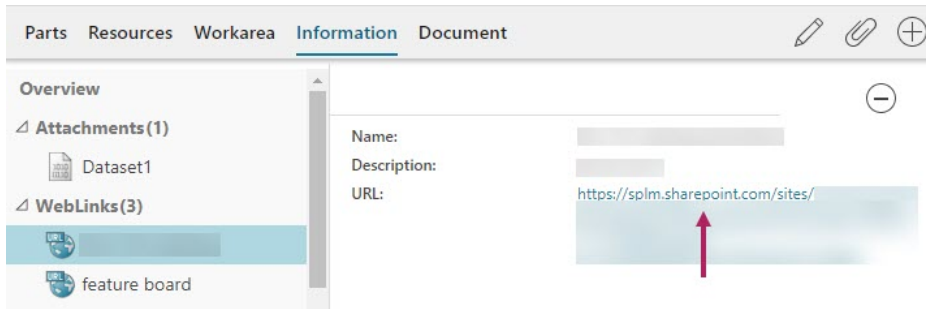
You can view links to data outside of Process Planning for ETO. The same links are also available from Electronic Work Instructions.

Note

Right-click the URL link, and open the link in a new tab or a separate window. If you click directly on the URL link, the link opens directly from the current page, and Process Planning for ETO leaves the page you are currently viewing.

Procedure

1. Open a work package that contains processes and operations.
2. On the **Work Instructions** tab, expand the structure and select the operation for which you want to view data.
3. Click the **Information** subtab and under **WebLinks**, locate the URL link that you want to view.



4. Right-click the URL and select an option:
 - **Open link in new tab**—launch a new browser tab to view the URL link.
 - **Open link in new window**—launch a separate browser window to view the URL link.

Managing attachments

Attachments

Attachment types

You work with two types of attachments in Process Planning for BTO/BTS/CTO:

- *Attachments* are non-managed documents, because they follow the life cycle of the object to which they are attached. You use the **Information** tab to add attachments.
- *Managed documents, or reference documents*, have their own life cycle. You use the **Documents** tab to add managed documents.

Manage attachments

You may want to add attachments to your process plan. For example, you may add images to show how an operation is performed, or documents that provide background information about the operation.

You can also delete, view, and download attachments.

Note

You can also add and remove file attachments in Teamcenter Manufacturing Process Planner. See the *Teamcenter Manufacturing Process Planner* documentation for more information.

Procedure

1. In Process Planning for BTO/BTS/CTO, navigate to the plant bill of process (BOP).
2. On the **Planning** tab, select a child object.
For example on the process station page, select an operation in the **Operations** section.
3. Select the **Information** subtab.
4. Click **Attach File** , and then click **Browse**.
5. In the dialog box, select the file and click **Open**.
6. (Optional) Type a name and a description.
If the file type is not automatically detected, from the **Type** list, select a supported type.
7. From the **Relation** list, select the document's relation to the object (for example, part or process element).

Attach File

Name:

Required

Description:

Type:

Relation:

8. Click **Done**.
The attachment loads and is selected on the **Information** tab.

Delete an attachment

Procedure

1. Select the attachment and click **Delete** .
2. At the prompt, click **Delete**.

View an attachment

If viewing is supported for the file type, do the following:

Procedure

1. Click **Large Preview** .
The attachment opens in a new page.
2. Review the attachment and when finished, in the upper-right corner, click .

Download an attachment

Procedure

1. Select the attachment and click **Download** .
2. At the prompt, click **Open** or **Save**.

View summary information about attachments

Procedure

1. Navigate to the plant bill of process (BOP).
2. On the **Planning** tab, select a child object.
For example on the process station page, select an operation in the **Operations** section.
3. Select the **Information** subtab.
4. In the pane to the left, select a file (dataset) from the list of **Attachments**.

Add reference documents to Process Planning for BTO/BTS/CTO

You add reference documents to an object so that they can be attached to operations. You use reference documents for any files that require a separate life cycle.

Note

From a Teamcenter perspective a reference document is an item type, not a dataset.

Documents may contain requirements, change notices, design information, descriptions, reports, procedures, or other content, depending on your industry and system configuration.

Procedure

1. Choose **Home**  from the global navigation bar.
2. Click the **Create Document**  tile.
3. In the **Add** panel, type a **Name**.
4. (Optional) Type meta data in the following fields:
 - Description
 - Document Title
 - Document Author
 - Document Subject
5. (Optional) In the **Workflow** field, click the drop-down arrow and select a template.
6. Under **File Attachments** drop a file.
 You can also click **Choose file** and navigate to the file you want to upload into Process Planning for BTO/BTS/CTO.
7. (Optional) Under **Projects**, click **Add Project**, then search for and select the owning project to assign to the document.
8. Click **Close**.

Assign reference documents

You can assign reference documents to operations.

Procedure

1. Search and open a document, or navigate to the **Home folder**.
2. In the **Home folder**, select one document, or use the Ctrl key to select multiple documents.

3. Click **Copy** .
 4. Search and open or navigate to a process station.
The process station page is displayed.
 5. Click the **Planning** tab.
 6. Select an operation.
 7. Click the **Documents** subtab.
 8. Click **Paste** .
- The document is assigned to the operation.

View reference documents

You can view the contents of reference documents in Process Planning for BTO/BTS/CTO.

Procedure

1. Search and open or navigate to a reference document on an operation.
The process station page is displayed.
2. For an operation, click the **Planning** tab and select an operation.
3. Click the **Documents** subtab on the right.
4. On the subtab, hover over the document and click **Open** .
5. Click the **Viewer** tab to view the file contents.

Plan processes by adding security markings

During process planning, you might work with sensitive data that should be handled with caution. For example, the data might contain proprietary or classified information. Teamcenter Easy Plan allows design engineers to add a security marking to sensitive data. The security marking acts as a prompt, reminding you to be cautious before you display the data. Security markings are displayed only once per session and work package, regardless of the Teamcenter Easy Plan product in which the part containing sensitive data is opened/

Note

- You must acknowledge the warning message before Teamcenter Easy Plan will display data with a security mark.
- If you open the part in a different work package or a different work session, you are still prompted to provide a security marking acknowledgment.

Procedure

1. **Search for and open** an existing work package that contains processes and operations, **navigate** to an appropriate planning task, and expand the process structure.
2. Select an operation within a process.
3. Select an object in the **Parts** tab below the process panel.
Teamcenter Easy Plan displays a dialog box that states the data you selected contains a security marking.
4. Click **I acknowledge the marking** to view the marked data.

Generate reports for Teamcenter objects

You can generate reports for the various Teamcenter objects (such as a process area, process station, or operation).

Reports are generated in Excel or PDF format. The Teamcenter administrator defines the report parameters and the output format for each report. Your Teamcenter administrator also creates any custom reports.

Note

If you filter the balancing view to display a specific product variant, the report shows data for that variant only.

Procedure

1. Navigate to the object on which you want to run a report.
2. Click **Reports** .
3. In the **Create Report** dialog box, choose a default or company-specific report and then click **Create**.

Note

The following default report types are provided. Report types listed in the dialog box vary, according to the object you used to run the report.

- **Operation** runs a report for an operation listing the activities and details about the operation (such as estimated time, picture, or name).
- **Material** runs a report for an operation listing the consumed parts and tools assigned to the operation.
- **Time Analysis** runs a report for an operation listing activities in the operation, and the assigned clock time, MTM data card, or TiCon time standard information.

Teamcenter Easy Plan generates report output to Microsoft Excel or PDF format.

4. Open or save the report.

4. Create and manage work packages

Create work package

Navigating planning tasks in work packages

Navigate to work package planning tasks

You can navigate to primary work package planning tasks from a work package page. Once you navigate to a planning task, you can navigate to other primary planning pages.

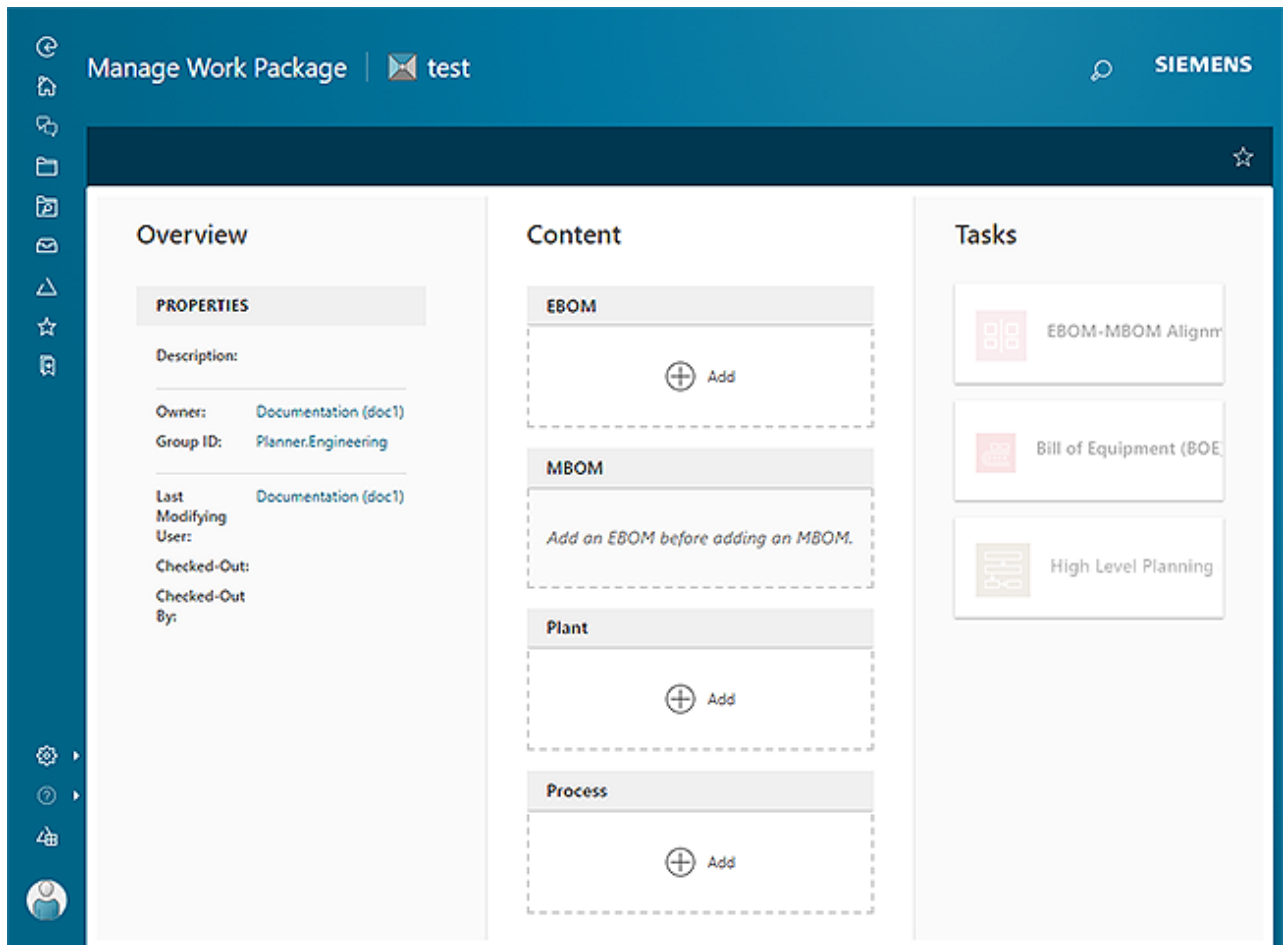
Procedure

1. Do one of the following.

- **Create** a work package.

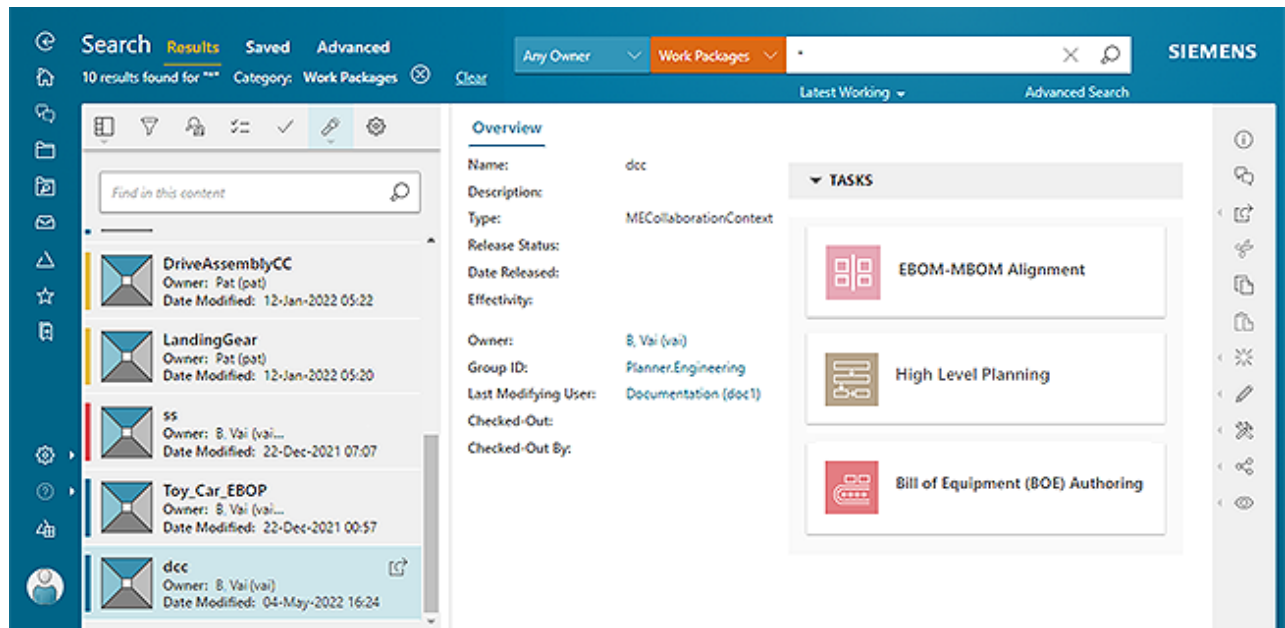
Before you can navigate to planning tasks, you must create or import structures in your work package. To access:

- The **EBOM-MBOM Alignment** task, you must add an engineering bill of materials (EBOM) and a manufacturing bill of materials (MBOM) structure.
- The **Manage Plant BOM View**, you must add a **author ain integrated MBOM** from a collaborative product engineering bill of materials (EBOM), known as a usage BOM.
- The **Bill of Equipment (BOE)** task, you must add a plant structure.
- The **High Level Planning** task, you must add a bill of process (BOP) structure.



- **Search for** but do not open an existing work package.

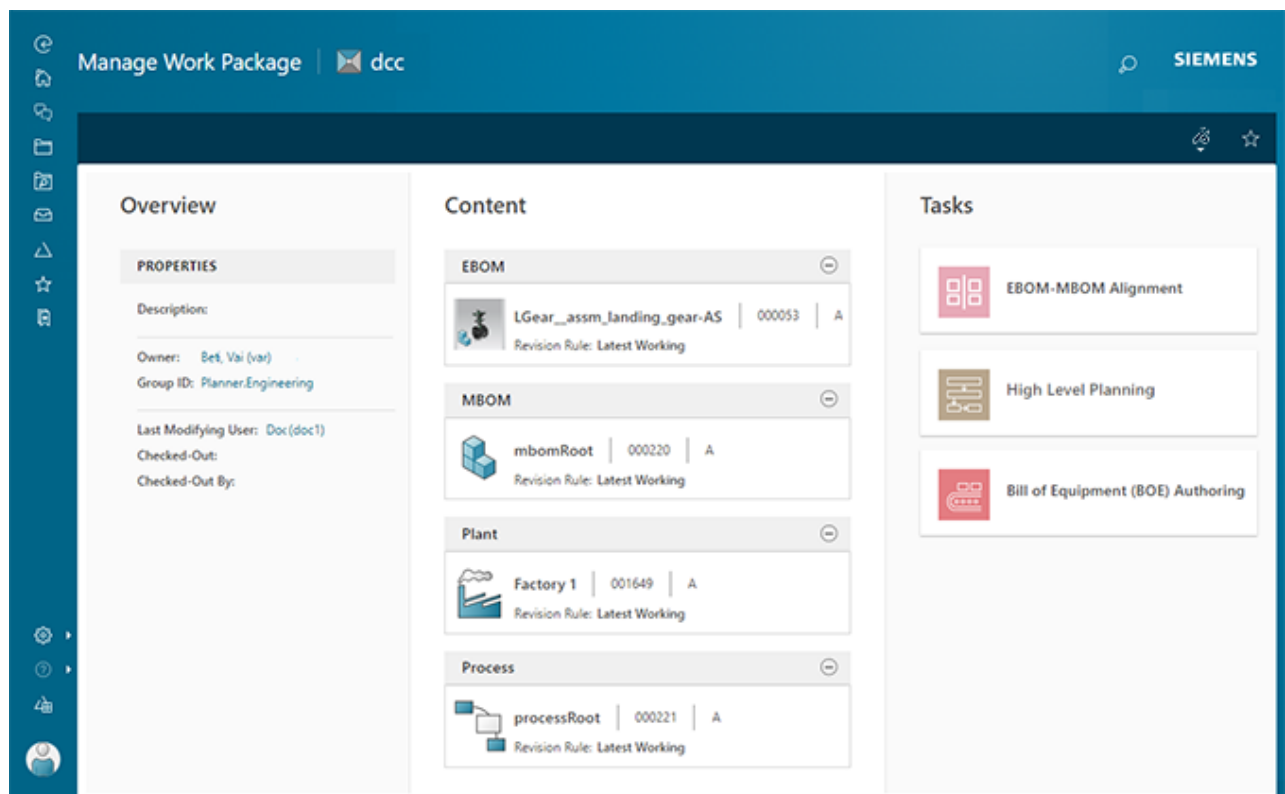
When you remain on the search results page and select a work package, but do not open the work package, a **TASKS** list is displayed as a series of tiles to the right of the search results.



- **Search for and open** an existing work package.

The current structure configuration is reflected in the **configuration header**.

If you open a work package by selecting it in the search results page and then click **Open** , the **Manage Work Package** page is displayed.



Note

- Planning tasks are specific to your logon and user role. The lists that you see will depend on which page you are currently viewing.
- The structures defined in your work package determine which planning tasks are available from that work package. The names associated with the task icons may differ from those shown here.

2. Click a task tile to navigate to a planning task.



The **EBOM-MBOM Alignment** tile takes you to the **EBOM-MBOM Alignment page**.



The **Manage Plant BOM View** tile lets you define and manage **integrated MBOMs**.



The **High Level Planning** tile lets you define a high-level BOP hierarchy for work packages with a specified MBOM and process.

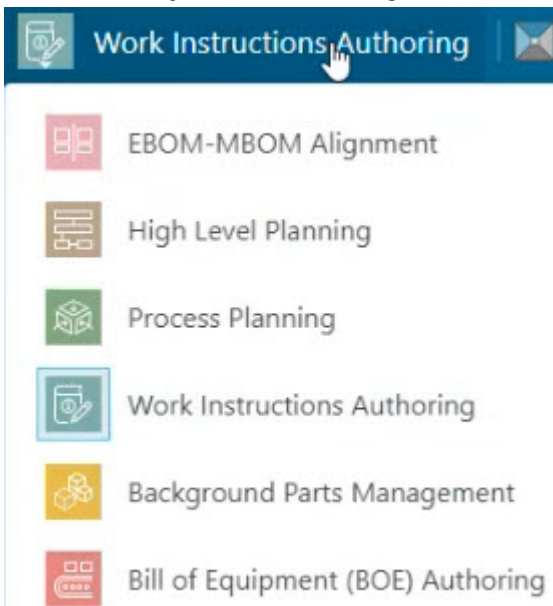


The **Product BOP Authoring** tile lets you define a product BOP hierarchy for work packages according to the area of the product they assemble. Product BOPs are optional; you do not have to include one in the work package.



The **Bill of Equipment (BOE) Authoring** tile takes you to a plant bill of process (BOP), where you can author a manufacturing plant hierarchy and its equipment.

3. Perform planning tasks on the page to which you jumped.
4. To jump to a different task in your work package, click the tile at the top of the page and click the task tile to which you want to navigate.



Note

The list of task pages changes depending on the structure of your work package. Your on-screen image may look different from the one in this topic.

From the **EBOM-MBOM Alignment** or **High Level Planning** pages, you can **navigate** to the **Background Parts Management**, **Process Planning**, and **Work Instructions Authoring** pages.

Navigate to Process Planning and Work Instructions Authoring

You can navigate to the **Process Planning** and **Work Instructions Authoring** pages from the **EBOM-MBOM Alignment** page and the **High Level Planning** page.

Procedure

1. **Navigate** from the work package planning tasks page to either of the following pages:

- **EBOM-MBOM Alignment** 

- **High Level Planning** 

2. If you are in the **EBOM-MBOM Alignment** page:

- a. In the **EBOM** or **MBOM** panel, select a part or assembly with one or more assigned processes, click **More *****, and then click:



Process Planning to go to the **Process Planning** page.



Work Instructions Authoring to go to the **Work Instructions Authoring** page.

- b. In the **Open in Process Planning** or **Open in Work Instructions Authoring** dialog box, select the process for which you want to perform process planning or work instructions, and click **Open**.

3. If you are in the **High Level Planning** page:

- a. In the **Assembly** or **Process** tab, select an object and click **Actions** .

- b. Click:



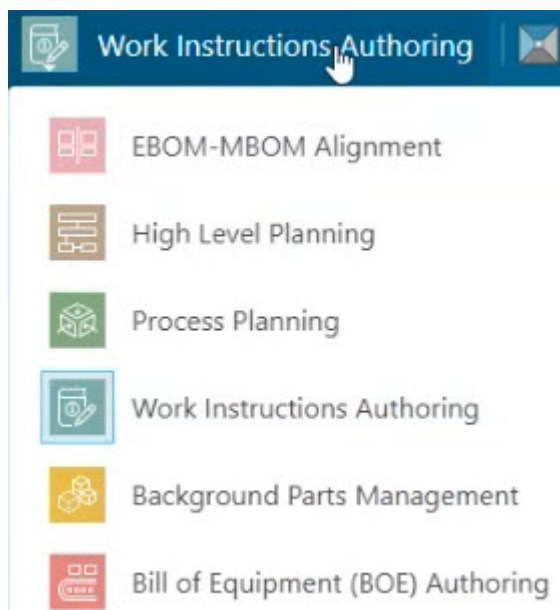
Process Planning to go to the **Process Planning** page.



Work Instructions Authoring to go to the **Work Instructions Authoring** page.

Operation Planning to go to the **Operation Planning** page.

4. Perform planning tasks on the page to which you jumped.
5. To jump to a different task based on your process or assembly selections, click the tile at the top of the page and click the task tile to which you want to navigate.



Navigate to Line Balancing

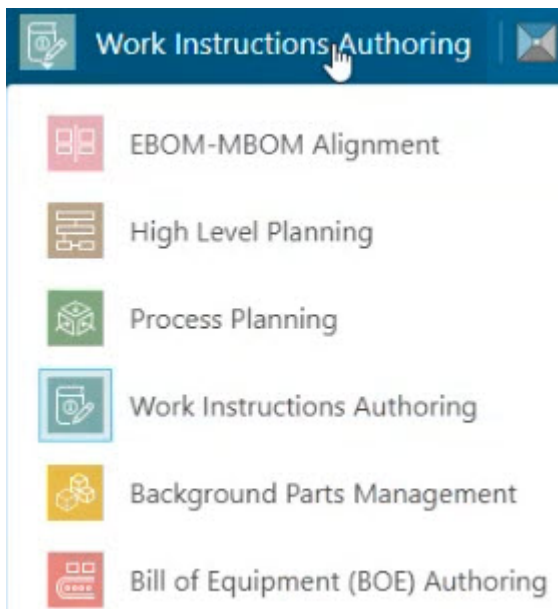
You can navigate to the **Line Balancing** page from the **High Level Planning** page or from the Easy Plan task list.

Procedure

1. **Navigate** from the work package planning tasks page to the **High Level Planning**  page.
2. In the **BOP** panel, expand the assembly, then select an object and click **More**  **Line Balancing** .

BOP		Submit to...	Regenerate Find...	Cut	Delete	Open Details	Manage Partial...
Object	Item ID						
000542/A;1-PLANT	000542						
000543/A;1-ENGINE	000543						
000544/A;1-ENGINE MACHINING	000544						
000569/A;1-CRANKSHAFT MACHINING	000569						
000574/A;1-ENGINE ASSEMBLY	000574						
000575/A;1-BASIC ENGINE							
001204/A;1-PUMP FILTER							
001207/A;1-READ 2L PUMA							

3. Use Easy Plan to balance the line.
4. (Optional) To jump to a different task based on your process or assembly selections, click the tile at the top of the page and click the task tile to which you want to navigate.



Navigate to Background Parts Management

Use the **Background Parts Management** page to perform several tasks, including managing background parts.

You can do the following:

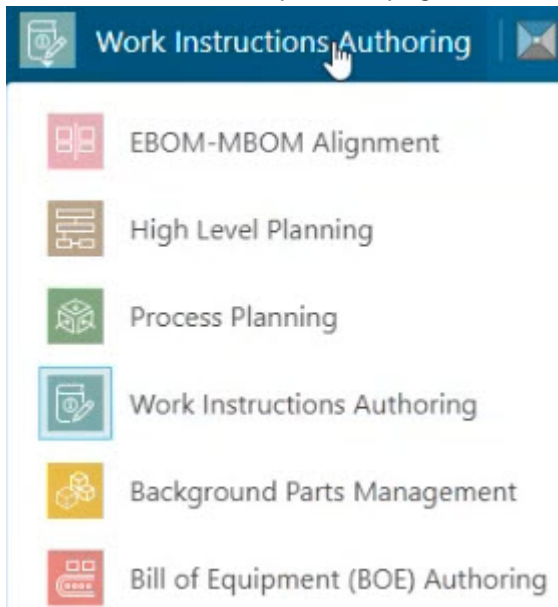
- Load and view the EBOM for a work package.
- Assign background parts in an assembly.
- Send parts to the **Viewer** panel for a 3D product view that includes background parts or the surrounding structure of your assembly.

Prerequisites

The work package you are using must contain an engineering bill of materials (EBOM) in the structure before you can work with background parts.

Procedure

1. **Navigate** from the work package planning tasks page to either of the following pages:
 - **Process Planning**
 - **Work Instructions Authoring**
2. (Optional) Perform planning tasks on the current page.
3. Click the tile at the top of the page and select **Background Parts Management**.



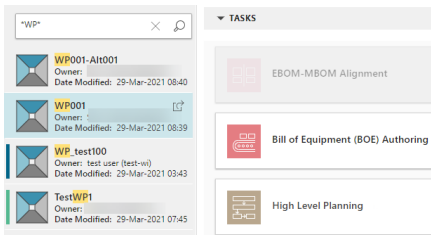
Navigate through planning tasks for a work package

You can use several methods to navigate planning tasks in Teamcenter Easy Plan.

Navigate from the work package page

You do not need to open the work package before you start navigating to planning tasks.

1. Search for a work package, and select it from the list.



2. Click a task tile to navigate to a planning task.

Note

The structures in your work package determine which planning tasks are available.

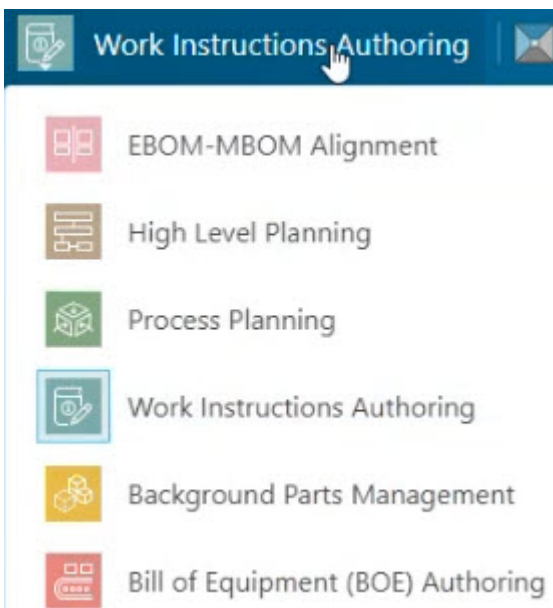
Navigate from the planning tasks list

When you perform planning tasks, you can easily navigate from one planning page to another.

Note

Teamcenter Easy Plan will display a planning tasks list that is specific to your login and user role. The list that you see will vary depending on which page you are currently viewing.

1. Navigate from the work package to any planning page.
2. Perform planning tasks on the current page until you complete your work.
3. Click the planning page name, and select a page from the planning task list.

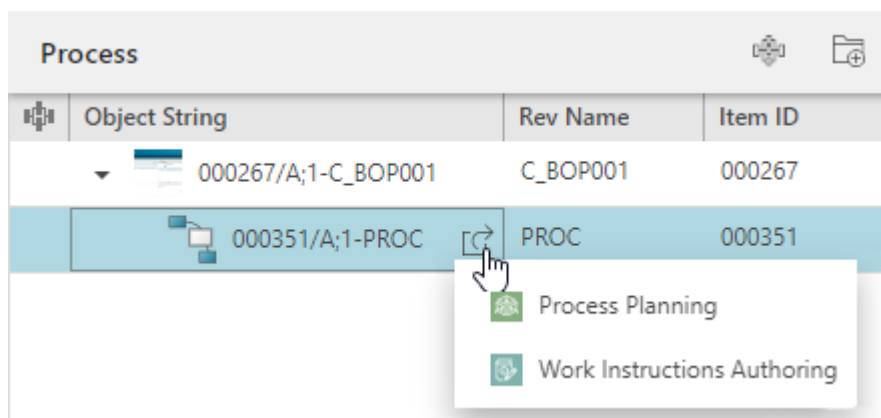


Teamcenter Easy Plan opens the planning page to the same scope level in which you are working. You do not need to drill down through the structure to locate the data you are working with.

Navigate from an object

When you navigate through a structure to perform planning tasks, you can stay at the same scope level but navigate to a different planning page.

1. Navigate from the work package to any planning page.
2. Navigate through the structure on the planning page until you complete your tasks.
3. Select an object, for example, an assembly or a process, and click **Open** .
4. Select a planning page from the list.

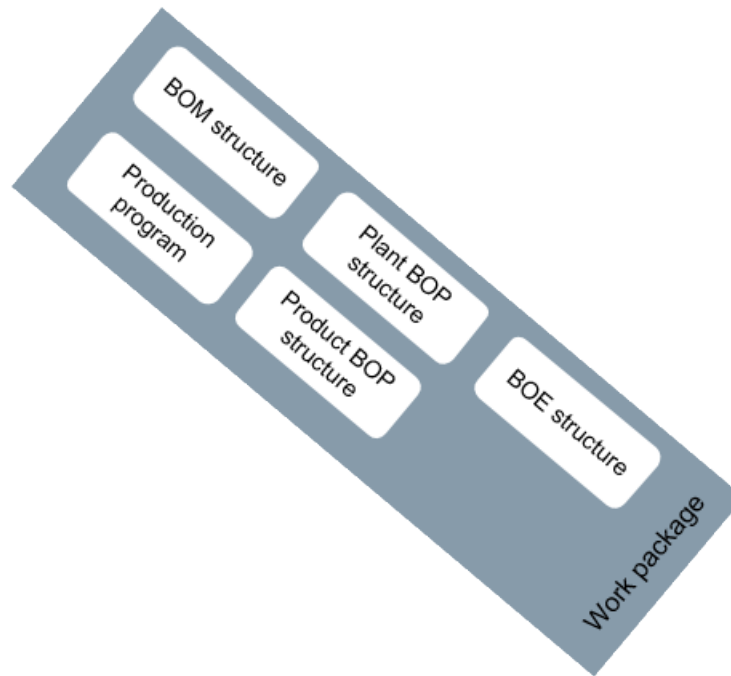


Note

Teamcenter Easy Plan opens the planning page to the same scope level in which you are working. You do not need to drill down through the structure to locate the data you are working with.

Work package structure

Before you can start planning, you must create a work package and place all the structures you need in it.



- **BOM**

The bill of materials is created by your product design group. It is the product structure associated to the work package. It is what you are planning to build.

- **Production program**

The production program contains the variants of the product structure that are applied to the operations in the plant BOP structure.

- **Product BOP**

The product bill of process contains all operations to build a product organized in functional groups.

- **Plant BOP**

The plant bill of process contains all operations performed at a specific plant to build a product.

- **BOE**

The bill of equipment is created by the layout group. It is the plant structure associated to the work package and it is where you are planning to build the product.

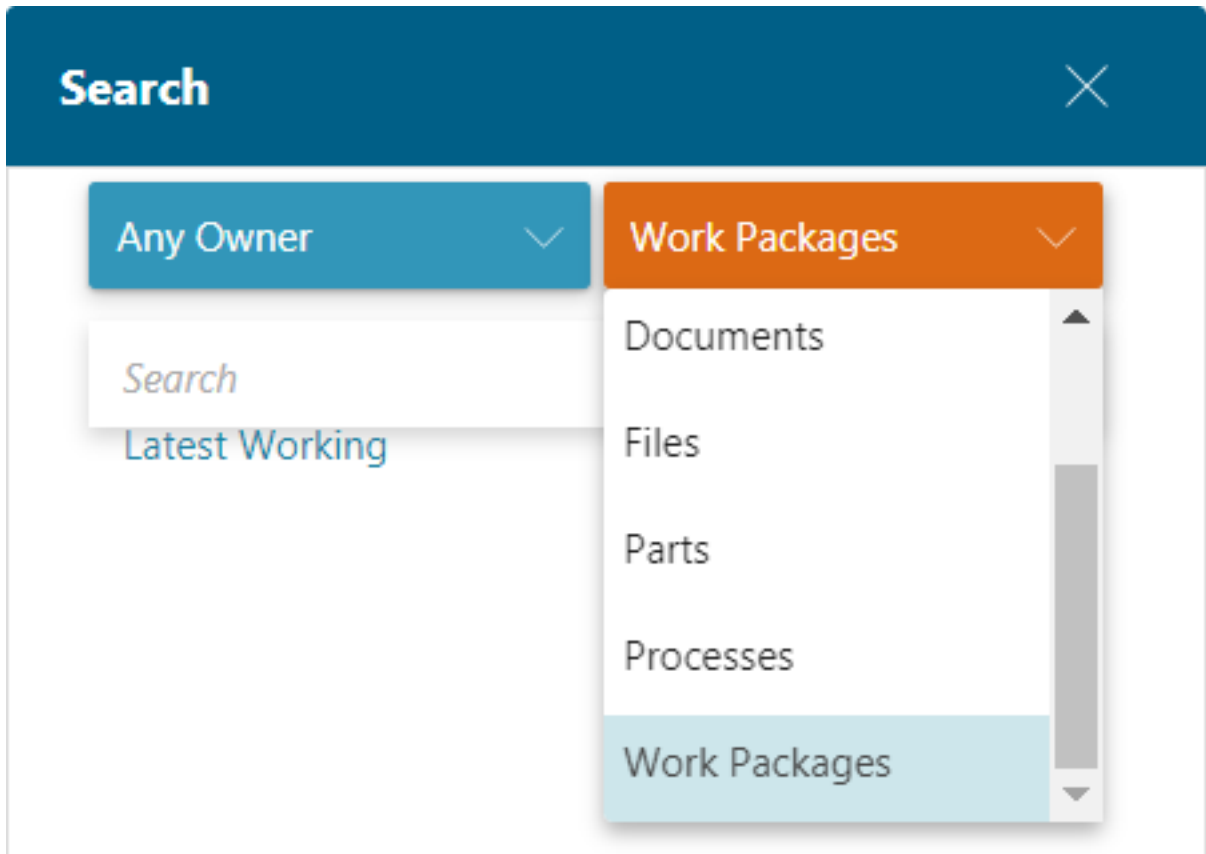
Search for and open a work package

A work package, called a collaboration context (CC) object in Teamcenter, is a container for product, plant, and process structures. A product structure in Teamcenter consists of an engineering bill of materials (EBOM) created by design engineers, and a manufacturing bill of materials (MBOM) intended for manufacturing personnel. An MBOM contains parts, manufacturing elements, and resources organized

in levels to reflect assembly structures and the assembly process. A plant structure is termed a classic bill of process (BOP) in Teamcenter. Once you open the work package, you can navigate to work planning tasks.

Procedure

1. Log on to Easy Plan.
2. Click .
3. From any view containing a search text box, click **Category** and select **Work Packages**.

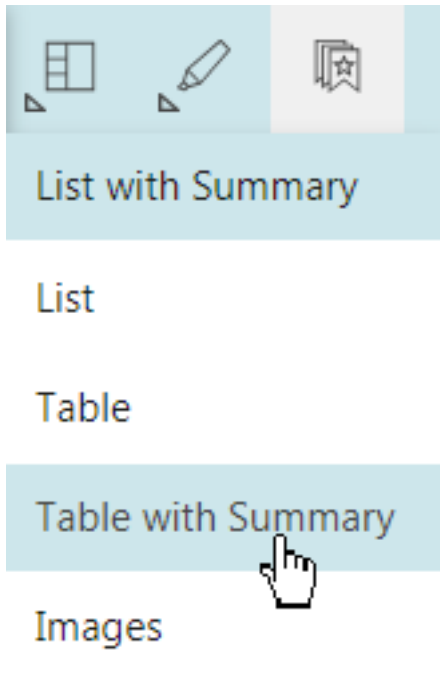


4. Type the name of your work package and press Enter.

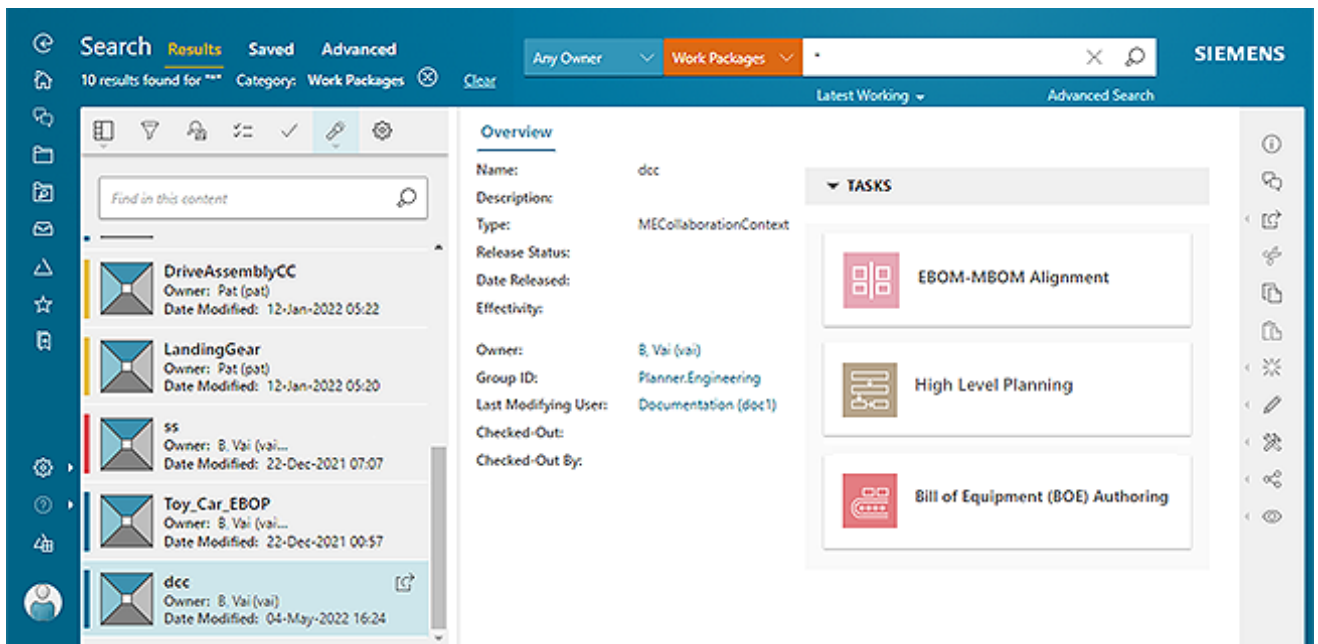
Tip

- Use asterisks * as wild cards (for example ***gear** to locate work packages named **homing gear, landing gear**). Use a single asterisk in the category **Work Packages** to locate all work packages in your database.
- Use an advanced search to locate objects by item ID, keyword, item name, or dataset name.

5. (Optional) In the **Filters** panel, type a **Property** or select an element to reduce your results.
6. (Optional) In the search results view, select a different view .



7. In the right panel, pause your mouse over the preferred work package and click . The work package opens in planning mode. On the search results page, the **Product** panel is displayed on the left. An **Overview** panel is displayed in the center, and a **TASKS** panel is displayed on the right.

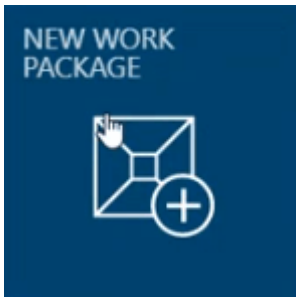


8. (Optional) **Navigate to work planning tasks** to manage data sources.

Create a work package

Procedure

1. You can create a work package (collaboration context) that contains an existing engineering bill of materials (EBOM) source structure, a new or existing target structure manufacturing bill of materials (MBOM), and plant, product, and other structures. You can also **search for and open** an existing work package.
2. On your **Home** page, click **New Work Package**.



Tip

If you have a blank **Home** page, using an administrator account, try the following command to retrieve the tiles.

```
aws2_install_tilecollections -u=Tc-admin-user -pf=${TC_USER_PASSWD_FILE} -g=dba -mode=add -file=${TC_INSTALL_DIR}/mbc0mfgbvrcore/data/Mbm0mbmGatewayTilesCots_Install.xml
```

3. In the **New Work Package** dialog box, from the **Type** list, select **MECollaborationContext** or an optional subtype.
4. In the **Properties** group, type a name and a project group if necessary, and then click **Create**. The **Manage Work Package** page is displayed.
5. To locate an existing EBOM, in the **EBOM Content** panel, click **Add** ⊕, and then do the following.
 - a. In the **Add Product** dialog box, type the text to search.
 - b. Select an appropriate EBOM to use as a template.

Note

To search for EBOMs with subtypes other than **Item**, your administrator must define those subtypes in Teamcenter Manufacturing Process Planner using the preference **EP_SearchSubtypesForEbom**.

- c. Select a **Revision Rule** to associate with the EBOM.
- d. Click **Add Product**.

6. In the **MBOM** group, click **Add** ⊕.

Note

Before you can add or modify an MBOM, you must first have an EBOM.

- To add a new MBOM, click **Create New MBOM**, and in the **Create Product** dialog box, type a name and optional description, and click **Create**.
- To use an existing MBOM, click **Use Existing MBOM**, then search for and select the preferred MBOM and add a revision rule.

Note

Available MBOM items and item subtypes are defined by your administrator in Teamcenter Manufacturing Process Planner using the preference **EP_CreateSubtypesForType_Item**. To search for MBOMs with other **Item** subtypes, your administrator must define those subtypes using the preference **EP_SearchSubtypesForMbom**.

- To create a new MBOM by mirroring an existing structure, click **Add MBOM using Mirror**.

In accordance with existing Teamcenter MBOM mirror preferences, the **Add MBOM using Mirror** command uses a specified EBOM structure to add a linked MBOM to your work package.

For more information on MBOM mirroring preferences in Easy Plan, see *Easy Plan Deployment*.

The MBOM is created and added to the work package, and a link between the EBOM and MBOM is created.

7. (Optional) Add a **product structure**. This step is only required to display product assemblies in the steps of a manufacturing process.
8. Add a **product bill of process (BOP)**.
9. **Create** or **add a plant BOP**.
10. (Optional) **Add a plant**.
11. Apply a **production program** (options or a variant definition).
12. Open the work package.
On the **Align** page, the structures are loaded.
13. (Optional) Choose one of the following options.
 - To create work instructions, **navigate to the Work Authoring Instructions page**.
 - To plan production processes, **navigate to the Process Planning page**.

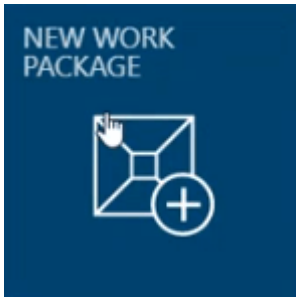
Create an ERM recipe work package

Create a general or master Enterprise Recipe Management (ERM) recipe work package to define general or master recipes.

An ERM recipe **work package** is much the same as any other work package. A *general recipe* is a general, plant-neutral recipe that can be applied to multiple manufacturing locations. A *master recipe* is equipment-specific and provides detailed, concrete manufacturing formulas for specific batch sizes at a specific plant location.

Procedure

1. On your **Home** page, click **New Work Package**.



Tip

If you have a blank **Home** page, and you are using an administrator account, use the following command to retrieve the tiles.

```
aws2_install_tilecollections -u=Tc-admin-user -pf=${TC_USER_PASSWD_FILE} -g=dba -mode=add -file=${TC_INSTALL_DIR}/mbm0mbmGatewayTilesCots_Install.xml
```

2. In the **New Work Package** dialog box, from the **Type** list, select:
 - **General Recipe Work Package** to create a generalized, plant-neutral work package. A general recipe is an abstract plan that establishes solutions and requirements for multiple manufacturing site locations. It is often based on a similar recipe.
 - **Master Recipe Work Package** to create a master recipe that uses variants to define a more concrete manufacturing formula intended for specific batch sizes, for a specific plant site. A master recipe gathers ingredients, processes, and parameters from a site recipe and manufacturing formula, including equipment and other manufacturing-specific tools such as fixtures and tools.
3. (Optional) To use a similar product to be used as a template, in the **Reference** panel, click **Add** ⊕, and then do the following.
 - a. In the **Search** text box, type the text to search and press Enter.
 - b. In the **Results** list, select the preferred reference and click **Add Reference**.
4. In the **Formula** panel, click **Add** ⊕, and then do the following.
 - a. In the **Add Formula to Work Package** dialog box, from the **Type** list, accept the default formula or recipe process type, or select a different type.
 - b. In the **Search** text box, type the text to search and press Enter.

- c. In the **Results** list, select the preferred formula and click **Next**.
- d. Select a **Revision Rule** to associate with the formula and click **Add**.

The selected formula is displayed in the **Formula** panel.

5. In the **Recipe** panel, click **Add** , and then do the following.
 - a. In the **Add Recipe to Work Package** dialog box, from the **Type** list, accept the default recipe process type, or select a different type.
 - b. Type a **Name**, optionally type a **Description**, and accept or modify the **ID** or **Revision** values.
 - c. Click **Add**.

The selected recipe is displayed in the **Recipe** panel.

6. For master work packages only, in the **Plant** panel, click **Add** , and then do the following.
 - a. In the **Add Plant** dialog box, in the **Search** text box, type the text to search and press Enter.
 - b. In the results list, select the preferred plant, select an optional **Revision Rule** to associate with the plant, and click **Add Plant**.
 - c. Select a **Revision Rule** to associate with the formula and click **Add**.
 - d. Type a **Name**, optionally type a **Description**, and accept or modify the **ID** or **Revision** values.
 - e. Click **Add**.
The selected recipe is displayed in the task panel. If both the formula and recipe are defined, the **General Recipe Authoring** task tile is enabled. If the formula, recipe, and plant are defined, the **Master Recipe Authoring** task tile is enabled.

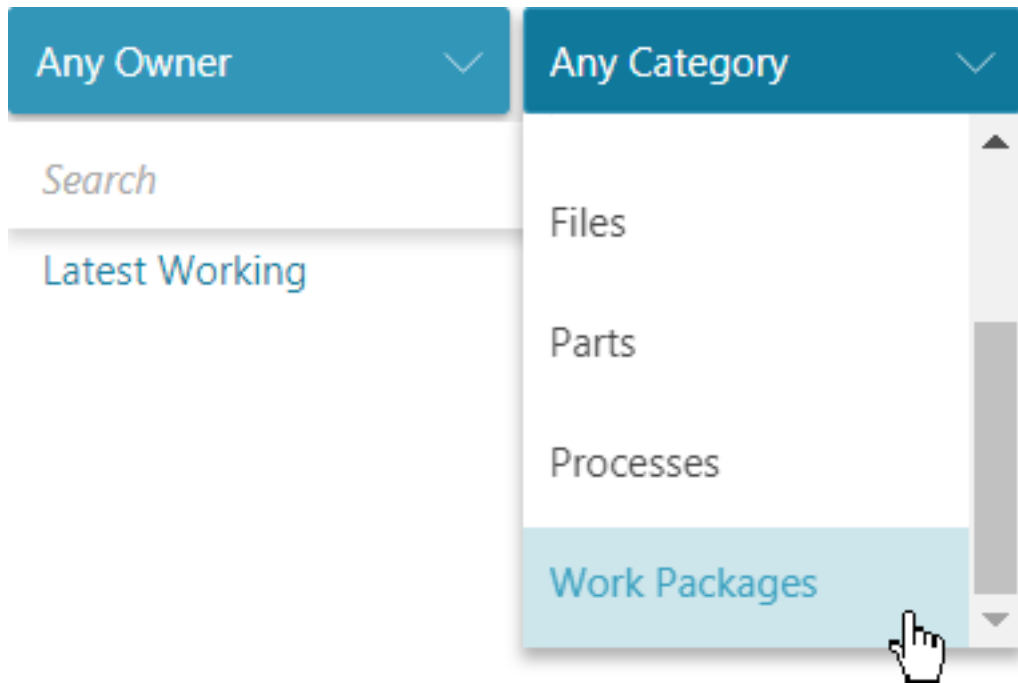
Results

- If you created a general recipe, the **General Recipe Authoring** task page is displayed and is ready to be **authored**.
- If you created a master recipe, the **Master Recipe Authoring** page is displayed and is ready to be **authored**.

Find a work package or process

Procedure

1. If the search options are not entirely visible, click .
2. (Optional) At the top right of the Electronic Work Instructions screen, click **Select: Owner** and choose a specific owner.
3. Click **Select: Category** and choose a category for the object you want to locate.



4. In the search box, type the object name.

- As you type your search text, the system suggests search terms that you may find helpful. The suggestion list is based on the most relevant matches. Click the suggestion to select the search term.

You can use:

- Operators in your search criteria.

For example, type **nut** to search for objects with the word **nut** in any of their indexed fields. Type **bolt AND nut** to search for objects with the words **bolt** and **nut** in any of their indexed fields. You can also type **"Part Revision" AND (Dan or Sally)** to search for part revision objects associated with users named Dan or Sally.

- Asterisks (*) with or without words to perform a wild card search.
- Quotation marks around a search string to search for an exact match.

Note

You can also perform a search by item ID, keyword, item name, or dataset name by clicking **Advanced Search** and selecting the preferred option.

5. (Optional) Select a revision rule.

Learn more about searching with revision rules in the *Active Workspace User Assistance* documentation.

You can only open configured structures in Electronic Work Instructions.

6. Click  or press Enter.
7. Select the correct object from the list and click  to open the object.

Results

If you open a work package, the header shows the properties of any process, product, or plant contained within the work package. If you open a process, the header displays related product and plant properties associated to the process with an **METarget** relationship. Your administrator can configure the relationship type.

Search for objects in the BOE tree

You can quickly search the bill of equipment (BOE) on the **Process Planning** or **Work Instructions Authoring** page before you assign a work area to the bill of process (BOP).

Prerequisites

You must set the following preferences to use this feature:

- **EP_SearchInBOEPropertyNames**—set the value to the **User Entry Name** of the property used in the query.
By default this value is set to **Item ID** and **Item Name**. However, you can also set this value to a custom property, such as **SAP work area name**.
- **EP_SearchInBOEByPropertyQueryName**—set the value to point to the property you query for this feature. For example, if you are querying by **Item Name** or **Item ID**, set this value to **Item_Name_or_ID**.

In addition, you must add the **EP_SearchInBOEPropertyNames** preference and the **EP_SearchInBOEByPropertyQueryName** preference to the **AWC_Startup_preference** in the Teamcenter rich client.

See the *Preferences* section in the *Active Workspace Administration* documentation for a description of preferences and how to set them.

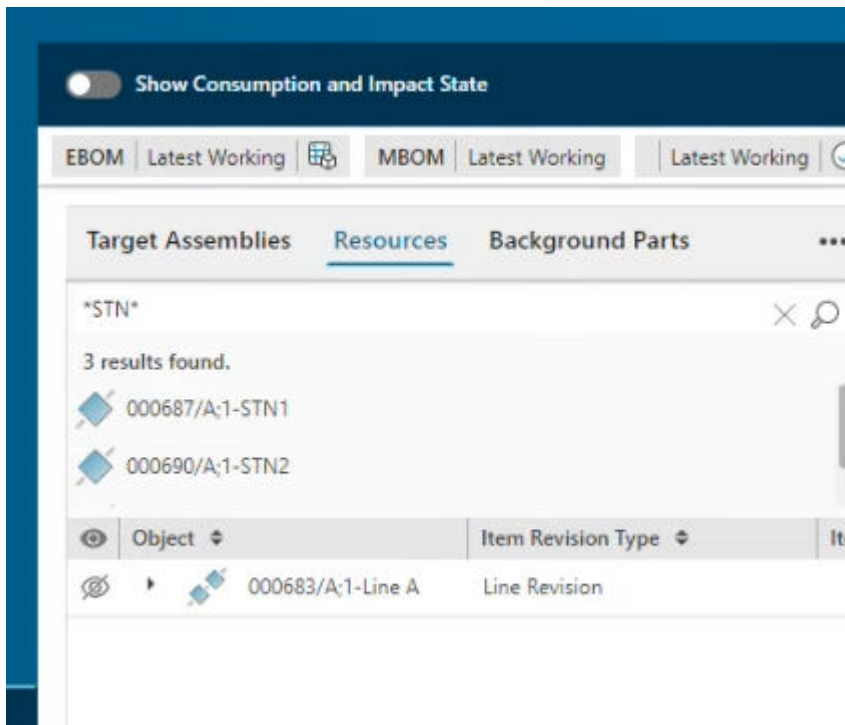
Procedure

1. If you have not done so already, **search for and open** an existing work package that contains processes and operations, and **navigate** to the **Work Instructions Authoring** or **Process Planning** page.
2. Click the **Resources** tab.
3. In the **Search for workarea** field, type your query and click **Search**.

Tip

You can use wildcard characters in your search. For example, type ***STN*** to search for a work area item name that begins with **STN**. To ensure the best search results, create a query with narrow parameters.

Teamcenter Easy Plan returns the results that match your query, returning up to 50 matching items.



4. Select the item that you want in the search results list.
Teamcenter Easy Plan expands the BOE and highlights the work area item you selected in the search results list.

Search for objects in the BOP tree

You can quickly search the bill of process (BOP) tree on the **Process Planning** or **Work Instructions Authoring** page to locate a process line, process station, process, or operation.

Procedure

1. If you have not done so already, **search for and open** an existing work package that contains processes and operations, and **navigate** to the **Work Instructions Authoring** or **Process Planning** page.
2. If you are working in the **Process Planning** page, in the **Process** panel, put your cursor in the **Search process or operation** field, type your query and click **Search**.

Tip

You can use wildcard characters in your search. For example, type ***scan*** to search for a work area item name that begins with **scan**. To ensure the best search results, create a query with narrow parameters.

Teamcenter Easy Plan returns the results that match your query, returning up to 50 matching items.

3. If you are working in the **Work Instructions Authoring** page, click the **Process** tab. In the **Search for workarea** field, type your query and click **Search**.

Tip

You can use wildcard characters in your search. For example, type ***scan*** to search for a work area item name that begins with **scan**. To ensure the best search results, create a query with narrow parameters.

Teamcenter Easy Plan returns the results that match your query, returning up to 50 matching items.

4. Select the item that you want in the search results list.
Teamcenter Easy Plan expands the BOP and highlights the work area item you selected in the search results list.

Work with saved searches

Search results appear in the home screen. You can manipulate your search results in the home screen as follows:

To	Do this
Save a search	1. Enter your search text in the search box and click Search  or press Enter on your keyboard. 2. Click Save Search . 3. Enter a name for your search and click Save.
Pin a search to your home page	1. Save a search as described above but select the Pin to Home check box before clicking Save.
Retrieve a search	1. Click the Search tile on the home screen. 2. If necessary, click the Saved tab. 3. Under My Saved or Recent, point your mouse over the search you want to retrieve and click . The search is rerun based on the saved search criteria.
Delete a search	1. Click the Search tile on the home screen. 2. If necessary, click the Saved tab. 3. Under My Saved or Recent, point your mouse over the search you want to delete and click . The search is removed from the list.

	4. At the prompt asking whether you want to delete the search, click OK .
Rename a search	1. Click the Search tile on the home screen. 2. Click the Saved tab. 3. Under My Saved or Recent , click the search you want to rename and click Save Search  4. Type the new name into the Name box and click Save .

Process Planning for electronics

Electronics process planning workflow

You can integrate electronics process planning tasks between Teamcenter Easy Plan and Valor Process Preparation software.

Note

Your Teamcenter administrator must enable electronics process planning functionality before you can use it.

Here is a basic workflow of the tasks you complete in Teamcenter Easy Plan for an electronics work package:

- 1. Create an electronics work package.**
- 2.** Conduct line balancing on the plant BOP.
- 3.** Perform **time analysis**.
- 4. Author work instructions.**
- 5. Send the structure to Valor Process Preparation.**

Create an electronics work package

Tip

Before you create a new electronics work package, **search** to see if one exists that contains the structures you need.

- 1.** On the **Home** page, click the **New Work Package**  tile.
- 2.** On the **New Work Package** page, select one of these types:

- **PCB Work Package**
- **Electronics Work Package**

3. In the **Name** box, type the name you want to use.
4. (Optional) Type additional information in the **Description** box.
5. Click **Create**.

The **Manage Work Package** page is shown. You can view package properties in the **Overview** section of the page. You can use other areas of the page to add or remove structures in the work package.

6. (Optional) Add a **product structure**.

Note

You must add a product structure:

- When you create a printed circuit board (PCB) work package.
- When you want to display product assemblies in the steps of a manufacturing process.

7. (Optional) **Attach an eCAD file to a PCB work package**.

Note

This step is required only when you create a PCB work package.

8. Add a **product bill of process (BOP)**.
9. **Create** or **add a plant BOP**.
10. (Optional) **Add a plant**.
11. Apply a **production program** (options or a variant definition).

Attach an eCAD file to a PCB work package

When you create a printed circuit board (PCB) electronic work package, you must attach an eCAD file before you **send the work package to Valor Process Preparation**.

1. **Search for a PCB structure** and hover on the work package in the results list.
2. Click **Manage Work Package** .
3. Hover on the **Product** tile and click **Attach eCAD file** .
4. Click **Choose File**, navigate to where the eCAD file is stored, and click **Open** to attach the file to the work package.

Send structure to Valor Process Preparation

Note

You send the structure to Valor Process Preparation only if you created a PCB work package.

In this procedure, you perform the task at the process area level. You can also perform this task at the process line level of the structure.

1. **Navigate to the plant BOP.**
2. Click **Launch Process Planning**  .
Teamcenter Easy Plan launches the integration that sends the structure to Valor Process Preparation.

Manage work package

Author the BOE

Author the BOE structure

To author the bill of equipment (BOE), complete these tasks.

1. **Create a work package.**
2. **Add a plant structure** or **create a twin station.**
3. (Optional) **Assign classified tools and resources to operations.**

Add a plant structure to the BOE

Procedure

1. **Create** or **search for and open** a work package.
2. In the **Plant** tile, click **Add** and select one of the following options:
 - **Create Plant**—allows you to create a plant structure.
 - **Add Existing Plant**—allows you to locate and add an existing plant structure.
 - **Generate Plant from Plant BOP**—allows you to automatically create a plant that is based on the plant BOP structure. See **Create a twin station for details about this process.**
3. In the **Name** box, type the name you want to use.

(Optional) Type additional information in the **Description** box.

4. Click **Create**.
The new plant is displayed in the **Plant** tile.
5. (Optional) In the **Plant** tile, click **Open**  to review or build the BOE.

Create a twin station

You can quickly create a plant bill of process (BOP) by basing it on the existing bill of equipment (BOE) within a work package. You can also create a BOE based on the existing plant BOP within a work package. This example uses an existing plant BOP to create a BOE.

When you create a twin station, Process Planning for BTO/BTS/CTO uses the source structure to create corresponding hierarchical levels in the target structure. In addition, plant BOP elements are mapped to plant BOE elements for you.

Note

You must have write permissions to create a plant BOP or BOE. Contact your Teamcenter administrator if you do not have the correct permissions to create a plant BOP or BOE.

You must be running Active Workspace version 5.0.1 or later and Teamcenter version 12.4.0.1 or later to use this feature.

1. **Create** or **open** a work package with a plant BOP.
2. In the **Plant** tile, click **Add** and select one of the following options:
 - **Generate from Plant BOP**—
Process Planning for BTO/BTS/CTO generates the BOE based on the plant BOP structure.
 - **Add Associated Plant BOE**—
Process Planning for BTO/BTS/CTO adds the plant BOE that is linked to the plant BOP structure.

Note

If the plant BOP is already linked to a plant BOE, you cannot generate a twin station. You can only add the existing linked plant BOE to the plant BOP in the work package. The plant BOP and BOE can only have a one-to-one link.

3. (Optional) In the **Plant** tile, click **Open**  to review or build the BOE.

Tree with Summary			Expand	Find	Selection Mode	Select All	Edit
Element Name	ID	Revision					
Station8	001153	A					
WORK LIGHT	001154	A					
MAA28675S ROBOTIC WELDGUN	001155	A					
ROBOTIC TIP DRESSER (VERT)	001156	A					
ROBOT BASEPLATE	001157	A					
OPERATOR GATE	001158	A					
ENCLOSURE 12X14X6	001159	A					
WELD CONTROLLER	001160	A					
TL09302010_FULL BODY PALLET	001161	A					
OPERATOR	001162	A					
WORK BENCH	001163	A					

Syncing to a twin station

During planning, you can update objects and attributes in one structure, and then sync the updates from the source to the target structure.

Process Planning for BTO/BTS/CTO performs the following tasks to synchronize between structures:

- Creates missing elements in the target structure.
- Copies attributes from the source line to the target line, including:
 - **Item**—Name, Description
 - **Item Revision**—Name, Description
 - **Occurrence**—Name, Alias, Variant Condition, Find No
- Deletes elements with no links in the target, if your environment is set to delete obsolete twins.

Note

Contact your Teamcenter administrator to find out if your environment is set to delete obsolete twins.

When objects exist in the source but not the target, Process Planning for BTO/BTS/CTO performs the following tasks to synchronize between structures:

- Creates new objects in the target structure.
- Links new objects in the target to the correct objects in the source.
- If objects in the hierarchy below a source synchronization object are not present in the target, the synchronization process also creates those levels in the target structure.

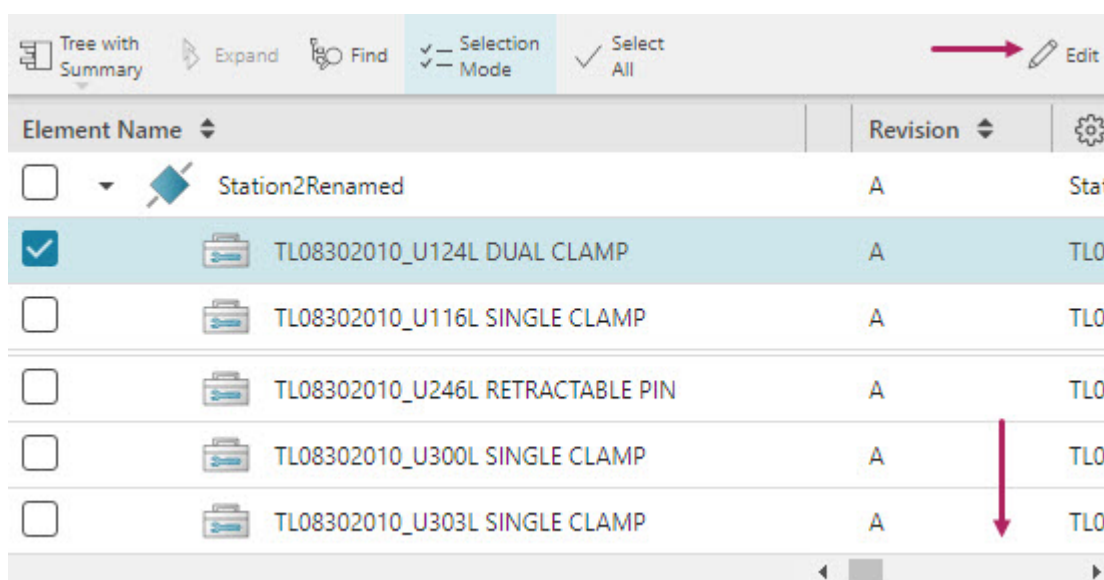
Sync attribute updates

This example task shows syncing updates from the bill of equipment (BOE) to the plant bill of process (BOP).

Note

You must be running Active Workspace version 5.0.1 or later and Teamcenter version 12.4.0.1 or later to use this feature.

1. **Create** or **search for and open** a work package.
2. In the **Plant** tile, click **Open** .
3. Click **Edit**, and make changes in the BOE.



Tip

Use the horizontal scroll bar at the bottom of the screen to review and edit object attributes, such as **Item Name** and **Variant Condition**.

4. Click **Save Changes** when you have completed edits to the BOE.
5. Open the plant BOP, and navigate to the hierarchy level in the BOE that you just edited.

Caution

Process Planning for BTO/BTS/CTO only connects objects that are mapped in the *BOEPlantBOPTypAndPropertyMap.xml* file. If your structure contains customized objects that are not in this map file, those objects are not synced.

Your Teamcenter administrator uses the **MEBOPTtoBOEObjectTypeMap** preference to support the *BOEPlantBOPTTypeAndPropertyMap.xml* file. Contact your Teamcenter administrator with any questions about mapped objects in your environment.

6. Click **Sync**.

Process Planning for BTO/BTS/CTO pulls updated attribute and object data from the BOE and syncs the data to the plant BOP.

When the synchronization is complete, Process Planning for BTO/BTS/CTO displays a message confirming that synchronization is complete, or explaining the reason for the full or partial synchronization failure.

Add a configurator context to a work package

By default, Teamcenter Easy Plan derives the configurator context for a work package from the engineering bill of materials (EBOM). However, during process planning you can manually add a configurator context to a work package.

Teamcenter Easy Plan associates the configurator context to all current and future structures in the work package, except for the EBOM and the plant structure.

Restrictions and limitations

You must set the **EP_ProductVariantsTiles** value to **True**. In addition, you must add **EP_ProductVariantsTiles** to the **AWC_Startup_preference** in the Teamcenter rich client.

See the Preferences section in the Active Workspace Administration documentation for a description of preferences and how to set them.

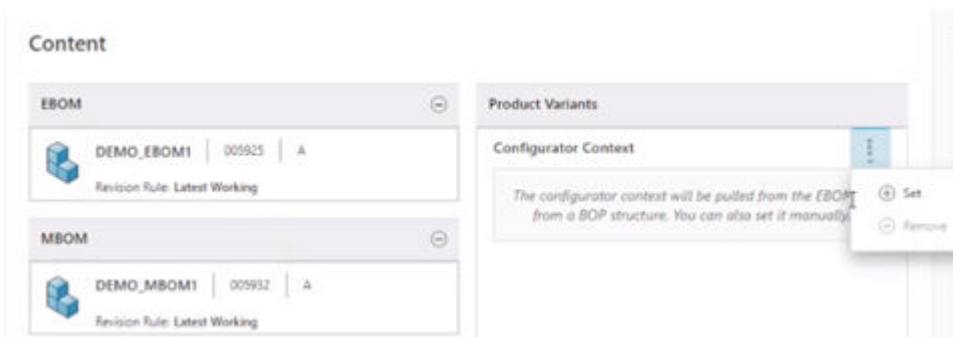
Prerequisites

You must have write permissions for any object before you can submit it to a workflow.

After you submit an object to a workflow, it is assigned a status. Before you can modify an object or children of an object with a status, you must create a new revision.

Procedure

1. If you have not done so already, **search for an existing work package**.
2. In the **Product Variants** panel under **Configurator Context** click **More** , then select **Set**.



Teamcenter Easy Plan displays the **Set Configurator Context to Work Package** dialog box so you can locate a configurator context and associate it to structures in the work package.

3. Type a full or partial name, click **Search**, and then select a search result.
4. Click **Set Configurator Context** and click **Associate** in the confirmation dialog box. Teamcenter Easy Plan associates the configurator context to:
 - Structures that are currently in the work package.
 - Structures added to the work package in the future.

Note

Teamcenter Easy Plan does not associate the configurator context to the EBOM or to the plant structure.

5. (Optional) Add a structure to the work package. Teamcenter Easy Plan performs one of the following actions:
 - If the structure is not associated to a configurator context, Teamcenter Easy Plan associates the structure to the configurator context and adds it to the work package.
 - If the structure is associated to a different configurator context than the work package, Teamcenter Easy Plan displays an error message and does not associate it to the configurator context or add it to the work package.
6. (Optional) In the **Product Variants** panel under **Configurator Context** click **More**  → **Remove**, and click **Remove** in the confirmation dialog box. Teamcenter Easy Plan removes the association between the configurator context and all structures within the work package.

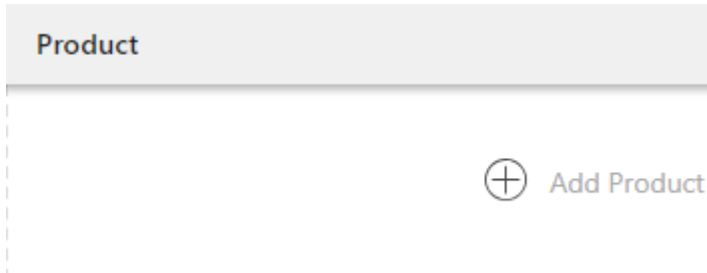
Add a product structure to a work package

Note

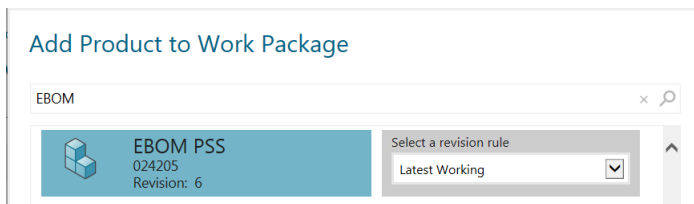
This task is optional. You only need to add a product structure such as an EBOM or an MBOM to the work package if you want to display product assemblies in the steps of the manufacturing process. After you add a product structure to the work package, you associate it to operations in the plant BOP.

Procedure

1. **Search for and open** a work package.
2. On the **Manage Work Package** page, in the **Product** panel, click **Add Product** ⊕.



3. In the **Add Product to Work Package** dialog box, type the name, ID, or description of a product or product assembly to associate to the package.
4. Click **Search** 🔍.
5. Select the product or product assembly from the search results.



6. (Optional) Select a different revision rule.

Note

Your Teamcenter administrator may customize the list of revision rules.

7. Click **Add Product**.

What to do next

Note

To remove a product structure from a work package, edit the work package. Hover over the structure in the work package and click **Unassign** ⊖.

Update a work package EBOM revision

Update an engineering bill of materials (EBOM) root revision on the **Manage Work Package** page to quickly apply milestone changes to a product.

Prerequisites

The **Update EBOM Revision** command is only available when:

- The preference **MBMEnableUpdateEBOMRevision** = **true**.
- The preference **EP_WorkPackageContentType** is defined with a value of **EBOM:ItemRevision** or **EBOM:PSBOMViewRevision**.

Procedure

1. **Navigate** to the **Manage Work Package** page.
2. In the **Content** panel, in the **EBOM** group, click **Update EBOM Revision** .
3. In the **Update EBOM Revision** dialog box, select the EBOM revision that you want to add to your work package.

Note

- By default, the **Update EBOM Revision** dialog box displays a required column (**Object**), and three optional columns (**Revision**, **Release Status**, and **Date Released**). You can remove any optional column value from the **MBMUpdateEBOMRevisionPopupColumnConfiguration** preference.
- Only later revisions are displayed. You cannot apply the current version or earlier versions to the EBOM.

4. Click **Update**.
The selected EBOM structure is updated in the **EBOM** tile on the **Manage Work Package** page.
5. (Optional) Update any assignment mismatches between the EBOM and MBOM on the **EBOM-MBOM Alignment** page.

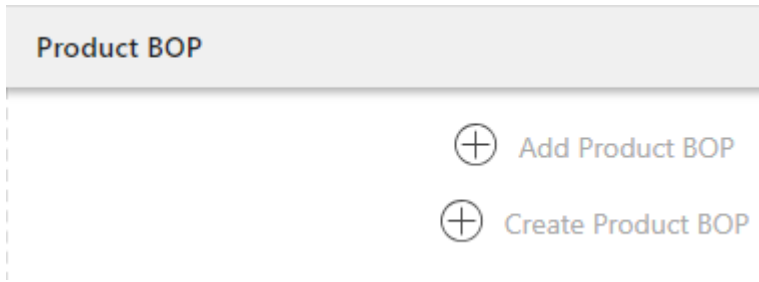
Create a product BOP

You can add an existing product BOP to your work package, or create one.

If you want to create a product BOP, create a work package that only contains this structure. Later, you can fine tune a product BOP when it is in a work package with a plant BOP.

Procedure

1. Search for a work package, and click **Manage Work Package**  in the results list.
2. In the **Product BOP** section, click **Create Product BOP** .



3. In the **Create Product BOP** dialog box, enter a name in the **Name** box and optionally, enter information in the **Description** box.
4. Click **Create**.

A new process structure is created and assigned to the work package.

Tip

Click **Submit to Workflow**  to **send the product BOP directly to a workflow** from this page.

What to do next

Note

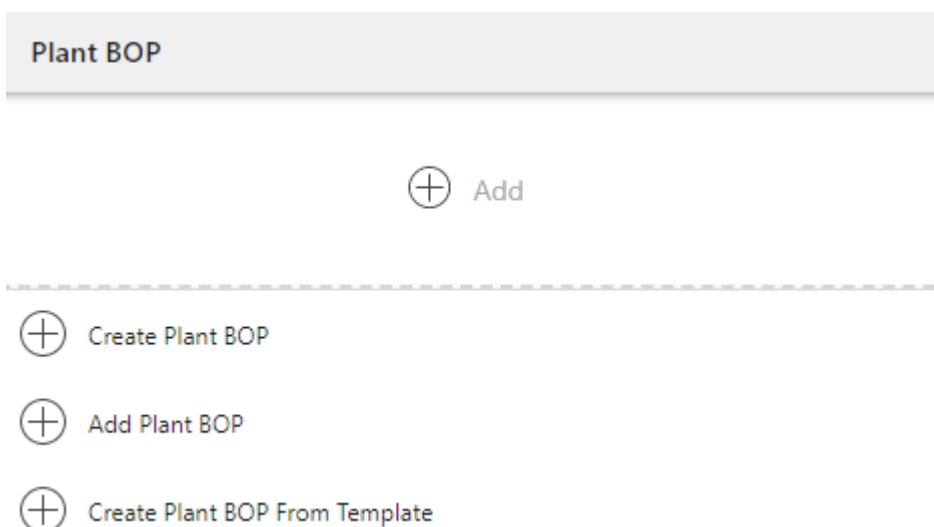
To remove a product BOP from a work package, hover over the product BOP and click **Remove associated structure** , then click **Remove**.

Plant BOPs

Create a plant bop

You can create a new plant bill of process (BOP), or **add an existing plant BOP** to a work package. You can also **use a template to create a plant BOP**. The template creates a clone of an existing plant BOP.

1. Search for a work package, and click **Manage Work Package**  in the results list.
2. In the Plant BOP tile, click **Add**  and select **Create Plant BOP**.



3. In the **Name** box, type the name you want to use.
4. (Optional) Type additional information in the **Description** box and
5. Click **Create**.

Process Planning for BTO/BTS/CTO adds the plant BOP to the work package.

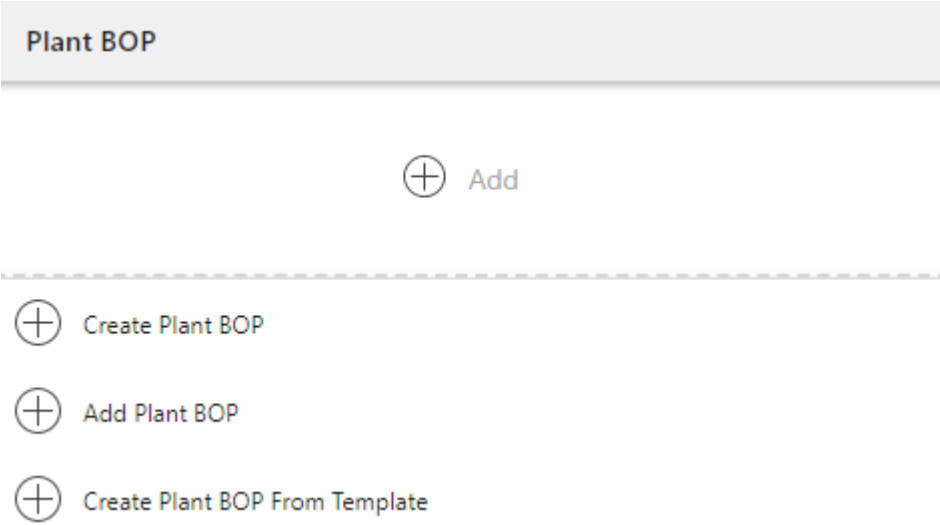
Tip

Click **Submit to Workflow**  to **send the plant BOP directly to a workflow** from this page.

Add a plant BOP

This task adds an existing plant bill of process (BOP) to a work package.

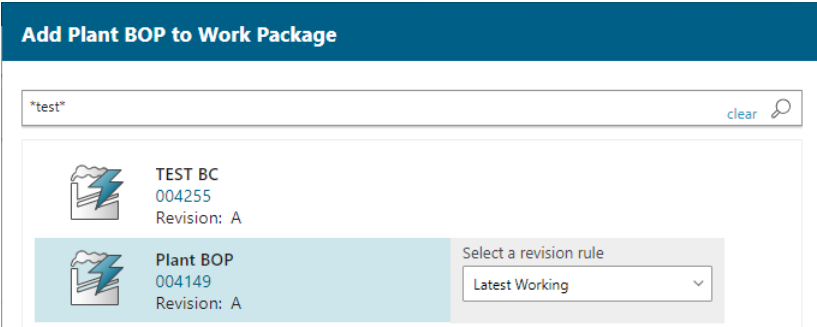
1. Search for a work package, and click **Manage Work Package**  in the results list.
2. In the Plant BOP tile, click **Add**  and select **Add Plant BOP**.



3. Type the partial or full name of the plant BOP you want to add to the work package and click **Search**.

Tip
Use asterisks * as wild cards during any search.

4. Select a plant BOP from the results, and select a revision rule to apply to the plant BOP.

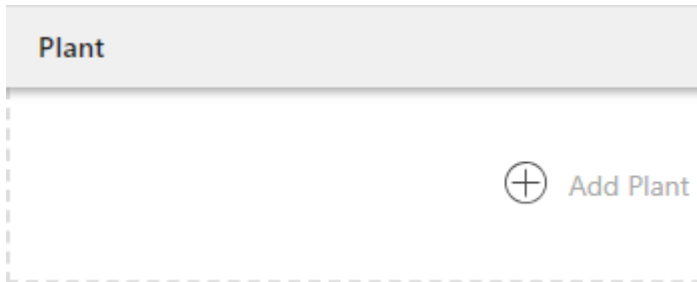


5. Click **Add Plant BOP**.
- Process Planning for BTO/BTS/CTO adds the plant BOP to the work package.
- Click **Submit to Workflow** to **send the plant BOP directly to a workflow** from this page.

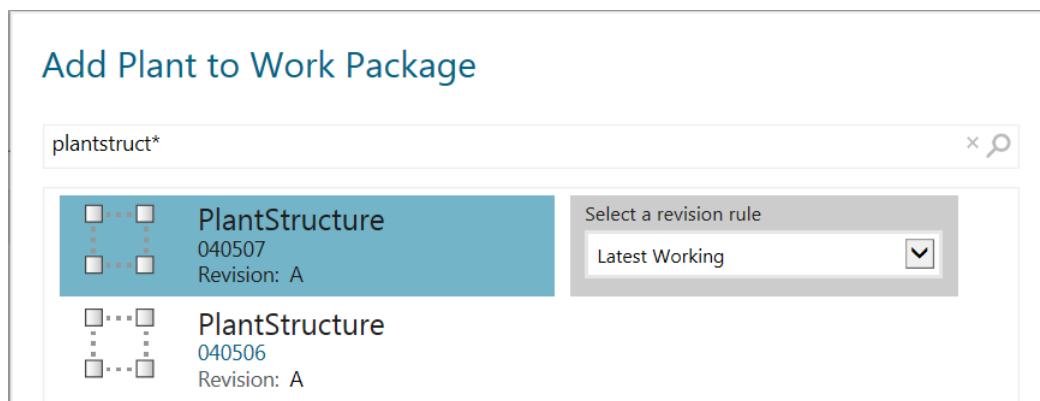
Add a plant structure to a work package

Procedure

1. Edit a work package.
2. To add a plant structure, click **Add Plant** + in the **Plant** section of the **Manage Work Package** page.



3. In the **Add Plant to Work Package** dialog box, type the name, ID, or description of a plant structure to associate to the package.
4. Click **Search** 🔍.
5. Select the structure from the search results.



6. (Optional) Select a revision rule.

Note

Your Teamcenter administrator may customize the list of revision rules your organization uses.

7. Click **Add Plant**.

What to do next

Note

To remove a remove a plant structure from a work package, hover over the structure in the work package and click **Unassign** ⊖.

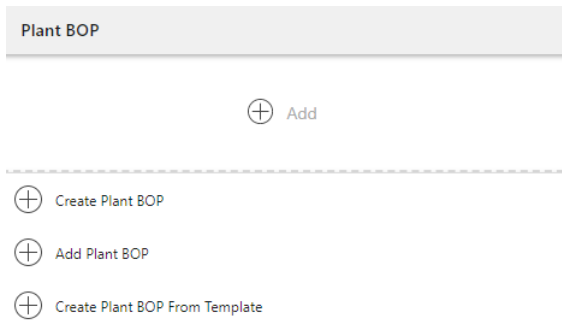
Clone a plant BOP

This task uses an existing plant bill of process (BOP) as a template to create a new plant BOP. The new plant BOP is a clone of the existing plant BOP.

Note

When you clone an existing plant BOP, its consumed parts and assigned resources are not copied to the new plant BOP.

1. Search for a work package, and click **Manage Work Package**  in the results list.
2. In the Plant BOP tile, click **Add**  and select **Create Plant BOP from Template**.



3. Type the partial or full name of the plant BOP you want to clone, and click **Search** .

Tip

Use asterisks * as wild cards during any search.

4. Select a plant BOP from the results, and select a revision rule.

Note

The revision rule that you select is applied to the cloned plant BOP.

5. Type in a **Name** for the plant BOP.
6. (Optional) Type information in the **Description** field.
7. Click **Create Plant BOP**.

Process Planning for BTO/BTS/CTO clones the existing plant BOP, and adds the cloned plant BOP to the work package.

8. (Optional) Click **Submit to Workflow**  to **send the plant BOP directly to a workflow** from this page.

Clone a full BOP to use in small product mode

You can clone and reuse the bill of process (BOP) for a full product and modify it as needed when you are working in small product mode. When you work in small product mode you can load and work on a component that is part of a larger assembly, and not load and view the full assembly.

The **Copy**  and **Paste**  commands are available, respectively, from the BOM and BOP toolbars. In Easy Plan, the ability to drag files or objects to other objects works the same way as it does in other applications. For more details on resequencing and moving elements, see [Rules for cloning, moving, and resequencing objects in the BOM or the BOP](#).

Restrictions and limitations

You must be working in small product mode to use this feature.

Prerequisites

You can use the must set the value for the **EP_PlanningForSmallProduct** preference to **true**. In addition, you can use the **Process.Template** preference to define which cloning rule process template is used to clone items in a process structure. Cloning rule options include:

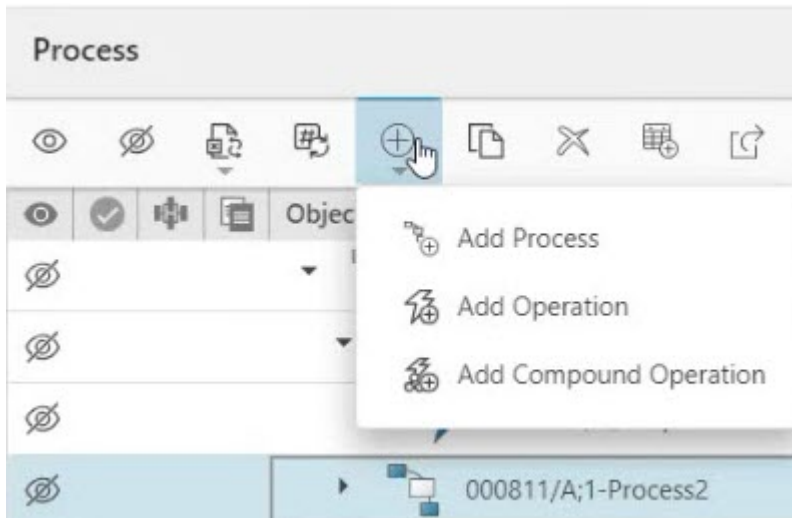
- **Mapping_Consume**—Clones all consumed objects referenced by the template to a new object in the cloned structure.
- **Referencing_Consume**—References all consumed objects from the manufacturing bill of materials (MBOM) into the cloned structure.
- **Ignoring_Consume**—Clones the process from the template, but ignores all consumed objects in the original process.

In addition, you must add the **EP_PlanningForSmallProduct** and **Process.Template.Mapping** preferences to the **AWC_Startup_preference** in the Teamcenter rich client.

See the *Preferences* section in the *Active Workspace Administration* documentation for a description of preferences and how to set them.

Procedure

1. If you have not done so already, [search for and open](#) an existing work package that contains processes and operations, and [navigate](#) to the **Process Planning** or **Work Instructions Authoring** page.
2. If you are on the **Work Instructions Authoring** page, do the following.
 - a. In the **Process** tab or panel, select a process or operation.
 - b. In the **Editor** tab, next to the process or operation name you just selected, click , then select one of the following options.
3. If you are on the **Process Planning** page, in the **Process** panel, select the process or operation beneath which you want to create the clone and click .
4. From the drop-down menu select a cloning option.



The **Add** panel is displayed.

5. Type the full or partial name of the process you want to clone or type its ID and click **Search**.

Tip

You can use wildcard characters in your search. For example, type ***STN*** to search for a work area item name that begins with **STN**. To ensure the best search results, create a query with narrow parameters.

6. Select a BOP from the results and type a **Name** for the cloned BOP.
7. (Optional) Select a revision rule.

Note

The revision rule you select is applied to the cloned BOP.
The default revision rule is **Latest Working**.

8. Click **Cloning Rule** and then select an option from the list.
 - **Mapping_Consumes**—Clones all consumed objects into the new BOP.
 - **Referencing_Consumes**—References all consumed objects into the new object.
 - **Ignoring_Consumes**—Ignores any consumed objects in the clone template, and only clones the BOP.
9. (Optional) Update values in any of the following fields and then click **Create BOP**.
 - **Description**—Type in a description for the cloned BOP.
 - **Process ID**—Type in a process ID for the cloned BOP. If you leave this field blank, Teamcenter Easy Plan provides a process ID.
 - **Revision ID**—Type in a revision ID for the cloned BOP. If you leave this field blank, Teamcenter Easy Plan provides a revision ID.

10. (Optional) Click the **Process Planning** tile to navigate to the **Process Planning** tile to continue planning in the work package.

Reusing a work package based on object values

When you change the top line of a work package object, such as an engineering bill of materials (EBOM), a BOM view revision (BVR) is saved with that object's structure by default. You can store values other than the BVR to each object's top line in your work package so that other values are instead saved with that object, and the work package can then be more easily reused (for example, saved without the BVR, and with an item ID instead). The preference **EPWorkPackageContentType** defines the following default values for each work package object.

Work package object	Default value
Engineering bill of materials (EBOM)	EBOM:PSBOMViewRevision
Manufacturing bill of materials (MBOM)	MBOM:PSBOMViewRevision
Bill of equipment (BOE)	Plant:PSBOMViewRevision
Plant BOP (bill of process)	BOP:PSBOMViewRevision

An administrator can change the values for any object to **Item**, **ItemRevision**, or **PSBOMView**, and then save your work package for reuse.

Example

EBOM:ItemRevision
MBOM:PSBOMView
Plant:Item
BOP:PSBOMViewRevision

Once the preferred preference values are defined, you can then modify the top line of the object based on the preference value and reuse the work package with each specific value's information.

Apply a production program

Add a production program using Product Configurator

If your environment uses Product Configurator variants, you can create a production program for those variants.

Saved variant rules (SVRs) are defined in the configurator context in Manufacturing Process Planner or Product Configurator. As you define the production program, you can review and add existing SVRs to your production program.

Note

Before you begin, verify that:

- Your Teamcenter administrator has configured your environment to use Product Configurator.
- The work package you plan to use contains a configurator context.

Procedure

1. If you have not done so already, search for and open an existing work package that contains processes and operations, and navigate to the Work Instructions Authoring or Process Planning page.
2. Click **More**  → **Create New Program**.
3. Type a name and click **Create**.
4. Click **Generate all product variants from the configurator context**.

Note

For each SVR, a product variant is created with a default rate of one. You can modify the default rate if needed.

5. (Optional) Double-click the production rate for a product variant and type a new value.
Production rates automatically update as you set them.
6. (Optional) To remove a product variant, select the product variant and click **Delete**.

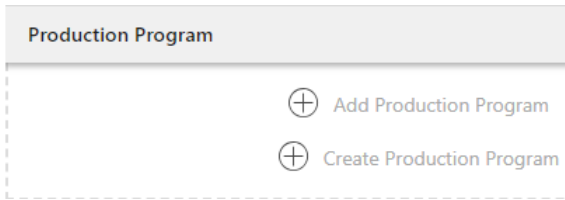
Author a production program with classic variants

Production programs contain a collection of product variants. You can add or create a production program, or edit an associated production program with classic variants.

Create a production program

Procedure

1. Search for a work package, and click **Manage Work Package**  in the results list.
2. In the **Production Program** section, click **Create Production Program** .



3. In the **Create Production Program** dialog box, enter a name in the **Name** box and optionally, enter information in the **Description** box.
4. Click **Create**.
A new production program is created and assigned to the work package.
5. Edit the contents of the new production program.

Edit a production program

Use this procedure to edit an existing production program.

Procedure

1. Search for a work package, and click **Manage Work Package**  in the results list.
2. Hover over the production program assigned to the work package and click **Edit** .
3. In the **Production Program** dialog box, click **Create Product Variant** .
4. In the **Create Product Variant** dialog box, enter a name in the **Name** box.
5. Enter a **Production Rate** value greater than zero.
This is used to calculate the probability for the variant.
6. Set the variant rule for the product variant, using the list of existing product variants.
You can select one option for a variant rule, or you can select multiple operations for a variant rule:

Production Program: Toy Car

Overview

Rev Name: Toy Car

Item Type: Production Program Collection

Item Description:

Date Released:

Item Revision Owning User: Documentation (doc1)

Product Variants +

Rev Name	Production Rate	Probability
BASE	40,00	40
LUXURY	35,00	35
SPORT	25,00	25
Total	100	100

Done

7. Click **Create**.

Continue using the **Production Program** dialog box to create, edit, or delete the product variants you want.

Apply a production program structure and add variants and effectivity to it

You can define the hierarchy of your production program structures and create multiple production program definitions. Moreover, you can create product variants more easily through an automated process that provides a filtered list of saved variant rules (SVRs).

A production program is structured as a three-level item hierarchy. It includes one or more definitions that store data for specific effectivity dates and lists of items representing product variants. Each definition specifies the targeted cycle time for the production line and the production rate for each variant. To ensure clarity, configure the BOM structure so that only one definition is visible for the production program. Production programs are stored in a collection, which is added to the collaboration context, allowing you to inspect and edit all programs consistently by opening the collection.

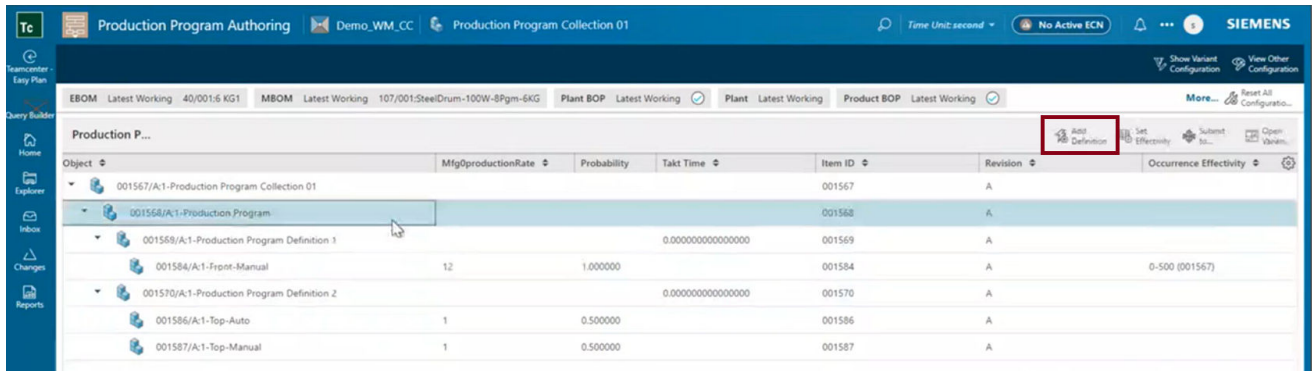
Prerequisites

You must set the EP_ProductionProgramStructureColumnPreference value to TRUE. In addition, you must add EP_ProductionProgramStructureColumnPreference to the AWC_Startup_preference in the Teamcenter rich client.

See the Preferences section in the Active Workspace Administration documentation for a description of preferences and how to set them.

Procedure

1. If you have not done so already, on the **Manage Work Package** screen, create a production program. For details, refer to **Author a production program with classic variants**
2. In the **Tasks** pane, select **Production Program Authoring**.
3. To add a production program definition, select the structure, then at the top right of the screen, click **Add Definition**, and enter the required details.



4. To add product variants to a structure or definition, select the product definition to which you want to apply the product variants, then at the top right of the screen, click **Show Variant Configuration**.
 - a. Select the variant type → ...
 - b. In the **Assign as Product Variant** pane, select the applicable variants, then click **Assign as Product Variant**.
The product variant definition is added.
5. (Optional) In the **Mfg0productionRate** column, update the production rate.
6. (Optional) In the **Takt time** column, update the takt time.
7. Configure the production program structure based on occurrence effectivity, element effectivity, or variants..
8. To add additional product variants to the structure or definition, repeat steps 3-6.

Add structure

Product structures and data

Create a structure in a work package

You can create any of these structures within an existing work package:

- Bill of Equipment (BOE)
- Manufacturing Bill of Materials (MBOM)

- Plant Bill of Process (Plant BOP)

Before you begin, verify the following items.

- You must have the correct user role and permissions to create structures in Teamcenter.
- You must have write access to the object you are changing. In this case, you are changing the work package.
- The object must be in an Open and Not Reviewing state.

Note

If you do not have the correct user role and permissions to complete this task, please contact your Teamcenter administrator.

1. Search for and open a work package.

Caution

The work package must contain an EBOM before you can add a manufacturing BOM.

2. Click **Add** in a structure tile and then select **Create New [structure]**.
3. In the **Create** dialog box, type a **Name**.
4. (Optional) Type a description.
5. (Optional) Click **Assign Projects** ⊕, then search for and select the owning project to assign to the structure.
6. (Optional) Click **Revision Rule**, and select an option from the list .

Note

The default revision rule is **Latest Working**.

7. Click **Add [structure]**.

Note

The tasks that are available on the **Manage Work Package** page depend on the structures in a work package.

Add an existing structure to a work package

You can search for and add any of these structures to a work package:

- Bill of Equipment (BOE)
- Engineering Bill of Materials (EBOM)
- Manufacturing Bill of Materials (MBOM)
- Plant Bill of Process (Plant BOP)

This example searches for and adds an EBOM to an existing work package.

Procedure

1. Search for and open a work package.

Tip

You must add an EBOM to a work package before you can add an MBOM.

2. Click **Add** in the EBOM tile.

Note

In your role, you do not create or maintain EBOMs. You only search for and add an EBOM to a work package.

3. In the **Add Product** dialog box, type a full or partial name and click **Search** .
4. Select the structure or the process from the search results.
5. (Optional) Click **Revision Rule**, and select an option from the list .

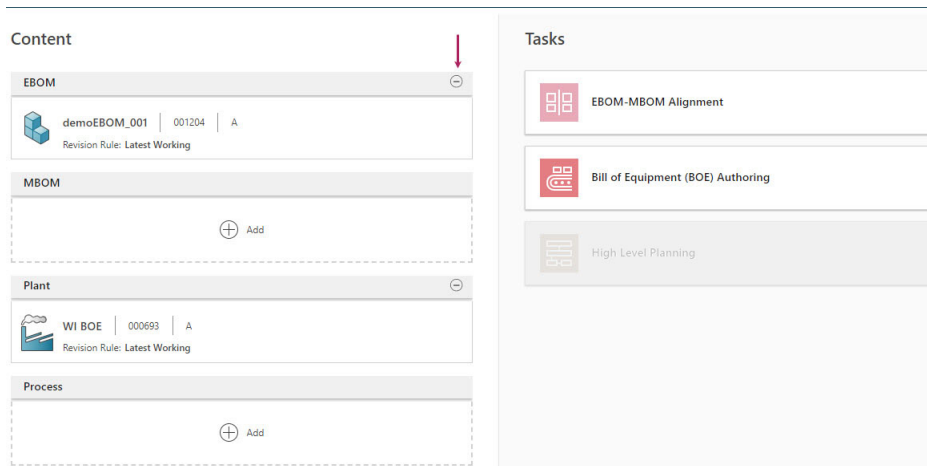
Note

The default revision rule is **Latest Working**.

6. Click **Add Product**.

Tip

The tasks that are available on the **Manage Work Package** page depend on the structures in a work package.



Remove a structure from a work package

Click **Remove**  on a product structure tile to remove it from a work package.

Tip

You must remove an MBOM from a work package before you can remove the EBOM.

Configuring structures

Configure work package structures

You can edit the configuration of each structure in a work package. You can save structure configurations on the **Manage Work Package** page, or any other task page that is defined for your work package.

Restrictions and limitations

You cannot define a structure by variant rules or expansion rules if the structure contains Product Configurator-authored variants.

Procedure

1. If you have not done so already, **search for and open** an existing work package or **navigate** to the **Process Planning** or **Work Instructions Authoring** page.
The current structure configuration is reflected in the **configuration header**.
2. (Optional) Do any of the following to edit the configuration structure:
 - To show or hide structure occurrences that are excluded by applied effectivity, select ☒ or clear ☐ the **Show occurrences excluded by effectivity** check box.

- To show or hide structure occurrences that are excluded by applied variants, select ☒ or clear ☐ the **Show occurrences excluded by variant** check box.
- (BOP configuration only) To show or hide BOP structure occurrences based on the effectivity of assigned occurrences as they are defined in their structure of origin, select ☒ or clear ☐ the **Show excluded assignments** check box.

Caution

Do not select or clear a check box and then immediately select an **End Item** from the **Units** section of the **Configuration** panel.

3. (Optional) Change the configuration by modifying:

- The revision rule in the **REVISION** group.
- The effectivity in the **DATE** or **UNITS** groups.

Your Teamcenter administrator decides which type of effectivity is available. For the end date, you can select **UP** (all future dates) or **SO** (stock out).

- Date-based effectivity displays structure data relevant to a specific past or future date, or range of dates. Part revisions and their related operations often have effectivities that determine when they are used in production.
- Unit-based effectivity displays structure data relevant to a specific unit number, such as unit 1, or range of units, such as 1-20.

Note

- Before you can use date-based or unit-based effectivity, your organization must create revision rules that reference date or unit effectivity. If you are not able to use unit-based effectivity, contact your Teamcenter administrator.
- An *end item* is a final combination of consumed end products, component parts, and materials that are hidden in the EBOM and MBOM because they are not currently of interest in the manufacturing process, usually because they are preassembled by a third party. To change an end item in the **UNITS** group, select a defined end item, use the **Search** tab to locate the end item, or select the **Palette** tab and select the end item from the resulting **CLIPBOARD**, **FAVORITES**, or **RECENT** group. The end item is applied to the structure.

4. (Optional) To define the structure by a **variant rule**, perform the following actions in the **VARIANT** section of the panel.
- To set the end item for the variant, click the **Saved Variant** object. The **Effective Variant For** panel is displayed.
 - Select the **Search** tab, then type part of the end item name and click **Search**. You can use wildcard characters in your search. For example, type ***MBOM_Easy*** to search for an end item named **MBOM_Easy_Navigation**. Teamcenter Easy Plan returns a list of objects that match the search criteria.

Note

You can also select the **Palette** tab and select the end item from the resulting **CLIPBOARD**, **FAVORITES**, or **RECENT** group.

- c. Select the end item for the variant from the list.
- d. Click **No variant rule** and select the variant rule you want to apply.

Teamcenter Easy Plan refreshes and displays the structure based on the new configuration.

- 5. (Optional) To define the structure by an **expansion rule**, in the **EXPANSION** group, select new or different expansion rules.
- 6. (Optional) To save your changes to your work package, rather than apply them locally and lose your settings the next time you open the package, select the **Save this configuration to the Work Package** ☒ check box.

Note

If your administrator has set the value of the preference **EP_ShowSaveConfigtoWorkPackageOption** to **true**, the **Save this configuration to the Work Package** ☒ check box is not available.

- 7. Click one of the following buttons.
 - **Configure All**—Applies the same configuration to all structures that are currently in the work package and are opened.
 - **Configure**—Applies the configuration only to the selected structure. For example, if you are working in the Plant BOP Configuration panel, this selection only configures the plant BOP.

Easy Plan closes the **Configuration** panel, and your changes are reflected in the **configuration header**.

Note

Unless you saved your configuration changes to the work package, you can revert all work structure configurations to the previously saved configuration by selecting **Reset All Configuration** .

Review configuration headers

You can review the data configuration for which different structures are defined as a header at the top of each work page in a work package.

For all work pages except the **EBOM-MBOM Alignment** page, that configuration is visible.

Procedure

- 1. **Search for and open** an existing work package and **navigate** to the **Manage Work Package** page or to another defined work page.

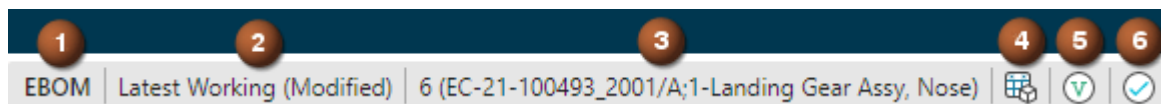
Available work pages in the work package reflect the structures your administrator has created. In this example, structures for an engineering bill of materials (**EBOM**), manufacturing bill of materials (**MBOM**), and **Process** (BOP) are defined, as reflected in the tiles that are displayed in the configuration header at the top of an **Process Planning** page.



If no configuration is applied to a structure (the default configuration), only the structure name, user role, and revision are displayed for that structure. If all structures are not visible in the header, you can view hidden tiles by clicking the < and > buttons.

2. In the **Configuration** panel, **configure** the structure.

The header reflects the current or revised configuration settings. Hover your mouse over each section to review details.



1 The type of structure being configured. 2 The structure's revision rule. 3 The unit effectivity (number of units and end item name). If the structure is configured to use date-based effectivity, the date or date range is displayed.	4 Indicates that the Show occurrences excluded by effectivity ☒ check box is selected in the structure's Configuration panel. 5 Indicates that the Show occurrences excluded by variant ☒ check box is selected in the structure's Configuration panel. 6 Indicates that the Show excluded assignments ☒ check box is selected in the structure's Configuration panel.

Applying configuration variants

When you **configure task page structures**, you can apply configuration variants in the **Configuration** panel. This lets you see which lines in that structure are affected in the **Variant Formula** column.

Classic or modular variants define options (for example, color) and corresponding values for each option (for example, red and blue). The Product Configurator application in Teamcenter separates variant data from the structure. Configuration variants are available in Easy Plan when your administrator sets up Manufacturing Process Planner for Product Configurator. Administrators can create predefined or custom rules in Teamcenter Manufacturing Process Planner using the preference **ClosureRulesForBomExpansion**.

The **Variant Formula** column shows the lines that are affected when you apply configuration variants.

EBOM | 005559/A;1-EBOM_TOP >

Revision Latest Working ▾ Date Today ▾ Units: None ▾ Variant 100CCRule ▾ Expansion ?

Element	ID	Variant Form
005559/A;1-EBOM_TOP	005559	
005561/A;1-Assembly1	005561	
005563/A;1-Item1	005563	[Teamcenter]Eng
005564/A;1-Item2	005564	[Teamcenter]Eng
005565/A;1-Item3	005565	[Teamcenter]Eng
005566/A;1-Item4	005566	[Teamcenter]Eng

Variant configuration supports:

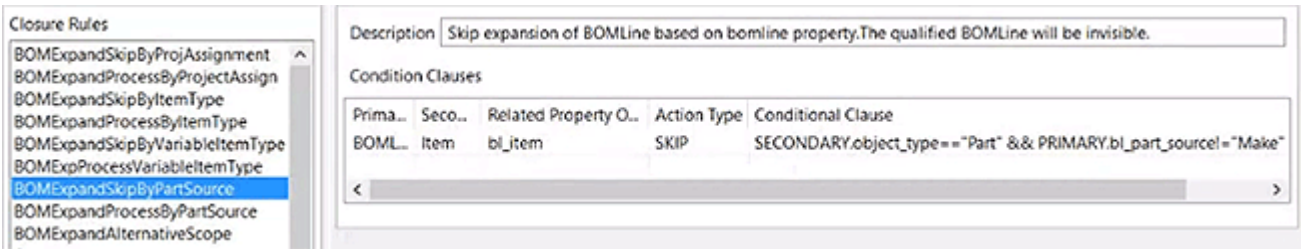
- Options that are a mandatory choice or an accessory.
- Components that can be configured by more than one option.
- Variant assemblies that can be shared between products.

Minimizing structure expansion

When you **configure task page structures**, you can use expansion rules to minimize expansion of unnecessary structure lines just as you do in Manufacturing Process Planner. For example, you may not want to expand an assembly if it is time consuming, if it is outsourced to a third party, or if it is not assigned to a current project.

Expansion rules are a type of closure rule. Expansion rules specify which lines in a structure should not load or expand when specific relationships are encountered. You can apply expansion rules to all structures except for a production program. That is, you can apply expansion rules to an engineering bill of materials (EBOM), a manufacturing bill of materials (MBOM), a product bill of process (BOP), a plant BOP, and a bill of equipment (BOE). Administrators can create predefined or custom rules in Teamcenter Manufacturing Process Planner using the preference **ClosureRulesForBomExpansion**.

In the following example, the closure rule **BOMExpandSkipByPartSource**, which is available by default in Manufacturing Process Planner, contains a condition that declares that if a secondary object type of **Part** exists in a BOM structure, and the primary part source is equal to **Make**, then the action type **SKIP** is applied to the structure.



The example below shows an EBOM structure before and after the **BOMExpandSkipByPartSource** rule is applied. All parts with a part source equal to **Make**, such as **Part2** and **Part4**, are excluded from the structure. All assemblies that contain parts whose primary part source is equal to **Make**, such as **Item2**, **Item3**, and **Item4**, are also excluded.

EBOM | 005559/A;1-EBOM_TOP >

Revision Latest Working ▾ Date Today ▾ Units: None ▾

	Element ▾
⋮	005559/A;1-EBOM_TOP
⋮	005561/A;1-Assembly1
✓	005563/A;1-Item1
✓	005564/A;1-Item2
✓	005565/A;1-Item3
✓	005566/A;1-Item4
✓	Part1
✓	Part2
✓	Part3
✓	Part4
⋮	005562/A;1-Assembly2

Before expansion rule

EBOM | 005559/A;1-EBOM_TOP >

Revision Latest Working ▾ Date Today ▾ Units: None ▾

	Element ▾
⋮	005559/A;1-EBOM_TOP
⋮	005561/A;1-Assembly1
✓	005563/A;1-Item1
✓	Part1
✓	Part3
⋮	005562/A;1-Assembly2

After expansion rule

Configure structures with revision rules

You can use object revisions to manage changes to a product structure.

An object revision defines the state of an object at a particular time. When the object moves to a new life cycle stage, you set a status and effectivity on the revision and create a new working revision.

If an object revision has no status (for example, the revision is released), you can change it directly. However, after an object revision has a status, you must create a new revision or object to change it.

Changes that may require a new revision include:

- Adding or removing subcomponents.
- Changing encapsulated data (referenced files such as images) and the properties that describe the object.

Note

For some types of changes, it is preferable to create a new object instead of revising the old one.

You apply the appropriate revision rule to set the configuration of the plant bill of process (BOP) structure for a specific time. A revision rule consists of any number of rule entries. Each entry defines a parameter that determines which revision of each object in the structure should display.

Note

You cannot view multiple revisions at the same time in one view. If you want to see another configuration, you must apply a different revision rule in another view.

A revision rule sets the criteria for selecting the revision. For example, the revision rule:

- Selects working revisions and, optionally, specifies the owning user or group.
- Selects released revisions by specific status, according to a status hierarchy or latest status (by date released).
- Optionally, specifies the date or unit number effectivity of the revisions.
- Selects the latest revisions according to the revision ID, by alphanumeric or numeric order, or by creation date. This selection is independent of whether revisions are working or released.

Apply different configurator contexts to the structures in a work package

To ensure that all the relevant variant information is captured and managed effectively, you can assign a specific configurator context to each structure in a work package.

You can preserve manufacturing-specific variants, such as plant-specific operations or shift-related information. This preservation is particularly important for mixed production scenarios in which multiple product and plant bills of materials (BOMs) are involved.

You can apply a configurator context to either a single structure or multiple structures within a work package. To achieve a uniform configurator context across all structures, add the value **Config1** to all existing values in the preference settings, ensuring that every structure shares the same configurator context. If you prefer to assign multiple configurator contexts, you can categorize them by specifying different values in the preference settings. This flexibility allows you to tailor the configurator contexts to meet specific requirements and maintain consistency where needed.

For example, you can set the engineering bill of materials (EBOM) to **Config1**, manufacturing bill of materials (MBOM) to **Config2**, plant to **Config2**, product BOP to **Config2**, plant bill of process (BOP) to **Config3**, and production program to **Config3**.

In this example, the MBOM, plant, and product BOP will share the same configurator context (**Config2**), while the plant BOP and production program will share a different configurator context (**Config3**). Initially,

each structure will share its assigned configuration. Any modifications made to **Config1** will automatically be reflected in all structures assigned to **Config1**, ensuring consistency and efficient management of updates. Similarly, changes to **Config2** will affect only the specific structures it is applied to, while updates to **Config3** will be reflected in both structures assigned to **Config3**, maintaining uniformity across them.

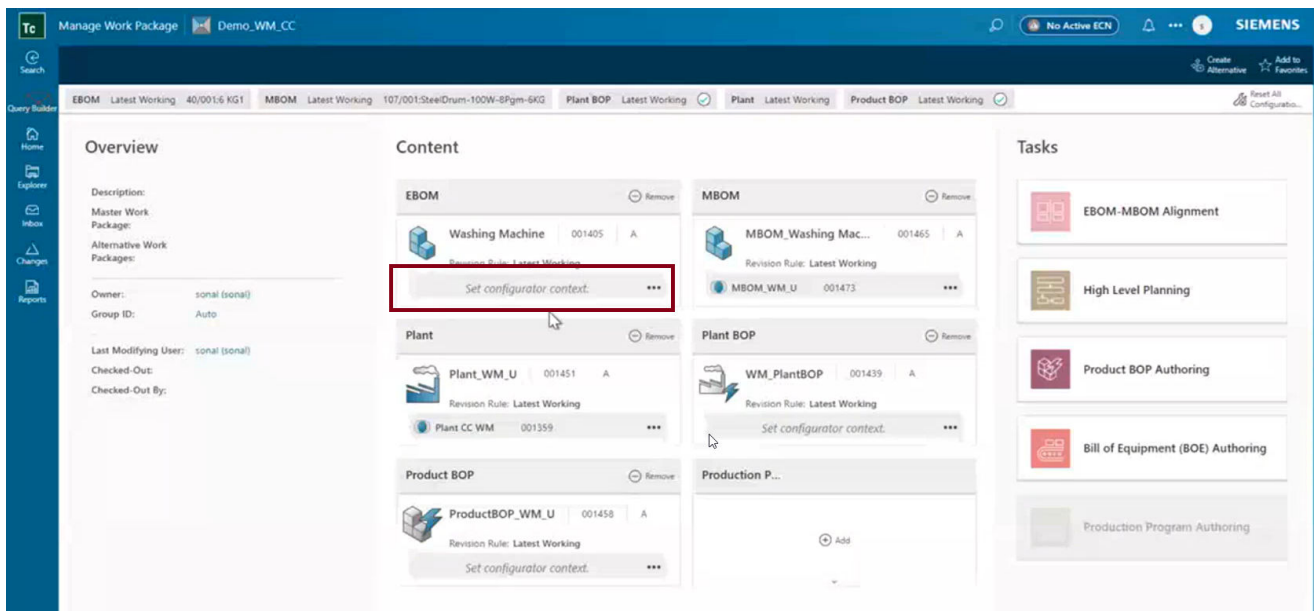
Prerequisites

You must set the **EP_WorkpackageContentType** value to TRUE. In addition, you must add **EP_WorkpackageContentType** to the **AWC_Startup_preference** in the Teamcenter rich client.

See the preferences section in the *Active Workspace Administration* documentation for a description of preferences and how to set them.

Procedure

1. Navigate to the **Manage Work Package** page.



2. On the required work package tile, click ... → **Add**.
3. In the **Set Configurator Context** dialog box, search for the context, and then in the search results, select the required configurator context.
4. Click **Associate**.
The configurator context is applied to the selected work package.
5. (Optional) For other work packages, repeat steps 1-4.

Enterprise Recipe Management (ERM)

ERM workflow

Use enterprise recipe management (ERM) software to author a general, plant-neutral recipe, or to author a master recipe in which you create or adapt a recipe for a specific plant location according to a specific batch size.

Easy Plan allows you to manage calculated formulas and recipes (for example, food, chemical, and pharmaceutical products) that allow you to validate formulations to support production and regulatory needs. Based on ANSI/ISA88, a standard that addresses batch process control, ERM recipes—not to be confused with **BOM recipes**—provide a way to describe products and how those products are produced.

A *general recipe* is a general, plant-neutral recipe that can be applied to multiple manufacturing locations. A *master recipe* is plant-specific and location-specific, and provides detailed, concrete manufacturing formulas for specific batch sizes based upon local materials and regulations.

Author a general ERM recipe

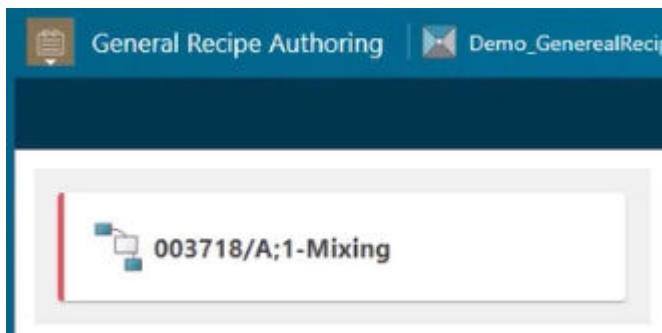
Author a general Enterprise Recipe Management (ERM) recipe to organize processes, operations, equipment, and materials for a variety of plants and situations.

A *general recipe* is a general, plant-neutral recipe that can be applied to multiple manufacturing locations. Author a **master recipe** using more concrete manufacturing formulas intended for specific batch sizes at a specific plant location.

Procedure

1. If you have not already done so, **create** or open a **General Recipe Authoring** work package, and from the **Manage Work Package** page, click **General Recipe Authoring**.
2. On the **General Recipe Authoring** task page, click **Add Process Stage**, and in the **Add Process Stage** dialog box, choose a process stage type, type a process stage **Name** and optional **Description**, and then click **Add**.

The initial process is displayed inside a gray process stage rectangle, and authoring is enabled.



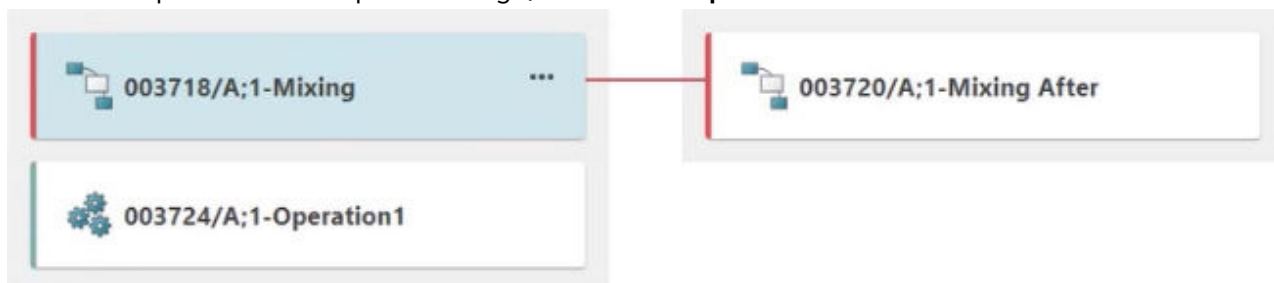
3. In the process, click **More**  and choose a command.
 - To add a serial process to the right of the selected process, select **Add Process Stage After**.
The new process is displayed in its own process stage.



- To add a parallel process below the selected process, select **Add Process Stage as Parallel**.
The new process is displayed in its own process stage.

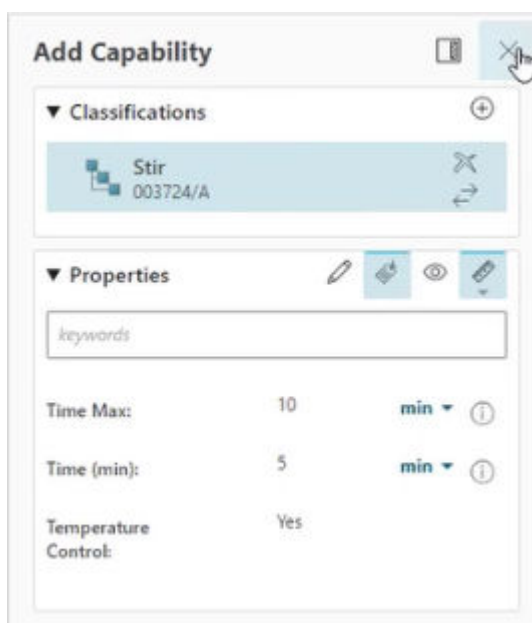


- To add an operation to the process stage, select **Add Operation**.



- To add equipment needed to complete the process, or to add capability classification elements to the process, select **Add Equipment** or **Add Capability**.

Equipment and capability classifications often include properties, which you define or modify after you select the classification.



Note

For more information on classifications, see *Basic and Advanced Classification on Active Workspace - Usage*.

Equipment and capability classifications are displayed as properties of the process.

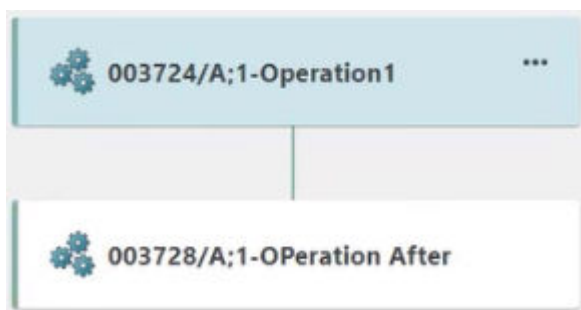


- To delete the process stage and all elements below it, select **Delete**.

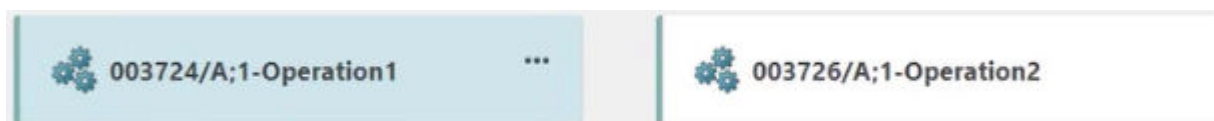
Note

- **Add Process Stage After**, **Add Process Stage as Parallel**, and **Add Operation** require a selection from the **Type** list, and a **Name**.
- **Add Capability** and **Add Equipment** require that you use the **Classification** filter to locate the appropriate capability and equipment.

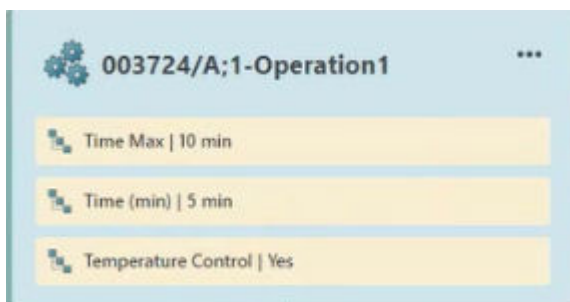
4. In an operation, click **More** and choose a command.
 - To add a serial operation below the selected operation, select **Add Operation After**.
The new operation is displayed in the same process stage.



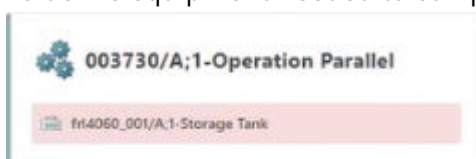
- To add a parallel operation below the selected operation, select **Add Operation as Parallel**. The new operation is again displayed in the same process stage.



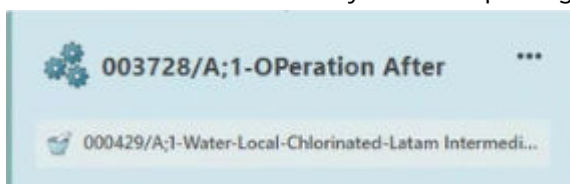
- To add classification elements to the operation, such as the minimum and maximum time the operation should take to complete, select **Add Capability**. Capabilities are displayed as properties of the operation.



- To define equipment needed to complete the operation, select **Add Equipment**.



- To add materials based on your work package formula, select **Add Materials** and click **Assign**.



- To delete the operation, select **Delete**.
- (Optional) Add additional objects to the processes and operations to which you have added details in steps 3 and 4 above.
 - (Optional) **Edit** your ERM recipe.

Author an ERM master recipe

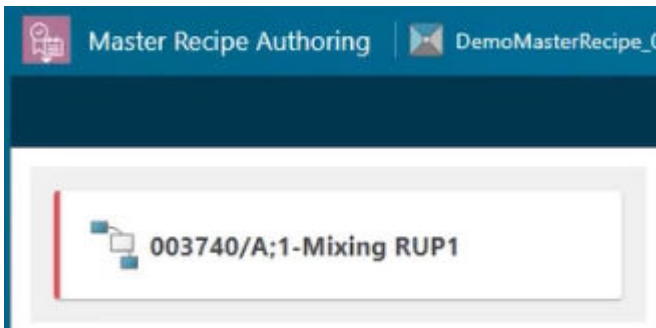
Author a master Enterprise Recipe Management (ERM) recipe to organize resource unit procedures, operations, equipment, and materials for use in a plant.

A *master recipe* is equipment-specific and provides detailed, concrete manufacturing formulas for specific batch sizes at a specific plant location. Author a *general recipe* if you instead need a general, plant-neutral recipe that can be applied to multiple manufacturing locations.

Procedure

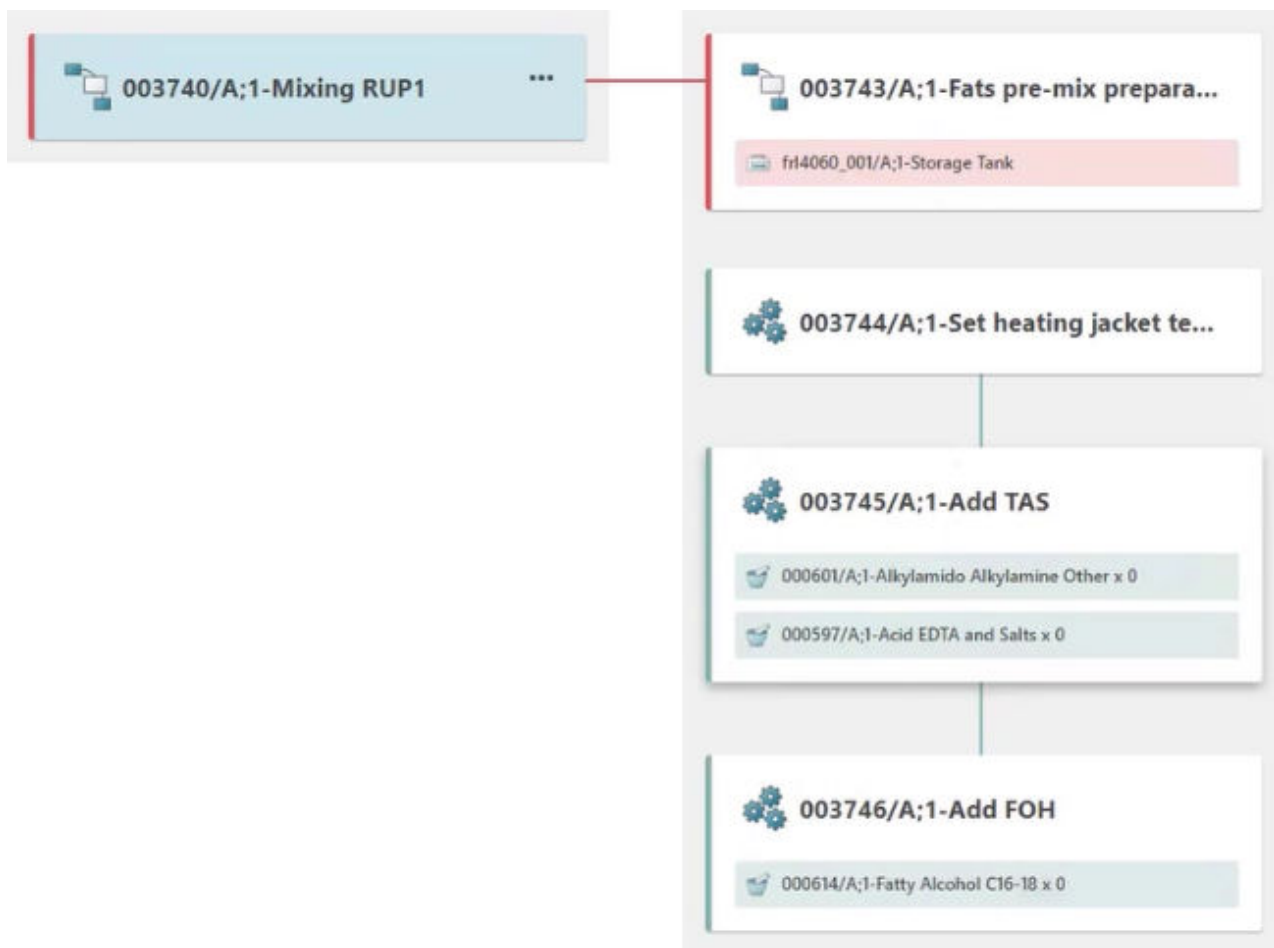
1. If you have not already done so, **create** or open a **Master Recipe Authoring** work package, and from the **Manage Work Package** page, click the **Master Recipe Authoring** task button.
2. On the **Master Recipe Authoring** task page, click **Add Resource Unit Procedure (RUP)**, and in the **Add Resource Unit Procedure** dialog box, choose a resource unit procedure **Type**, type a resource unit procedure **Name** and optional **Description**, and then click **Add**.

The initial resource unit procedure is displayed inside a gray stage rectangle, and authoring is enabled.



3. In the process, click **More** **⋮** and choose a command.
 - To add a serial unit procedure to the right of the selected resource unit procedure by searching for a specific classification, select **Add Resource Unit Procedure After** and click **Add as Clone**.

The new resource unit procedure is displayed in its own stage. Because it contained parallel procedures and operations, which in turn reference equipment and materials, that content is referenced in the master recipe's root resource unit procedure.

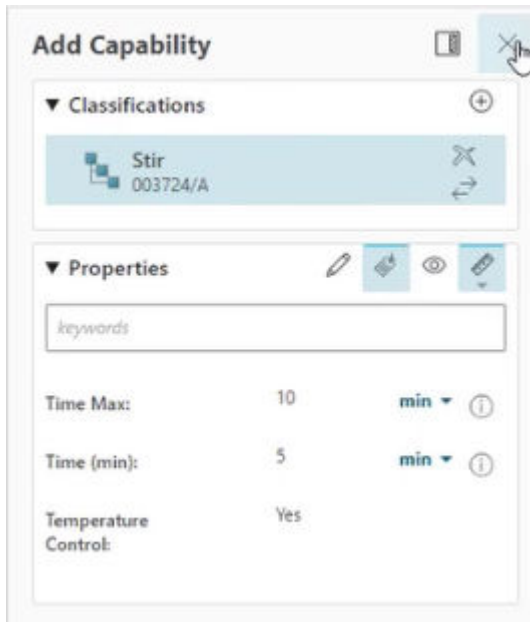


- To add a parallel resource unit procedure below the selected resource unit procedure, select **Add Resource Unit Procedure as Parallel**.

The new resource unit procedure is displayed in its own stage.

- To add an operation to the selected resource unit procedure, select **Add Operation**.
- To add equipment needed to complete the process, or to add capability classification elements to the process, select **Add Equipment** or **Add Capability**.

Equipment and capability classifications often include properties, which you define after you select the classification.



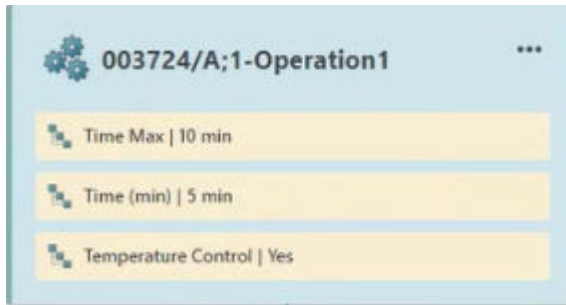
Note

For more information on classifications, see *Basic and Advanced Classification on Active Workspace - Usage*.

Equipment and capability classifications are displayed as properties of the process.



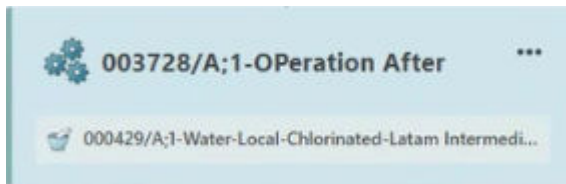
- To delete the resource unit procedure and all elements below it, select **Delete**.
- 4. In an operation, click **More** and choose a command.
 - To add a serial operation below the selected operation, select **Add Operation After**.
The new operation is displayed in the same process stage.
 - To add a parallel operation below the selected operation, select **Add Operation as Parallel**.
The new operation is again displayed in the same process stage.
 - To add classification elements to the operation, such as the minimum and maximum time the operation should take to complete, select **Add Capability**.
Capabilities are displayed as properties of the operation.



- To define equipment needed to complete the operation, select **Add Equipment**.



- To add materials based on your work package formula, select **Add Materials** and click **Assign**.



- To delete the operation, select **Delete**.
5. Add additional objects to the processes and operations you have defined as detailed in steps 3 and 4 above.
 6. (Optional) **Edit** your ERM recipe.

Review, edit, or replace an ERM recipe

You can review, edit, or replace an enterprise recipe management (ERM) general or master recipe. You can also print or submit your recipe to a workflow.

Procedure

1. If you have not already done so, open the ERM general or master **work package** and recipe to be edited.
2. Add or remove processes, resource unit procedures, and operations as you would when authoring a **general** or **master** recipe.

Note

To zoom in and out on the **General Recipe Authoring** or **Master Recipe Authoring** task page, place your mouse over the page and use your scroll button.

3. Add capability, equipment, and material elements as you would when authoring a general or master recipe.
4. To review or remove recipe details, do the following.
 - a. Select the root process or resource unit procedure and click **Information** ⓘ. Recipe information is detailed on the **Summary** tab of the **Information** panel.



Item Type:	Recipe Procedure
Item Description:	Batch Size : 300
Rev Name:	Hair_Conditioner_Batch_Y -Rec Proc - CB
Find No.:	
Item Id:	000261
Revision:	A
Date Released:	11-Nov-2024 15:00
Item Revision Owning User:	erm_user5 (erm_user5)

- b. Select a process or operation node, click , and in the **Item Description** or **Find No.** text boxes, define or modify values.

Note

In the example above, **Item Description** is used to define the batch size. To define a batch size that is displayed in the header of the master or general recipe task page, add your custom property value to the preference **EP_ShowPropertyInERMHeader**.

- c. To remove unwanted equipment or capabilities, select the preferred tab, select the object to be removed, and click **Remove** ⊖.
 - d. To unassign material, select the Material tab, select the object to be removed, and click **Unassign** ⊖.
5. To replace a master recipe release unit procedure, do the following.
 - a. Select the release unit procedure, click **More** ⋮, and click **Replace Release Unit Procedure**.
 - b. In the **Replace Release Unit Procedure** dialog box, use the **Classification** filter to locate the release unit procedure that will replace the existing unit procedure.
 - c. Select the release unit procedure and click **Next**.
 - d. (Optional) Select a revision rule and a cloning rule, and click **Replace**.

Print or submit an ERM recipe to a workflow

You can print your Enterprise Recipe Management (ERM) recipe using standard browser commands, or submit your recipe to a workflow.

Procedure

1. To print the recipe, right-click the page, choose **Print**, and follow your browser's standard print procedure.
2. **Submit your recipe to a workflow.**

Product manufacturing information (PMI)

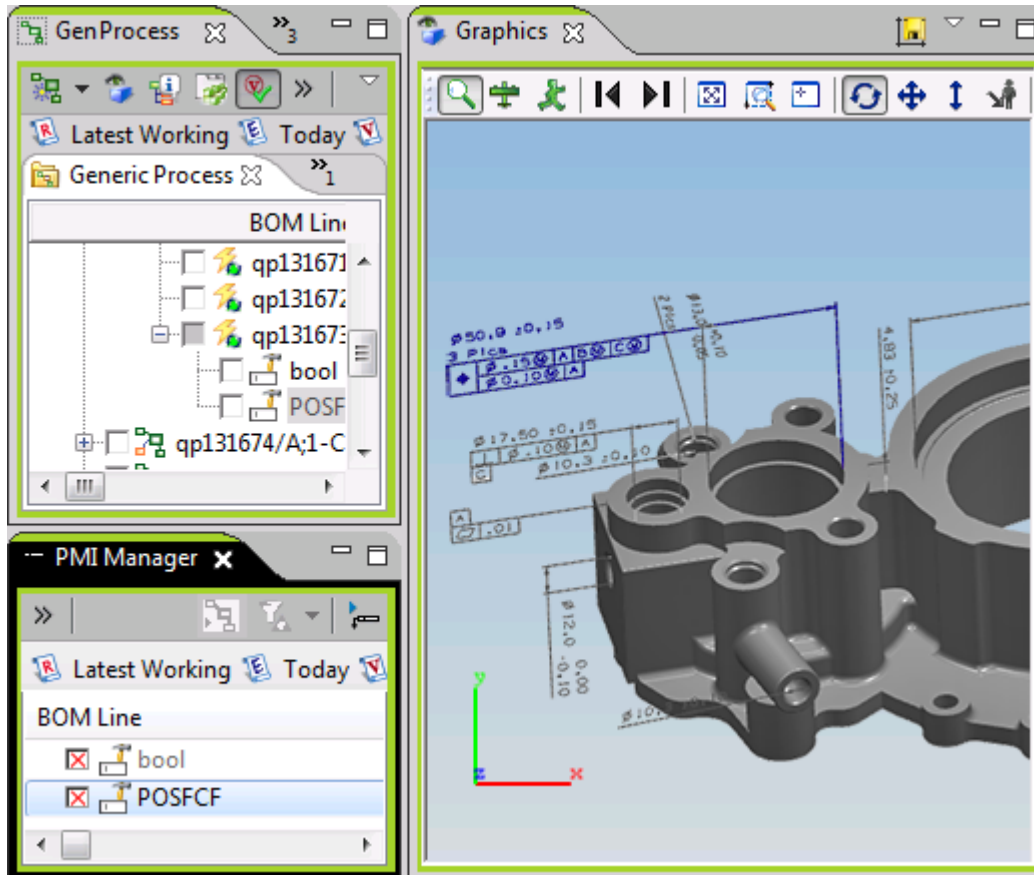
PMI

In Process Planning for ETO, you can work with product manufacturing information (PMI) when you **search for and open** an existing work package that contains processes and parts and **navigate** to the **Work Instructions Authoring** page. PMI information is displayed in the **PMI Assembly Level** tab.

PMI provides engineering, manufacturing, quality control, and other data in a 3D model such as a JT file. Like a 2D drawing, PMI helps manufacturing designers and engineers to convey dimensional markup, but uses a single source 3D format to build and measure a part, automate tasks, and verify that manufactured results fall within specified parameters.

Note

- You cannot perform PMI commands without a PMI license.
- PMI is not supported on any version of the Teamcenter 14.2 release.



PMI is governed by the industry standards of the American Society of Mechanical Engineers (ASME) and the International Organization for Standardization (ISO). A primary focus is on geometric dimensioning and tolerancing (GD&T), which is used to verify that products fall within the same specifications in computer-aided manufacturing (CAM), computer-aided inspection (CAI), and coordinate-measuring machine (CMM) software.

PMI can also include a bill of materials (BOM), weld symbols, surface and material specifications, change order information, other metadata, and related notes.

Sort and filter the PMI Assembly Level tab

When authoring your process plan, you can sort and filter product manufacturing information (PMI) objects in the **PMI Assembly Level** tab. As you can in most Active Workspace tabs, you can drag columns to rearrange the column order. You can also right-click a single column and sort the table by choosing:

- **Sort Ascending** to sort from A to Z and from zero (0) to the highest number.
- **Sort Descending** to sort from Z to A and from the highest number to zero (0).

Procedure

1. If you have not done so already, **search for and open** an existing work package that contains processes and parts and **navigate** to the **Work Instructions Authoring** page.
2. To filter the list of PMI objects by a text string, in the **PMI Assembly Level** tab, right-click a text column such as **PMI Description**, and then in the **Text Filter** text box, type the text that you want included in all PMI object results, and click **Filter**.

For example, type **dat** to limit the list of PMI objects to those that only contain the text string **dat**, such as **Datum Feature Symbol**. Text filters are not case-specific.

3. To filter the list of PMI objects by number, right-click a numeric column such as **Nominal Value**, and from **Numeric Filter**, select:

- **Equals** to limit the results to only PMI objects with a specific value. For example, right-click the **Upper Specification Limit** column, type **-0.0.2**, and click **Filter**.

The **PMI Assembly Level** tab now displays only PMI objects with USL values that are exactly equal to -0.0.2.

- **Greater Than** to limit the results to only PMI objects with more than a specific value. For example, right-click the **Nominal Value** column, type **1.0**, and click **Filter**.

The **PMI Assembly Level** tab now displays only PMI objects with nominal values that are greater than 1.0.

- **Less Than** to limit the results to only PMI objects with less than a specific value. For example, right-click the **Lower Specification Limit** column, type **0.1**, and click **Filter**.

The **PMI Assembly Level** tab now displays only PMI objects with USL values that are less than 0.1.

- **Range** to limit the results to only PMI objects that fall within a specific numeric range.

Example

Right-click the **Nominal Value** column and:

- a. In the **From** text box, type **0.1**.
- b. In the **To** text box, type **-0.2**.
- c. Click **Filter**.

The **PMI Assembly Level** tab now displays only PMI objects with nominal values that fall between the range of 0.1 and -0.2.

What to do next

Note

To clear the sort capabilities, right-click the sorted column and select **No Sorting**. To clear a filter, right-click the filter column and click **Clear**.

Define content in the PMI Assembly Level tab using a selection method

When defining an assembly or process plan, you can review relevant product manufacturing information (PMI) objects by selecting a content method that is based on your selection from the **Assembly** or **Process** tab. Methods can be applied to an entire assembly or process, or to a specific part or operation in a process.

Procedure

1. If you have not done so already, **search for and open** an existing work package that contains processes and parts and **navigate** to the **Work Instructions Authoring** page.
2. From the **Assembly** or **Process** tab, select the part, assembly, process, or operation for which you want to display PMI information, and in the **PMI Assembly Level** tab, click **Select method**.

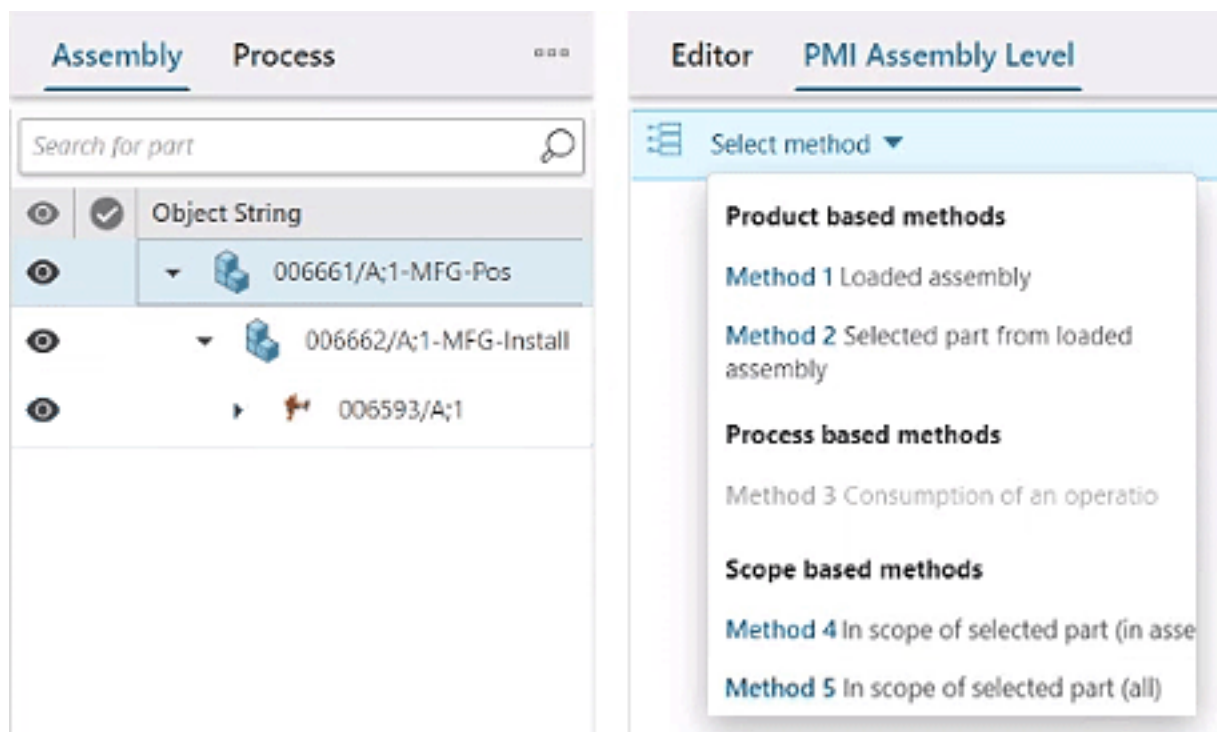
Part or assembly selections enable **Product based methods** and **Scope based methods**. Process or operation selections enable **Process based methods**.

Tip

To select multiple operations, select the last operation you want to include in your method.

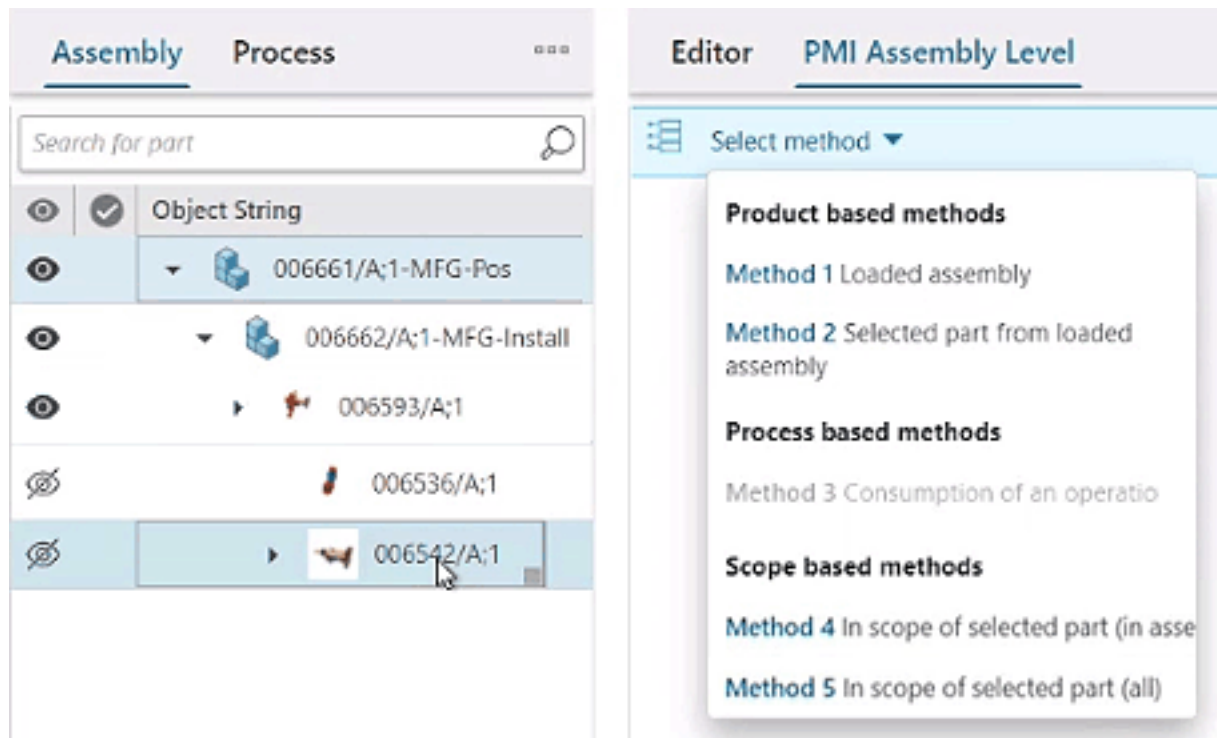
3. In the **PMI Assembly Level** tab, accept or select one of these methods:
 - **Method 1 Loaded assembly** to view all PMI objects contained in an assembly selected in the **Assembly** tab.

All PMI information derived from the manufacturing bill of materials (MBOM) for that assembly and its parts are displayed in the **PMI Assembly Level** tab.

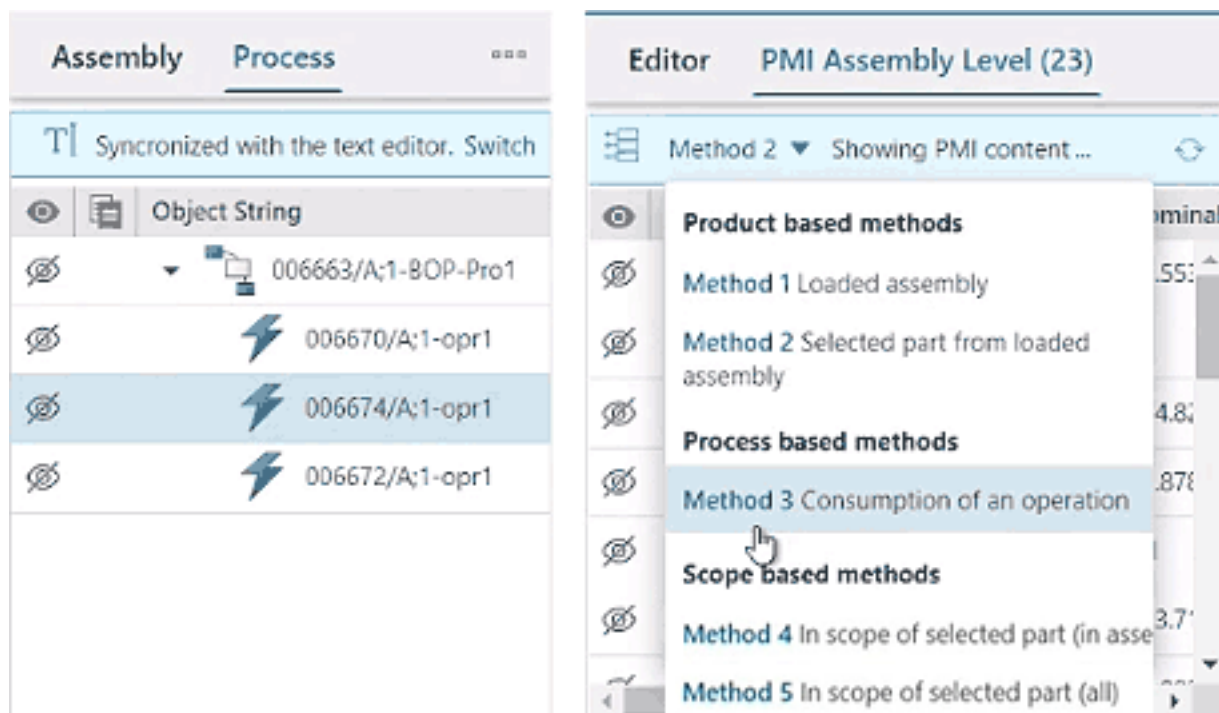


- **Method 2 Selected part from loaded assembly** to view all PMI objects from a part selected in the **Assembly** tab.

Only the PMI information derived from the MBOM for that part is displayed in the **PMI Assembly Level** tab. If the part contains part subassemblies, PMI objects related to those subassemblies are displayed as well.

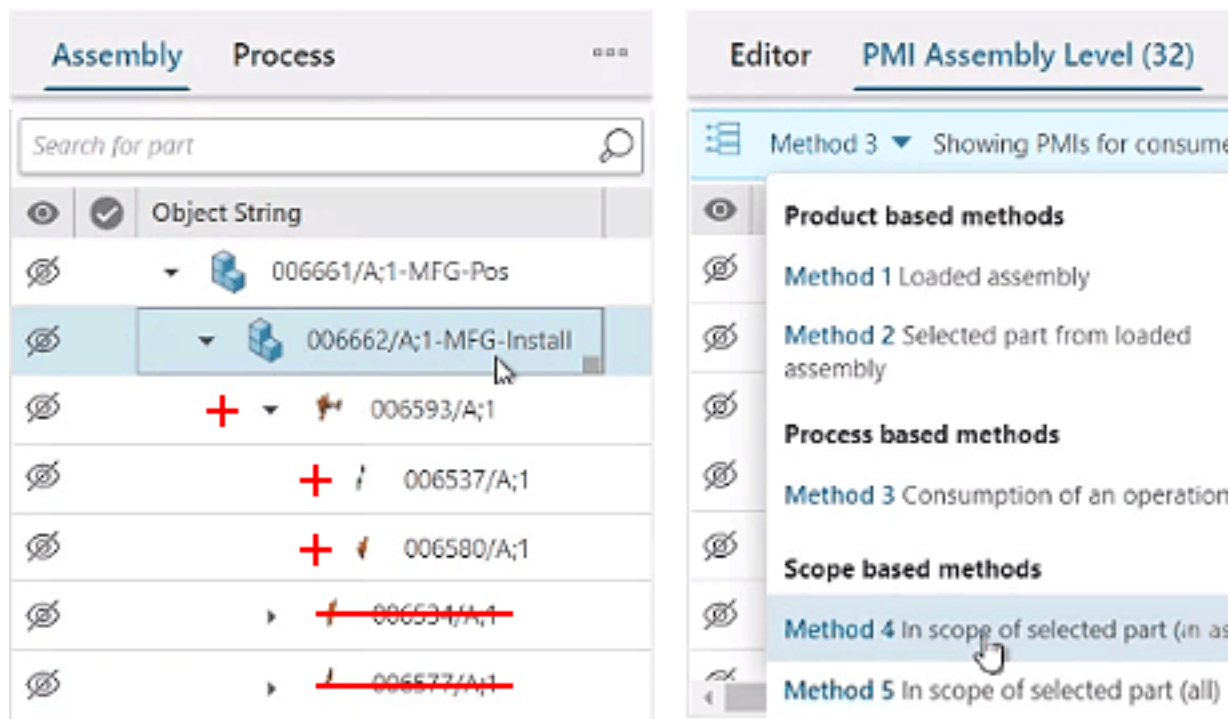


- **Method 3 Consumption of an operation** to view all PMI objects related to parts that are consumed in the selected operation.



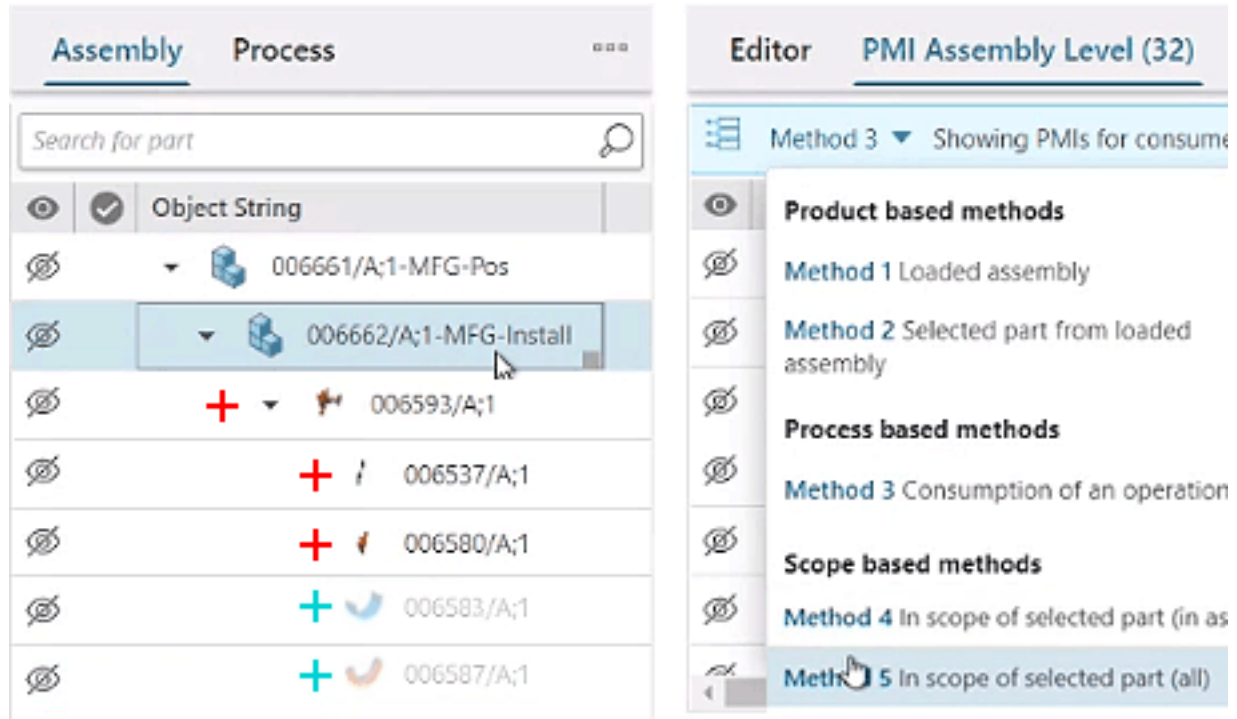
- **Method 4 In scope of selected part (in assembly)** to select an assembly and view only PMI objects assigned to the first level of parts in the assembly's first subassembly in the **PMI Assembly Level** tab.

If the first subassembly contains additional subassemblies, PMI objects associated with those subassemblies or their subparts are not displayed. Method 4 gathers PMI objects only associated with parts that are consumed within the selected assembly's domain scope.



- **Method 5 In scope of selected part (all)** to select an assembly and view all PMI objects in the selected assembly in the **PMI Assembly Level** tab, *regardless of whether they are or are not consumed in the MBOM*.

For illustrative purposes, the + icons below indicate unconsumed parts for which PMI objects are displayed in the **PMI Assembly Level** tab. The unconsumed parts are not actually displayed in the **Assembly** tab.



Note

You must have Teamcenter 14.1.0.5 server installed for method 5 to function. Teamcenter 14.2 does not contain the required preference **MciOPropertyListforFindingImpactedPMI**.

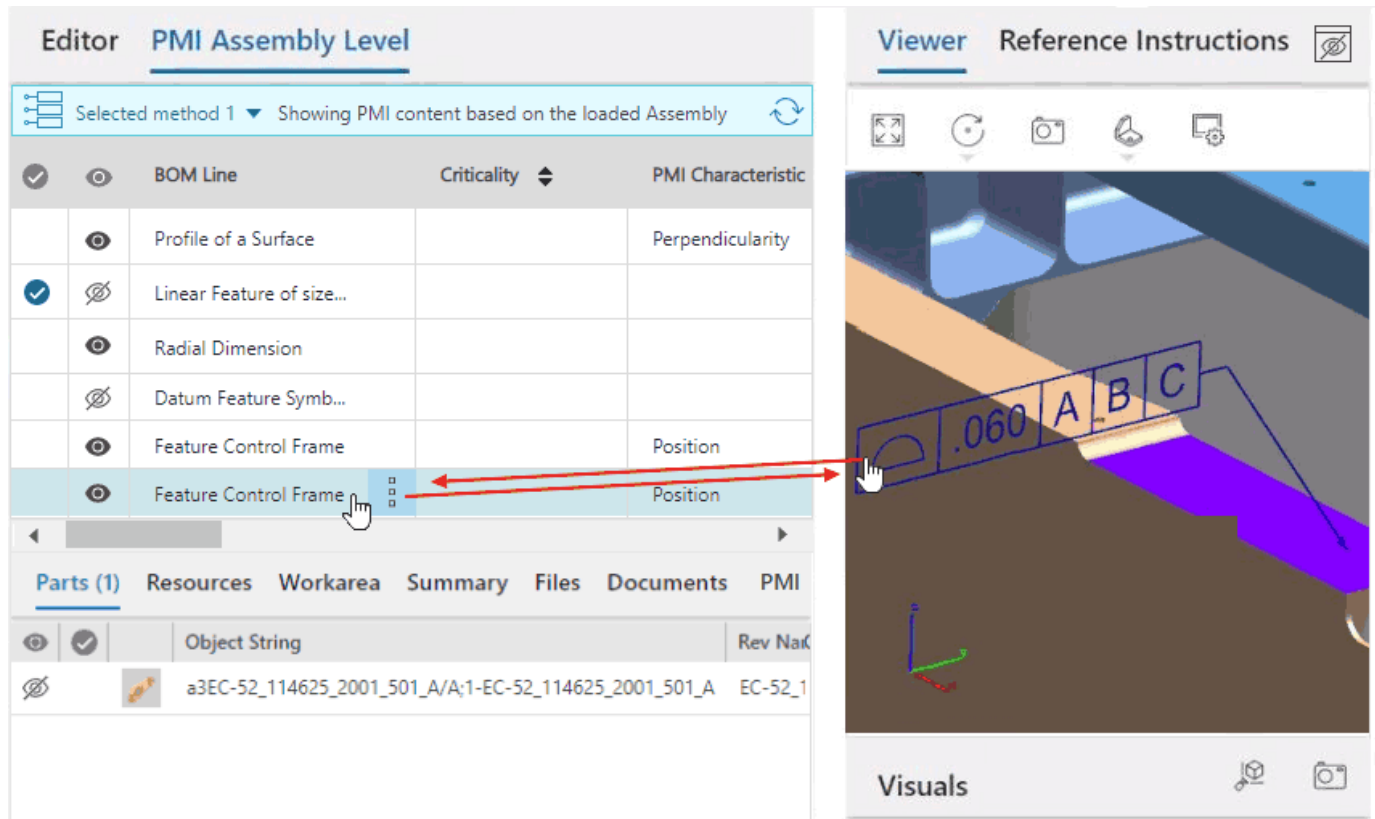
Note

You can change your selections in the **Assembly**, **Process**, or **PMI Assembly Content** tabs as necessary and change method selections. As you switch from an assembly to process or vice versa, you may need to change your PMI content method.

4. Do either of the following:
 - Drag any unconsumed PMI objects you want to assign to the objects selected in the previous steps to the lower **PMI** tab.
The objects are displayed in the **PMI** tab.
 - On the **PMI** tab, select any PMI objects to be unassigned from the objects selected in the previous steps and click **Unassign** .

Displaying selected PMI information in the Viewer

You can display product manufacturing information (PMI) elements that are enabled  in the **View** column  of the **PMI Assembly Level** tab to highlight them in the **Viewer** panel in the **Work Instructions Authoring** page. You can optionally enable visualization of the part or parts to which the element is connected from a PMI popup window.



Note

- In the example above, the surface to which the PMI element is attached is highlighted in purple.
- You can also select a PMI element in the **Viewer** panel to highlight it in the **PMI Assembly Level** tab, or by selecting assigned PMI elements in the **PMI** tab beneath the **PMI Assembly Level** tab.

Examine detailed PMI part information views

You can view the parts to which which product manufacturing information (PMI) is connected even if they belong to a different manufacturing assembly than that which you are currently reviewing. In many cases, the connected parts are referenced parts.

Procedure

1. If you have not done so already, **search for and open** an existing work package that contains processes and parts and **navigate** to the **Work Instructions Authoring** page.
2. On the **Assembly** tab, select a part or assembly and then, in the **PMI Assembly Level** tab, **select a product-based method** to see PMI elements connected to the part or assembly.

On the **Assembly** tab, you can also click  to show the part or assembly in the **Viewer**.

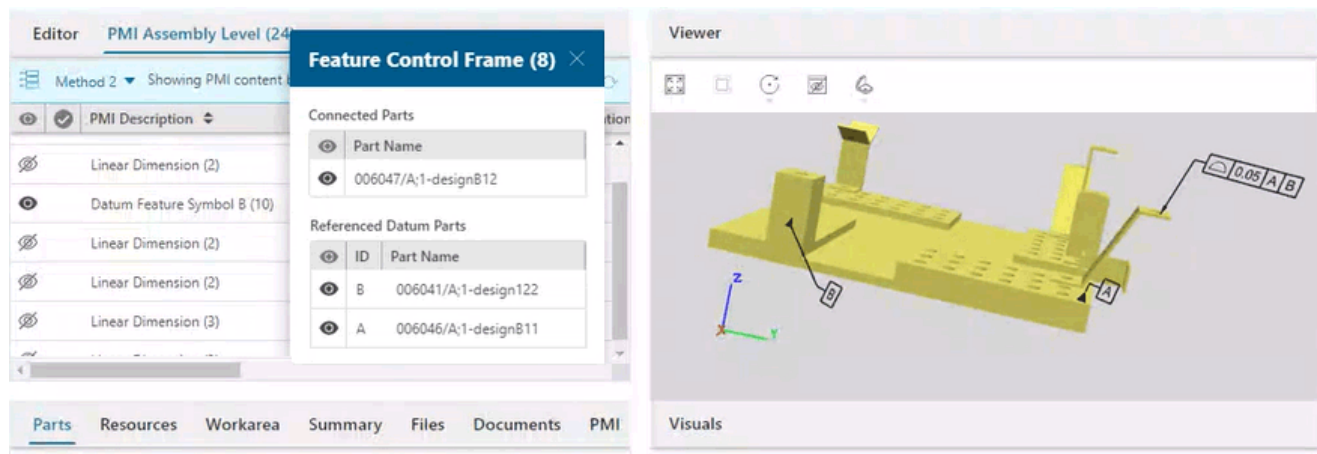
3. (Optional) For unassigned PMI elements, select the **PMI Assembly Level** tab, hover your mouse over any PMI element for which you want to identify connected parts, and click **More** .

For assigned PMI elements on the **PMI** tab of the information panel below the **PMI Assembly Level** tab, you can also hover your mouse over any PMI element for which you want to identify connected parts, and click **More** .

In the information popup, the PMI element's physical parts are displayed in the **Connected Parts** list. Datums, if available, are listed in the **Referenced Datum Parts** list. If any connected or referenced parts are not visible in the part or assembly you selected in step 2, they display  icons.



4. (Optional) Click  to change the status of any connected parts or referenced datum parts to visible . Those parts are displayed in the **Viewer**.



Note

- If you rotate a part or assembly in the **Viewer**, the graphic appears backward, but when you release, it flips to display correctly.
- You may need to zoom, rotate, or pan the part in the **Viewer** to completely view the PMI information.

5. On the **PMI Assembly Level** or **PMI** tab, hover your mouse over a different PMI element and click **More**  to update the information popup with connected, assigned, or referenced parts for that element.

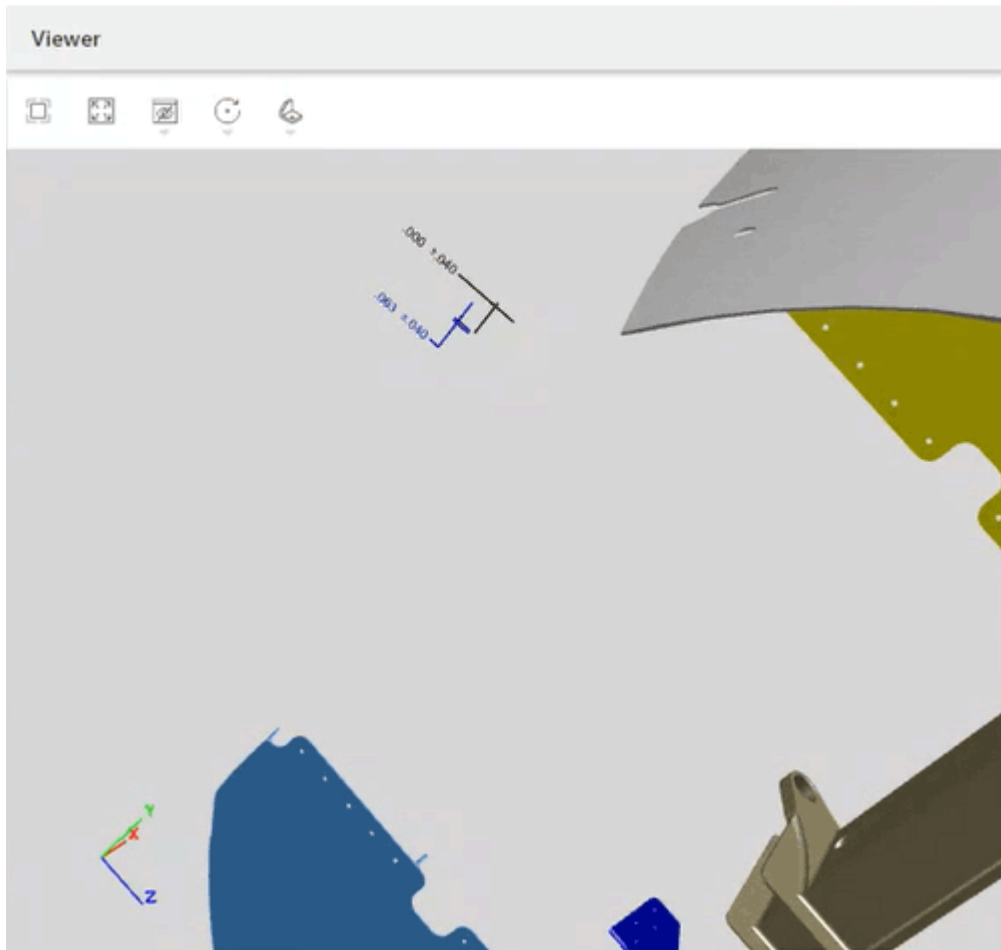
Inspect PMI information in the Viewer

When inspecting three-dimensional product manufacturing information (PMI) in the **Viewer** panel, you can zoom in or out on specific PMI elements, as well as hide all visible PMI elements without hiding 3D parts and features from your view.

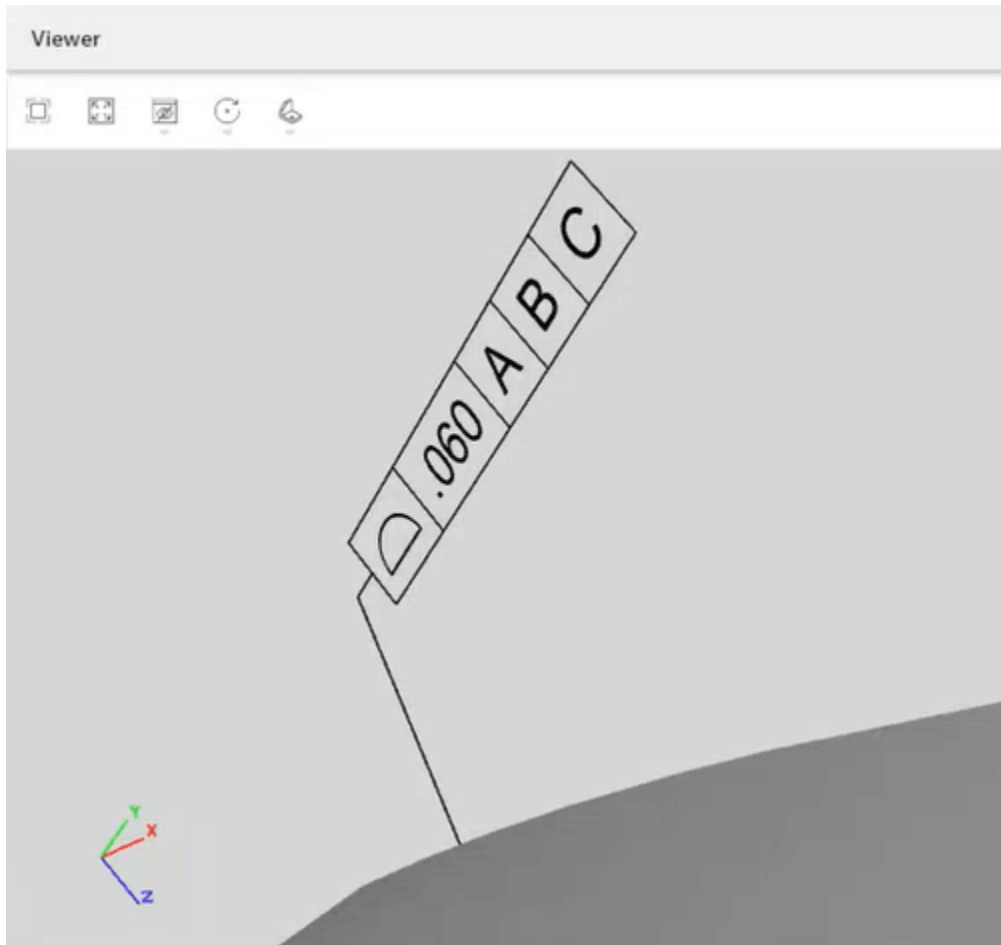
Procedure

1. If you have not done so already, **navigate** to the **Work Instructions Authoring** page.
2. In the upper-left panel, in the **Assembly** tab, select  next to each part or assembly of parts to be shown in the **Viewer**.
3. To zoom in to a specific PMI element:
 - a. On the **PMI Assembly Level** tab, select  next to each PMI element to be displayed in the **Viewer**.

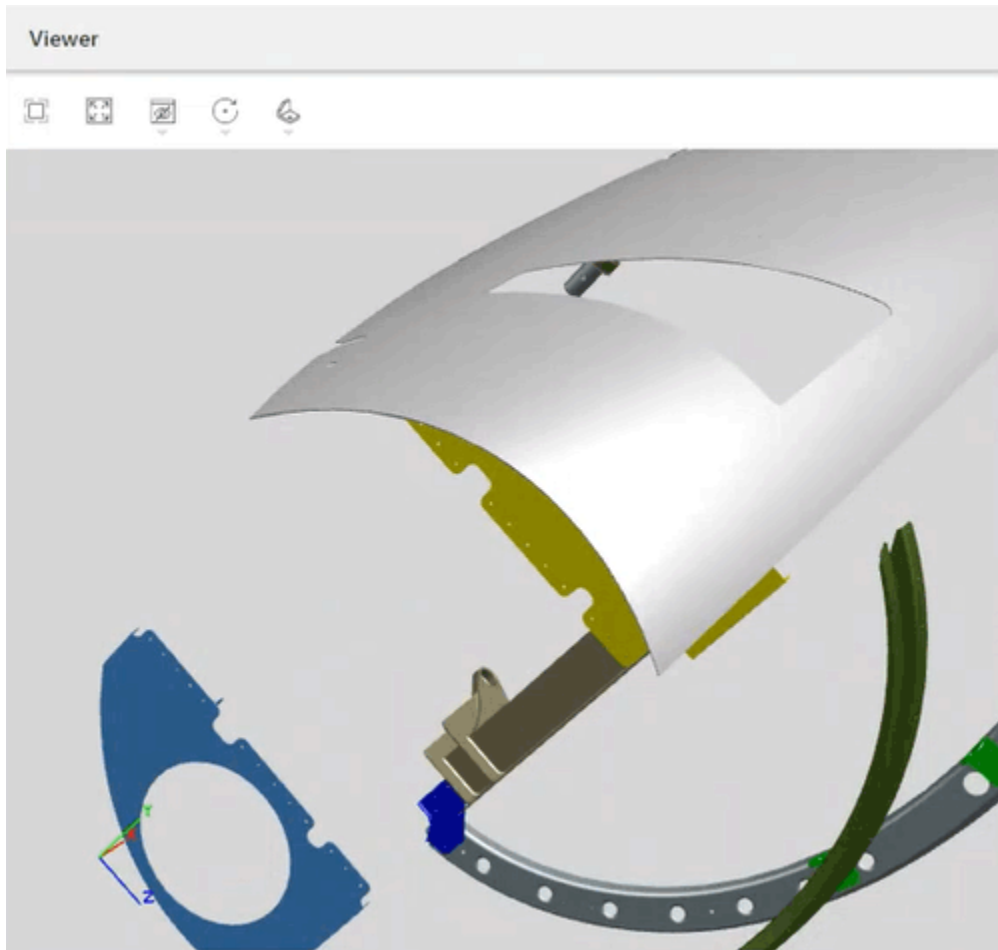
PMI elements attached to parts or assemblies that are outside those that you selected in step **2** may appear to hang in space outside the viewer.



- b. To zoom in to a specific element, select it in the **PMI Assembly Level** tab or **Viewer** and click . The view jumps to the PMI selection.



- c. (Optional) To zoom out to include all parts and assemblies and PMI elements, click .
- 4. To hide all PMI elements in the **Viewer**:
 - a. In the **Viewer**, click  and select **Hide All PMIs**.
PMI elements are cleared but part and assembly elements remain in the viewer.

**Tip**

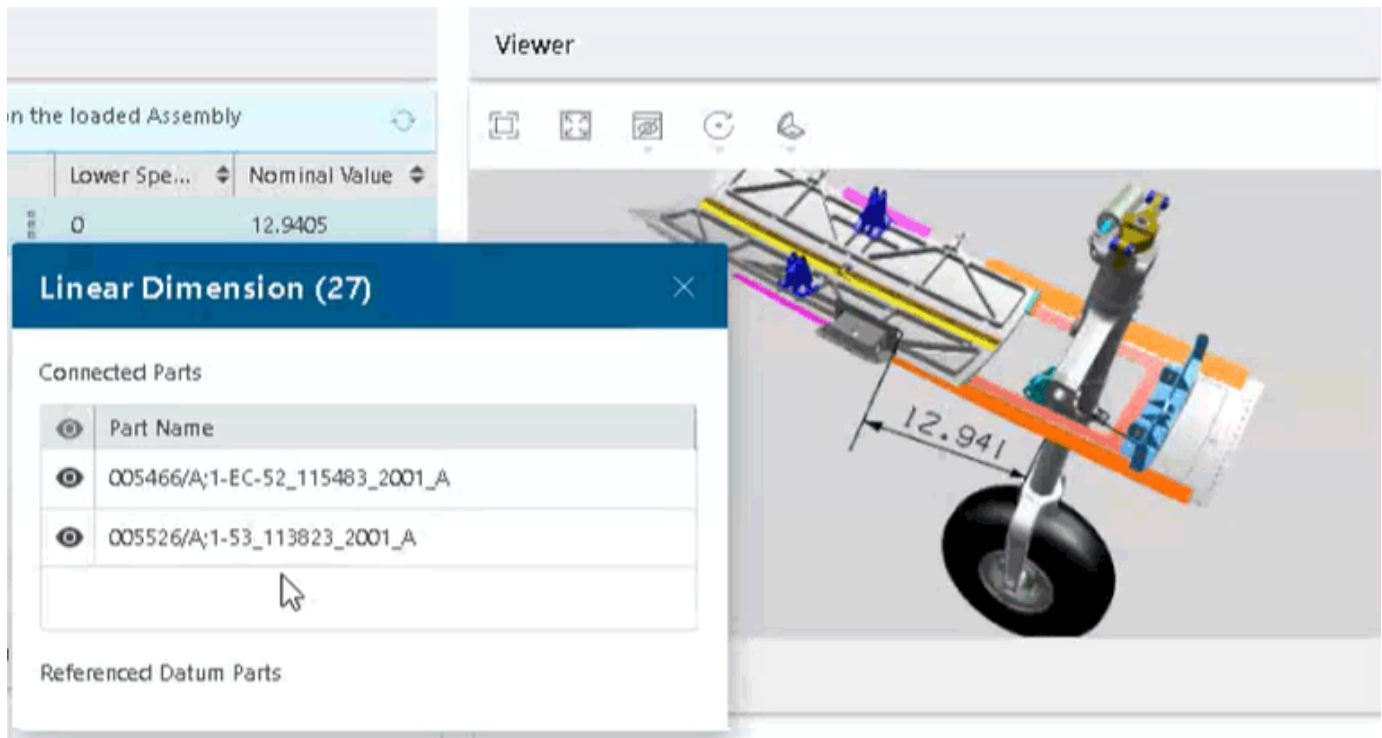
To hide all parts, assemblies, and PMI elements, click  and select **Hide All**.

- b. (Optional) To display the same or different parts, assemblies, and PMI elements, repeat this process.

Reviewing wave-linked geometry with PMI elements

In some cases, product manufacturing information (PMI) elements reference geometry that is not defined in an actual part occurrence, but rather in geometry stored in the upper assembly level of the model in NX.

To save time, wave-linked geometry such as a face, body, line, or curve (called *features* in NX) is copied and linked from a nominal part component in a lower-level assembly so that you can associate it with other components, such as PMI elements. You can then display wave-linked parts to which PMI elements are connected in **detailed views** by clicking  to show the wave-linked face, body, or curve of the part in the **Viewer** (wave linked geometry is displayed in orange in the example below).



Note

A PMI element might be specific to the visible wave-linked feature. For example, it might measure the length of a curve.

Visualize and review PMI assignments

Product manufacturing information (PMI) objects listed in the **PMI Assembly Level** tab of the **Work Instructions Authoring** page that are assigned to operations display icons to indicate whether they are assigned, overassigned, or missing in the JT source files.

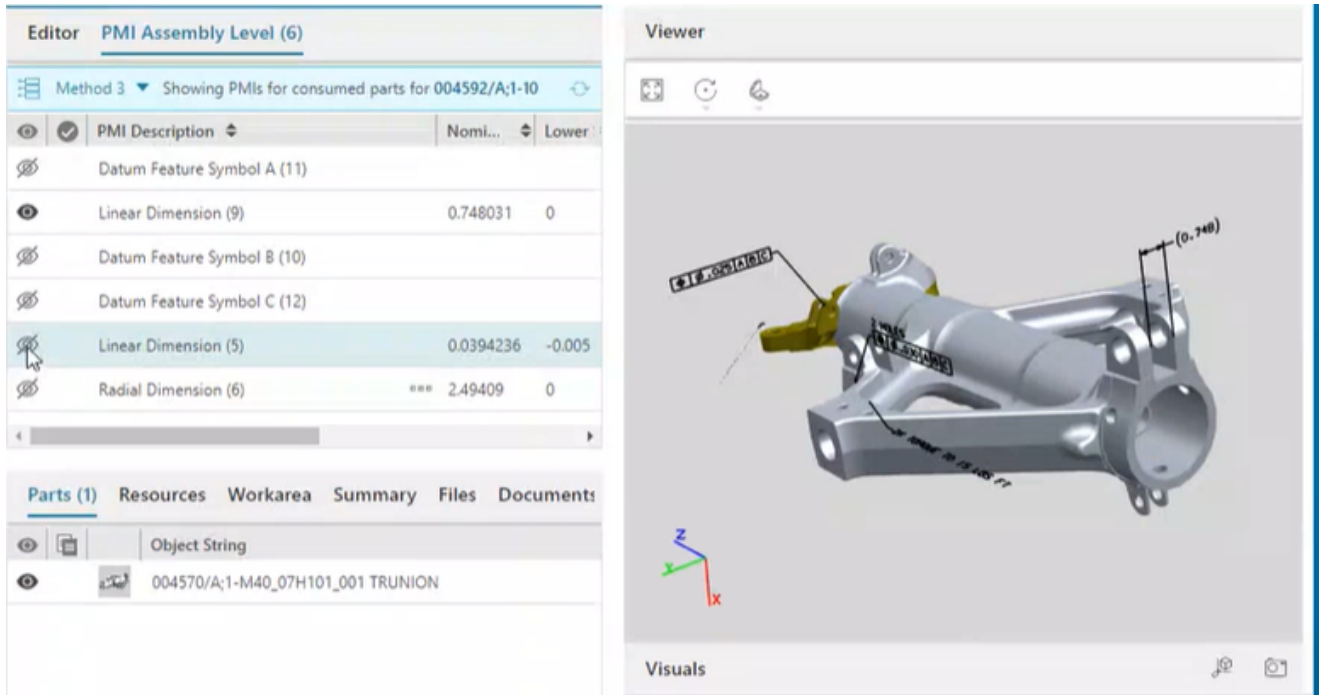
You can quickly:

- Visualize PMI and parts in the **Viewer** panel.
- Review the parts and operations to which a PMI object is assigned or connected.
- Select an operation and jump to that operation on the **Process** tab.

Procedure

1. If you have not done so already, **search for and open** an existing work package that contains processes and parts and **navigate** to the **Work Instructions Authoring** page.
2. On the **Process** tab, select a part or operation that contains PMI objects and **select a method**.

The PMI objects connected to the operation are displayed on the **PMI Assembly Level** tab. PMI objects that are connected to parts display an icon () on the right side of the **PMI Description** column when you hover over lines in the list. When you click that icon, if a part is marked as visible in the lower **Parts** tab, all PMI associated with that part is also visible in the **Viewer** panel.



Note

You can also show additional PMI objects in the viewer by marking individual PMI objects as visible  on the **PMI Assembly Level** tab. If the parts to which they are attached are not marked as visible in the viewer, they may not appear to be attached to a part.

3. Toward the top of the window, select **Show Consumption and Impact State** to enable assignment indications.

The **PMI Assembly Level** tab displays an icon to indicate PMI objects that are:

-  Consumed once under a loaded process.
-  Consumed twice or more under a loaded process.
-  Consumed once outside the scope of the loaded process.
-  Consumed twice or more outside the scope of the loaded process.

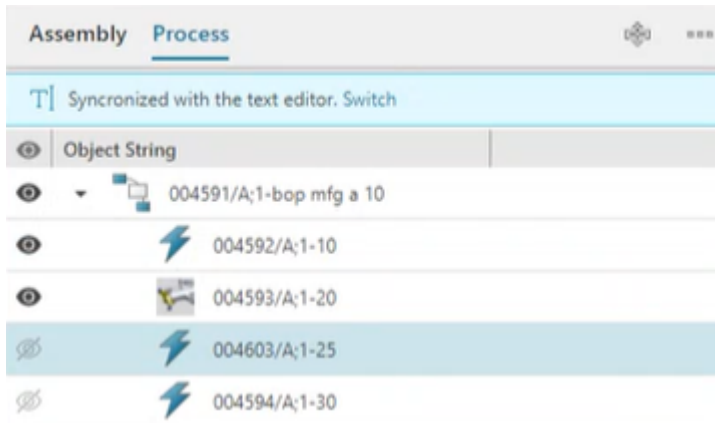
4. Hover your mouse over an assignment icon to review operations.

In this example, **Linear Dimension (5)** is consumed by operation **25**.



5. Click the operation indication.

On the **Process** tab, operation 25 is selected.



Assign or unassign PMI objects to a BOP

You can assign one or more product manufacturing information (PMI) objects to an operation in a bill of process (BOP) plan from the **PMI Assembly Level** tab to the lower **PMI** tab in the **Authoring Work Instructions page**. You can also unassign PMI objects from an operation via the **PMI** tab.

Procedure

1. If you have not done so already, **search for and open** an existing work package that contains processes and parts and **navigate** to the **Work Instructions Authoring** page.
2. Using the **Process** tab, define the operations that you want to handle specific PMI objects.

Tip

You can assign more than one PMI object to an operation.

3. On the **Process** tab, select an operation.
4. In the **PMI Assembly Level** tab, select a **content method** relevant to the operation (**Method 3** for a selected operation in the **Assembly** list).
5. Do either of the following:
 - If there are unconsumed PMI objects you want to assign to the selected operation, drag them to the lower **PMI** tab.
The objects are displayed in the **PMI** tab and are assigned to the operation.
 - On the **PMI** tab, select any PMI objects to be unassigned from the selected operation and click **Unassign** ⊖.

Locate PMI assembly and process definitions

Product Manufacturing Information (PMI) objects can be attached to parts that are used in assemblies or processes that are either actively loaded or unloaded. You can quickly identify the assemblies or processes to which PMI objects belong, both in currently loaded assemblies and processes, and in unloaded external assemblies and processes.

Note

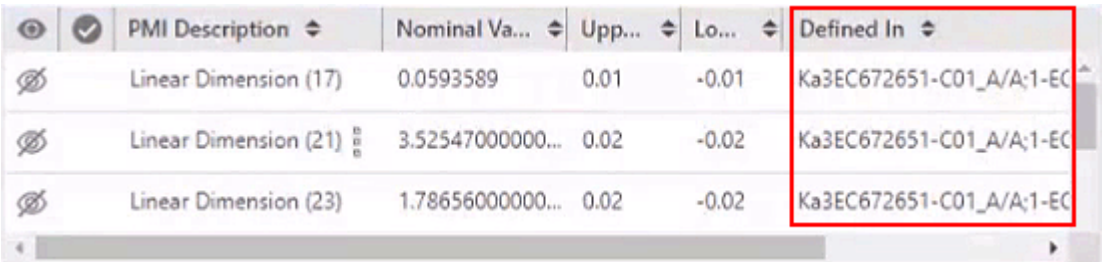
All loaded and unloaded manufacturing assemblies and processes that are referenced by the PMI data must be installed.

1. If you have not done so already, **search for and open** an existing work package that contains processes and parts and **navigate** to the **Work Instructions Authoring** page.
2. Select the **PMI Assembly Plan** tab and **define content** using a selection method.

Note

Method 1 shows PMI content that is based on the loaded assembly.

For each PMI object in the tab, the **Defined In** column reports the names of those EBOM parts or assemblies to which the object is connected in the currently loaded configuration, as well as in external configurations. A *defined in* location or *parent context* to which assembly PMI is connected often indicates where other PMI objects may also be defined at the same level.



	PMI Description	Nominal Va...	Upp...	Lo...	Defined In
	Linear Dimension (17)	0.0593589	0.01	-0.01	Ka3EC672651-C01_A/A:1-EC
	Linear Dimension (21)	3.52547000000...	0.02	-0.02	Ka3EC672651-C01_A/A:1-EC
	Linear Dimension (23)	1.78656000000...	0.02	-0.02	Ka3EC672651-C01_A/A:1-EC

When you make general configuration and revision changes to the parent assembly, assigned PMI and product views are automatically updated.

3. Next to a preferred PMI object in the **PMI Description** column, click **More**

Links to **Defined In** information are available in the PMI object's specific dialog box. The dialog box also displays information on the PMI object's target assemblies and target processes.

Linear Dimension (21)

Defined In: Ka3EC672651-C01_A/A;1-EC672651-C01_A

Connected Parts

	Part Name	Target Assembly	Target Process
	Ka3EC-53_115096_2001_a_...	Current loaded Assembly	Current loaded Process
			011907/A;1-sank_5
			011898/A;1-P_10

Referenced Datum Parts

This PMI does not reference any datums

4. Click the **Defined In** link.
- The item revision opens in Active Workspace and further details on the target assemblies and processes are displayed.

Element	ID	Revision	Revision Name
Ka3EC672651-C01_A/A;1-EC672651-C01_A	Ka3EC672651-...	A	EC672651-C01_A
Ka3Washer, Flat, NAS1149,29/A;1-Washer, Flat, NAS1149,29	Ka3Washer, Fla...	A	Washer, Flat, NAS1149,29
Ka353_103502_2002_A/A;1-53_103502_2002_A	Ka353_103502_...	A	53_103502_2002_A
Ka3EC-21-322032_2001_A/A;1-EC-21-322032_2001_A	Ka3EC-21-3220...	A	EC-21-322032_2001_A
Ka3EC-21-874598_2001_A/A;1-EC-21-874598_2001_A	Ka3EC-21-8745...	A	EC-21-874598_2001_A

5. (Optional) Close Active Workspace.

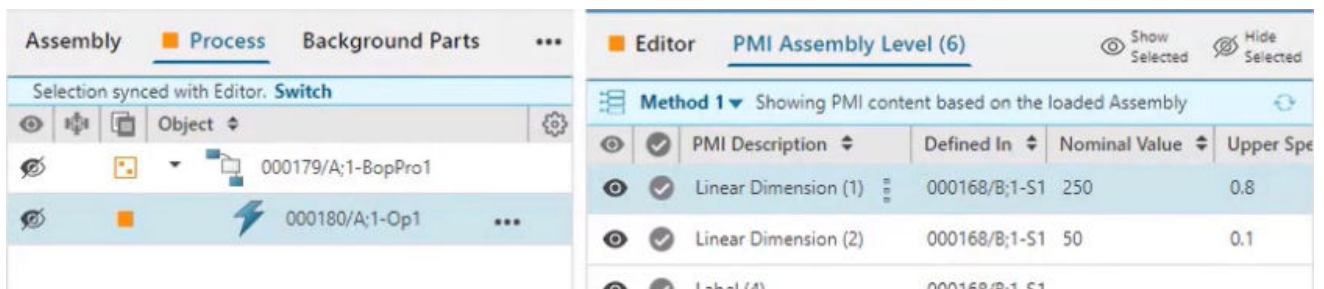
Compare and update PMI assignment indications

Use the consumption and impact state comparison to compare assigned and changed PMI values and to update impacted PMI.

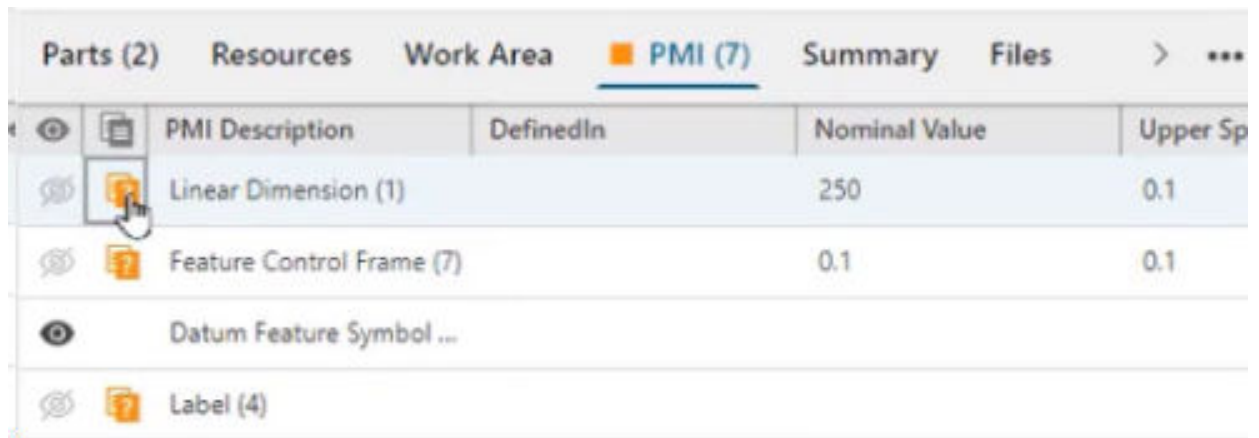
Procedure

1. If you have not done so already, **search for and open** an existing work package with an active manufacturing change notice (MCN), and then **navigate** to the **Work Instructions Authoring** task page.
2. To set up a useful PMI view, select the **Process** and **PMI Assembly Level** tabs, and in the Information panel, select the **PMI** tab.
3. Click the **Show Consumption and Impact State**  **assignment comparison control**.
4. **Review** PMI assignment indicators.
5. In the **Process** tab, select an impacted process or operation, and in the **PMI Assembly Level** tab, select an impacted PMI node.

In this example, the impacted node is a linear dimension consumed outside the scope of the loaded process.



6. In the Information panel, select the **PMI** tab.
7. For each PMI object impacted by changes, do the following.
 - a. In the **PMI** tab, click an impacted assignment indication icon.



- b. In the **Review changes** dialog box, review the PMI specification changes, and if you approve, click **Update**.

Review changes for "Linear Dimension (1)"

Close

	Assigned PMI Value	Changed PMI Value
Upper Specification Limit	0.100000	0.800000
Lower Specification Limit	-0.100000	-0.800000
Context	000168/A;1-S1	000168/B;1-S1

Cancel

Update

The impacted assignment indication icon is updated in both the **PMI Assembly Level** tab and the **PMI** tab.

Editor

PMI Assembly Level (6)

Show Selected

Hide Selected

Method 1

Showing PMI content based on the loaded Assembly

	PMI Description	Defined In	Nominal Value	Upper Spe
	Linear Dimension (1)	000168/B;1-S1	250	0.8

Parts (2)

Resources

Work Area

PMI (7)

Summary

Files

>

...

	PMI Description	DefinedIn	Nominal Value	Upper Spe
	Linear Dimension (1)		250	
	Feature Control Frame (7)		0.1	0.1

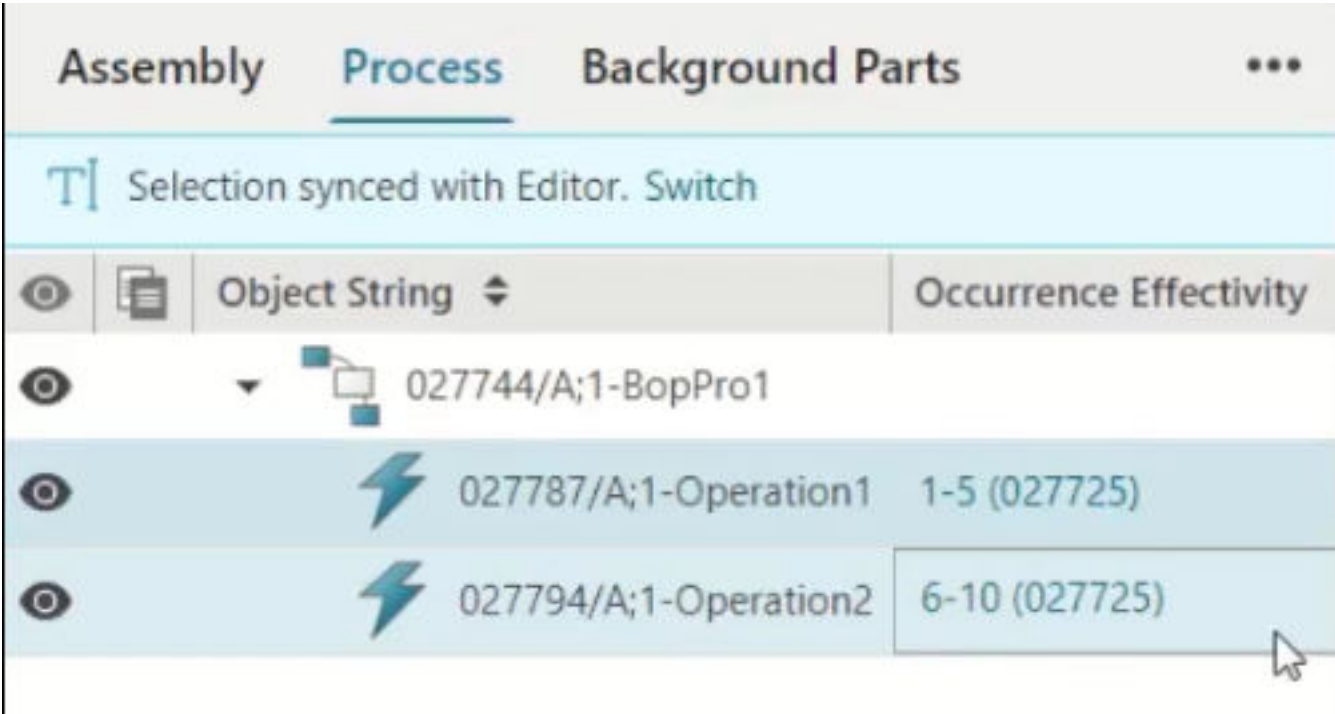
More Comm

PMI assignment indications and occurrence effectivities

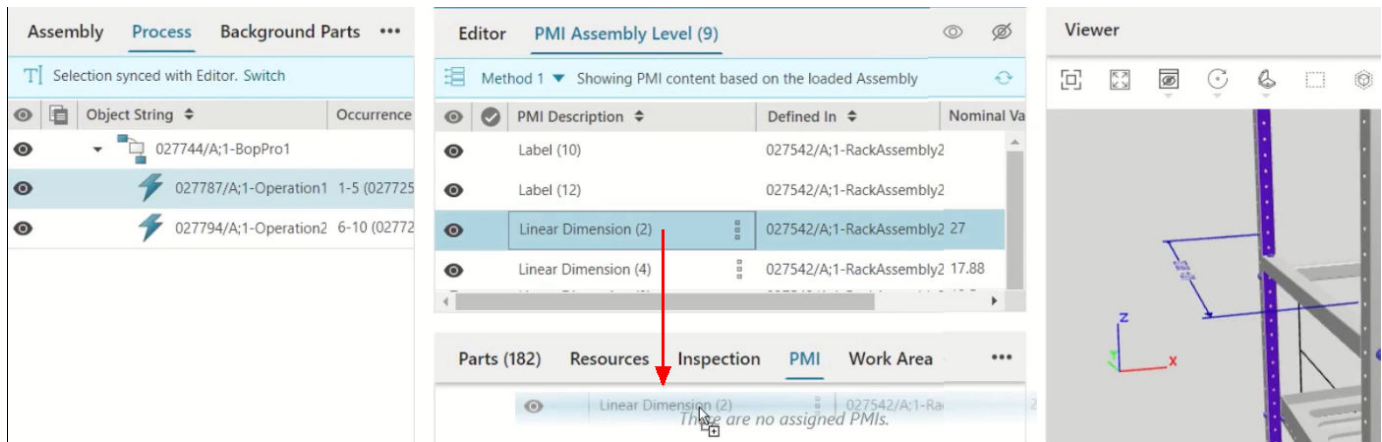
PMI assignment icons let you review operations to which PMI objects are assigned.

This example shows how **PMI assignment indications** function in combination with occurrence effectivities.

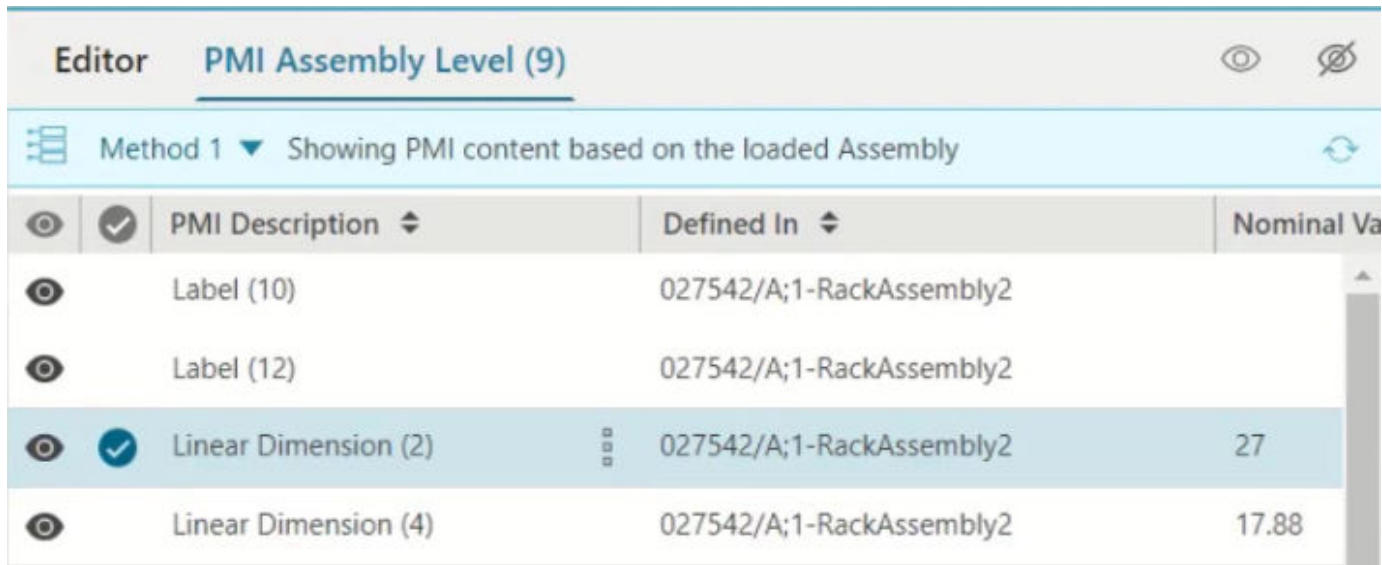
Beginning with a simple process that contains two operations with no PMI assigned to either operation, you define an **occurrence effectivity** for **Operation1** by selecting end item **027725** and specifying units 1-5. You similarly set an occurrence effectivity for **Operation2** with the same end item, **027725**, but instead specify units 6-10. These effectivities are mutually exclusive, because they have different unit ranges.



With **Operation1** selected in the **Process** tab, you drag the PMI object **Linear Dimension (2)** from the **PMI Assembly Level** tab to the **PMI** tab in the Information panel.

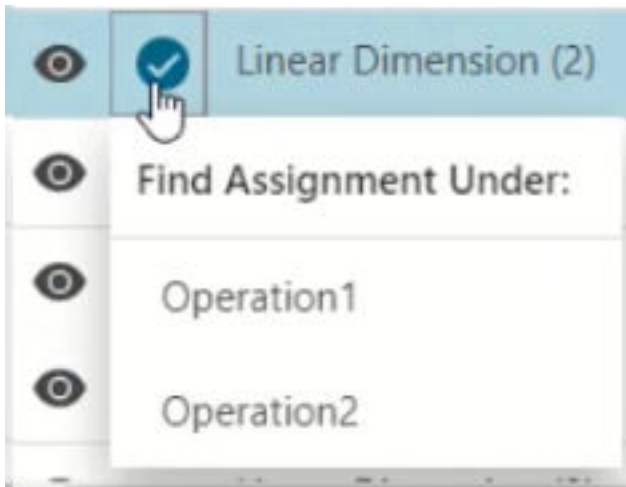


The PMI is now assigned to **Operation1**. When you enable the **Show Consumption and Impact State** ☒ **assignment comparison control**, the **Consumed** assignment indicator ☒ is displayed.

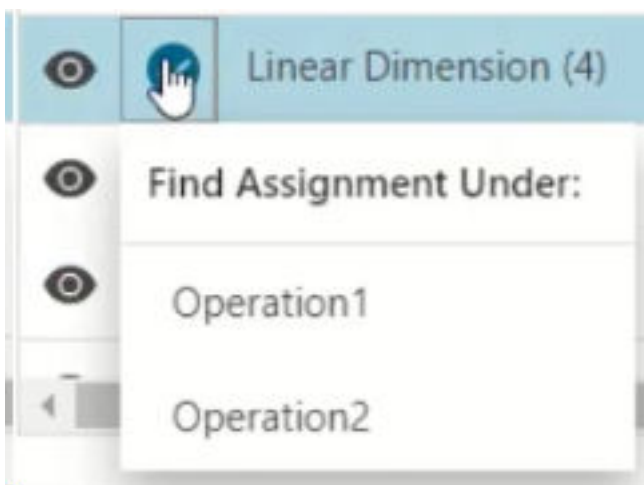


When you also assign **Linear Dimension (2)** to **Operation2**, the PMI object retains the **Consumed** ☒ icon. Normally, assigning a PMI object to multiple operations automatically results in a **Consumed Multiple Times** ☒ icon, but this object retains the **Consumed** ☒ icon due to the effectivity calculations based on the operations.

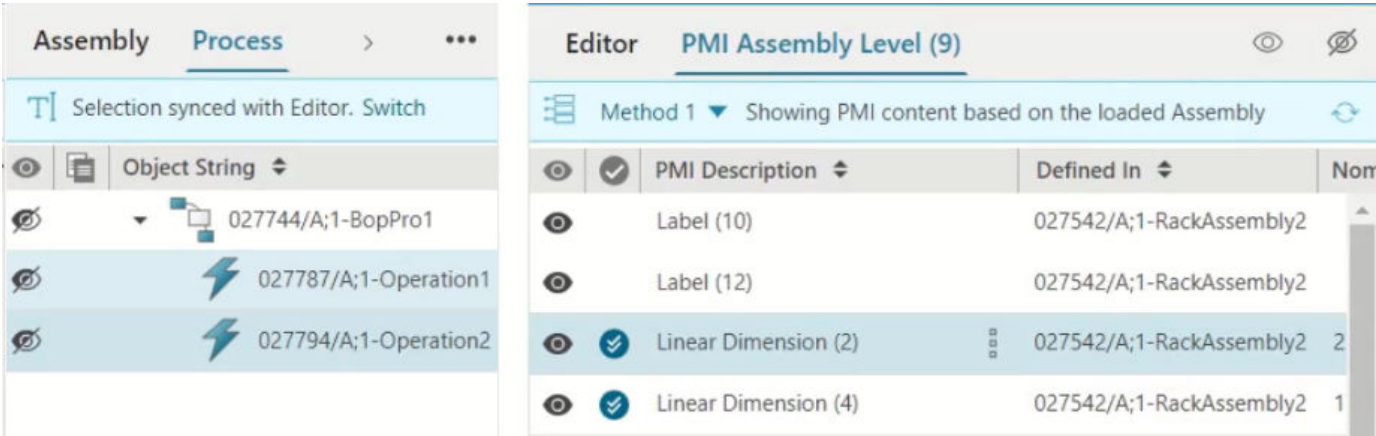
Click the icon to highlight and review the PMI assignments in the **Process** tab.



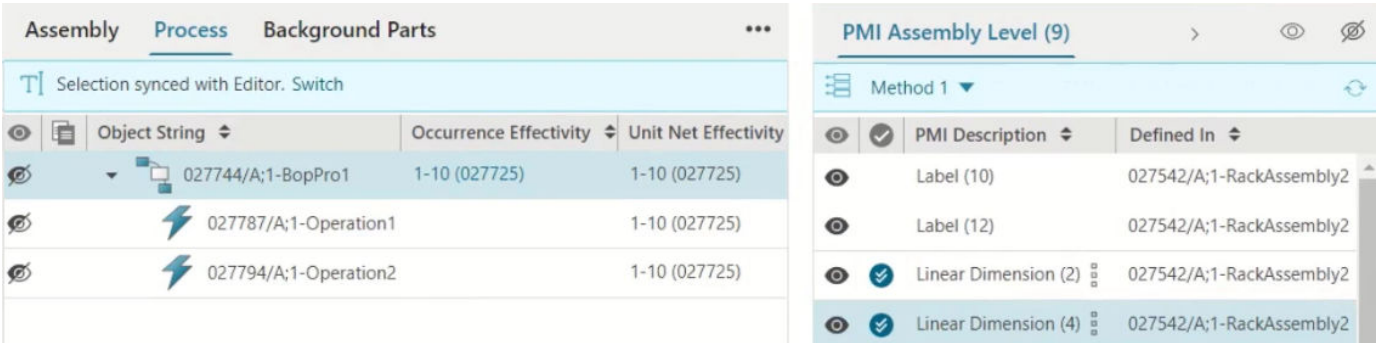
Similarly, assigning an additional PMI object to both operations retains the single check mark. In this example, **Linear Dimension (4)** is assigned twice within the process, but appears to be assigned only once due to the two mutually exclusive effectivities.



When you remove the effectivities, **Linear Dimension (2)** and **Linear Dimension (4)** are still assigned to **Operation1** and **Operation2**. They display the **Consumed Multiple Times** icon.



If occurrence effectivity is applied at the process level, that effectivity flows to each operation. In this example, a single occurrence effectivity, **1-10 (027725)**, applies to both operations in process **BopPro1**. Since **Linear Dimension (2)** and **Linear Dimension (4)** are assigned to both operations, both display the **Consumed Multiple Times** icon.



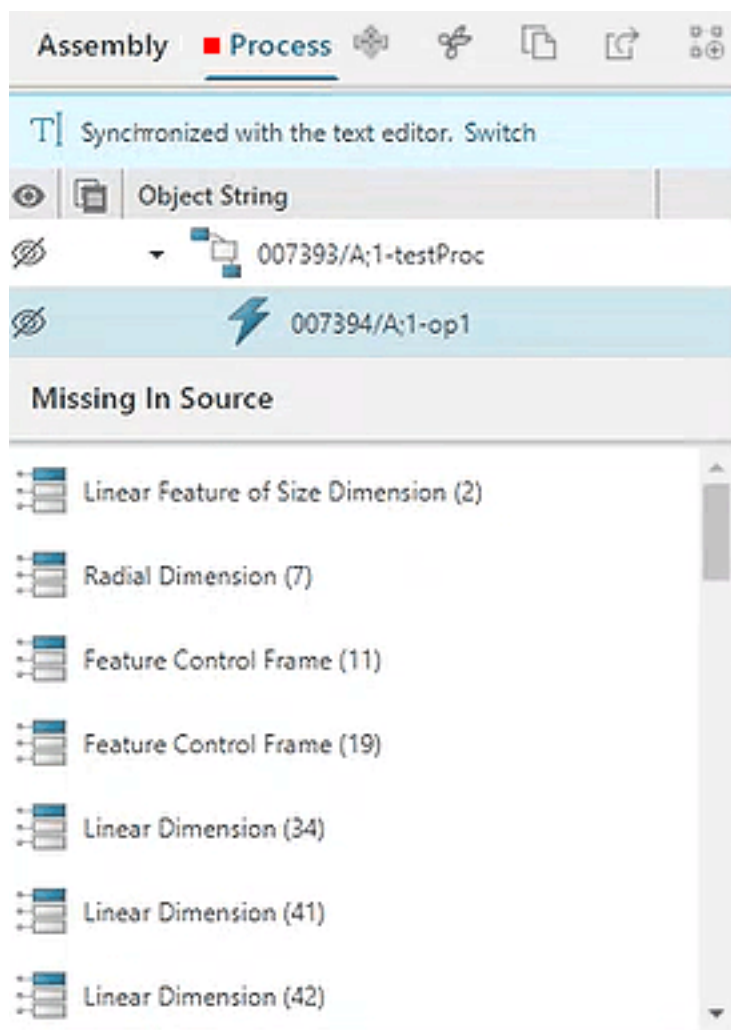
Review missing-in-source PMI information

Product manufacturing information (PMI) may appear missing in the manufacturing bill of materials (MBOM) due to a design change, or because it is connected to, or referenced by, another external assembly. From a single location, you can review a list of PMI objects that are assigned to a process or operation, in the same way you can review parts that are missing in the source engineering bill of materials (EBOM).

Procedure

1. If you have not done so already, **search for and open** an existing work package that contains processes and parts and **navigate** to the **Work Instructions Authoring** page.
2. Click the **Process** tab and enable **Show Consumption and Impact State**.
To the right of **Show Consumption and Impact State**, the number of parts that are overconsumed in the loaded process are reported. The next field shows the number of parts and PMI objects that are missing in the source for the loaded process.

The **Process** tab displays a red indicator . Below the tab, a **Missing In Source** list details the dimensions, feature control frames, and geometric dimensioning and tolerancing (GD&T) elements that are missing from the work package source. The number of elements missing from the source appears to the right of each kind of element.



- On the **Process** tab, click a process or operation to which PMI information is assigned, and then click the **PMI Assembly Level** tab.
The **PMI Assembly Level** tab displays a red indicator and affected PMI elements display missing-in-source icons . The **PMI** tab in the information panel below the **PMI Assembly Level** tab displays the same icon for all PMI elements missing in the source from the selected process or operation.

Parts Resources Workarea Summary Files Documents PMI (37)						
		PMI Description	Nominal Value	Upper Specificatio...	Type	Lower Specific
		Linear Dimension (23)	1.78656000000000e-18	0.02	Inspection Revision	-0.02
		Linear Dimension (28)	0.0635489	0.03	Inspection Revision	-0.03
		Linear Dimension (30)	0.0630558	0.03	Inspection Revision	-0.03
		Feature Control Frame (14)	0	0.02	Inspection Revision	0
		Linear Dimension (33)	3.83498000000000e-18	0.04	Inspection Revision	-0.04
		Feature Control Frame ...	0.05	0.025	Inspection Revision	-0.025
		Feature Control Frame (1)	0.02	0.01	Inspection Revision	-0.01

When the parts are reclaimed, the warnings are resolved.

Review impacted in-scope PMI objects

On the **Work Instructions Authoring** page, you can review changes to PMI properties.

If a part contains product manufacturing information (PMI) objects that have been changed by engineering, and that part is associated with change notices, indicators and impacted in-scope partial match warnings  are displayed on the **Work Instructions Authoring** page to indicate the change to PMI properties.

Note

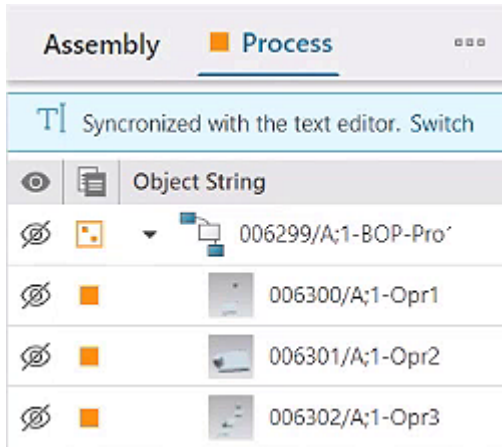
In-scope warnings are only displayed if an engineering change notice (ECN) is applied to the operation that contains the affected part, and a manufacturing change notice (MCN) is applied to that operation's work package.

For more information on change notices, see *ECNs, MCNs, CRs, and ECNs*.

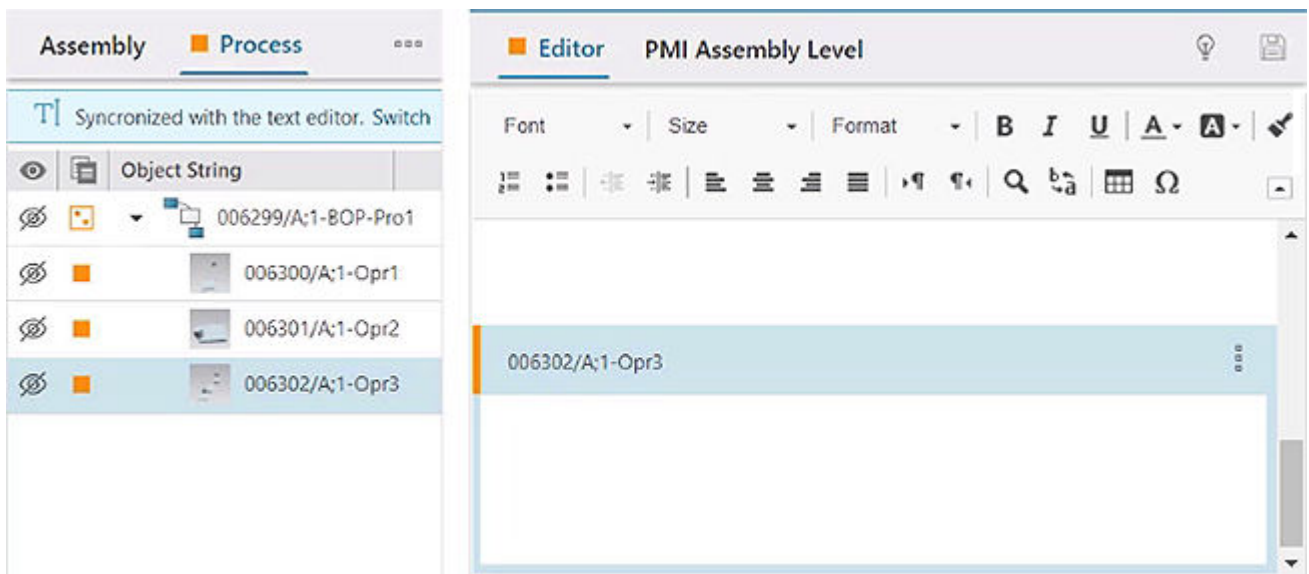
Procedure

1. If you have not done so already, **search for and open** an existing work package that contains processes and parts and **navigate** to the **Work Instructions Authoring** page.
2. Click the **Process** tab and enable **Show Consumption and Impact State**.
To the left of **Show Consumption and Impact State**, the MCN is reported.

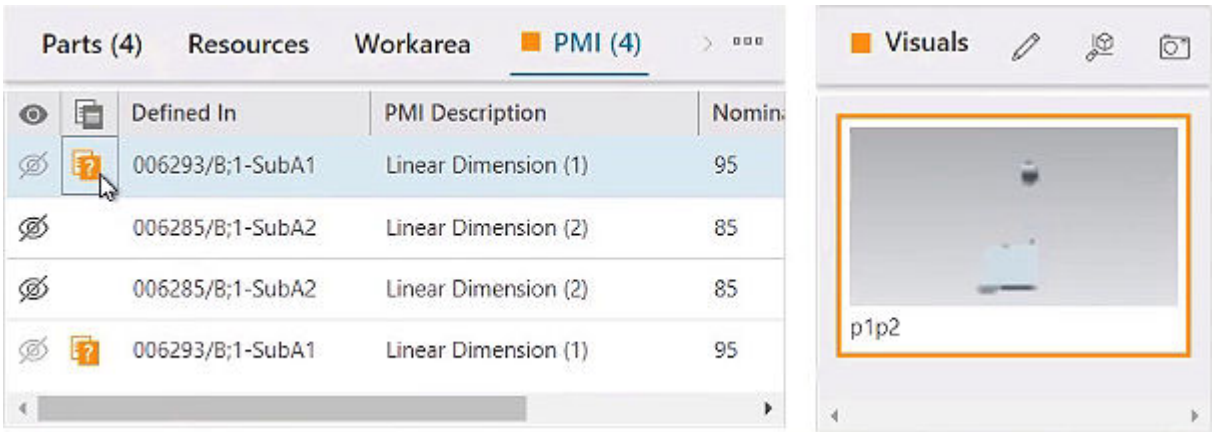
The **Process** tab displays an orange indicator . Any operations containing consumed parts with impacted PMI objects display the same indicator.



3. In the **Process** tab, select an affected operation.
If the **Process** tab is synchronized with the **Editor** tab, an orange indicator is also displayed on the **Editor** tab, and the operation is indicated.



4. In the information panel below the **Editor** tab, click the **PMI** tab, and in the **Work Instructions Authoring** page toolbar, click **Calculate Impact on Product Views**.
Impacted PMI objects display in-scope partial match warnings  in the **PMI** tab. When you select an impacted PMI object in the tab, any affected product views are highlighted in the **Visuals** panel below the **Viewer** panel.



When the associated ECN is **verified**, the warnings are resolved.

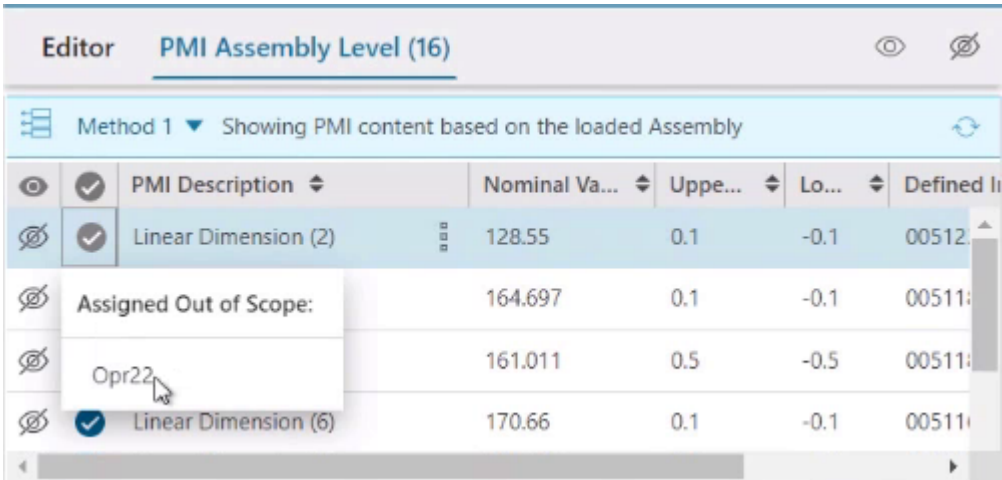
Review out-of-scope PMI objects

On the **Work Instructions Authoring** page, you can review PMI objects that are out of the scope of the work package.

If a part with product manufacturing information (PMI) objects is assigned outside the scope of your work package, an out-of-scope partial match warning  is displayed next to those PMI objects on the **Work Instructions Authoring** page. You can open a new browser page to view the PMI objects in scope.

Procedure

- 1. If you have not done so already, **search for and open** an existing work package that contains processes and parts and **navigate** to the **Work Instructions Authoring** page.
- 2. Click the **PMI Assembly Level** tab and next to an out-of-scope PMI object, click the out-of-scope partial match warning , and then click the out-of-scope operation.



A new browser page opens with the PMI object now in scope, and in the **Work Instructions Authoring** page toolbar, the operation is reported as **Selected**. You can work in the new page, or return to the original browser page, to work as you prefer.

Define 3D PMI in Teamcenter Lifecycle Visualization

When you incorporate product manufacturing information (PMI) into your assembly process plans in Process Planning for ETO, you can define how PMI is displayed in the **Viewer** panel for each operation by capturing screen shots with PMI in product views in Teamcenter Lifecycle Visualization.

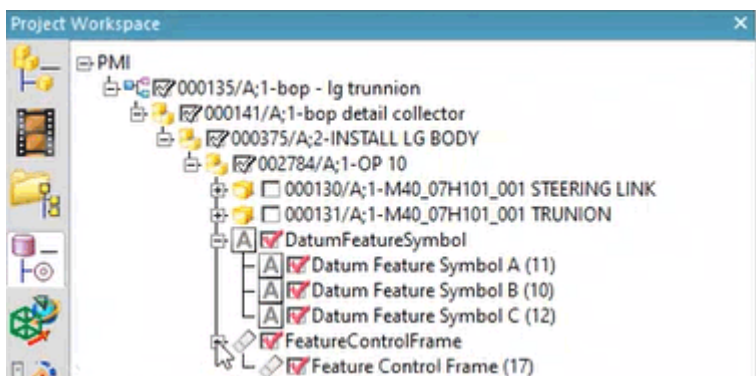
Note

Teamcenter Lifecycle Visualization must be installed on your client machine.

Procedure

1. If you have not done so already, **search for and open** an existing work package that contains processes and parts and **navigate** to the **Work Instructions Authoring** page.
2. On the **Process** tab, select an operation that contains assembly PMI in the engineering bill of materials (EBOM) that is not shared with the manufacturing bill of materials (MBOM) and click  to visualize the PMI with part data in the **Viewer** panel.
3. On the **Visuals** panel beneath the **Viewer** panel, click **Manage Product Views in Teamcenter Visualization** .
Teamcenter Lifecycle Visualization opens, including assemblies, parts, operations, and PMI data.
4. In the Assembly page of the Project Workspace window, expand the hierarchy structure and select  the elements that you want to show in your screen shot.

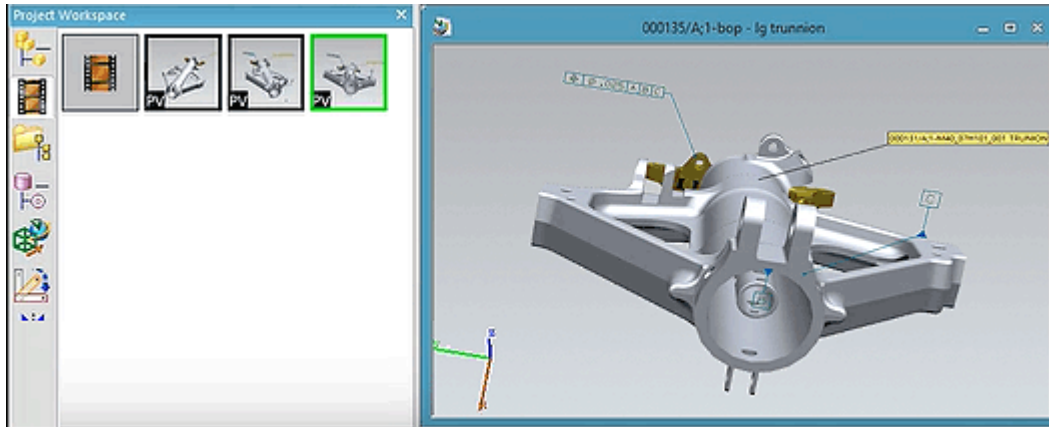
Elements include parts, assemblies, subassemblies, operations, suboperations, and PMI data.



5. Add markup text and use the **Manipulate PMI** and **Confirm PMI Manipulation** commands to move markup and PMI information not attached to nonvisible parts in the Viewing window.

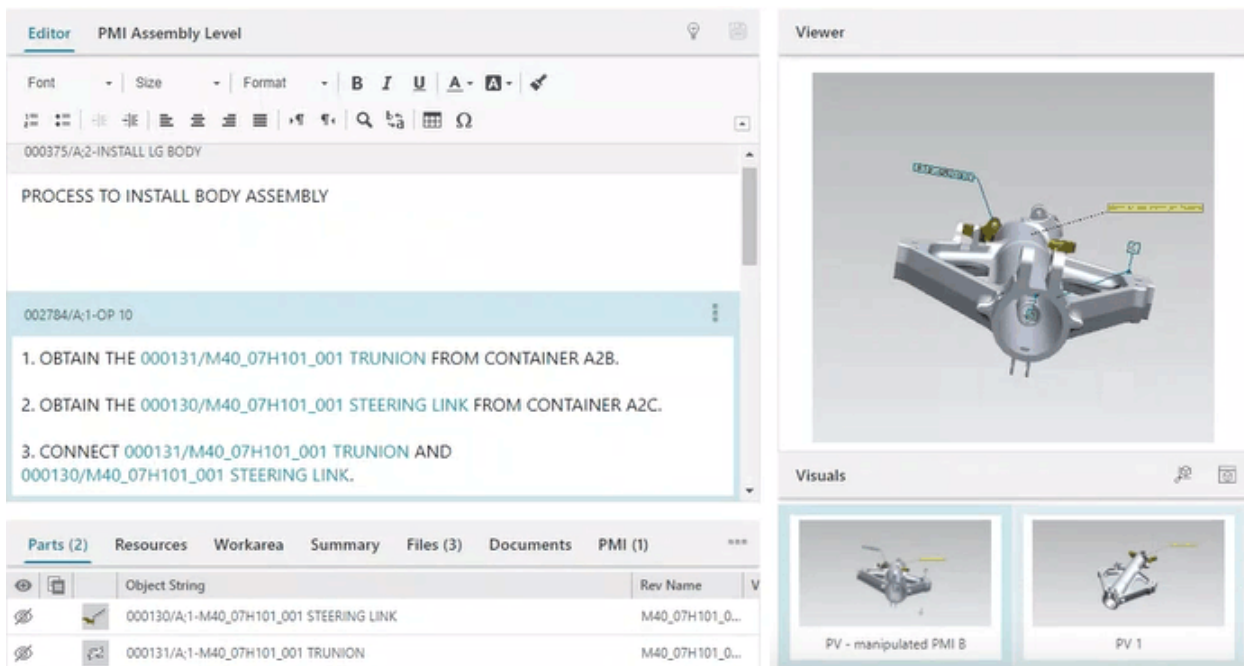
For details on adding markup, working with PMI, and other information on Teamcenter Lifecycle Visualization, see the Teamcenter Lifecycle Visualization online help on Support Center.

- In the Project Workspace window, click the Snapshots page and add new product views of the manipulated Viewing window.



You can add as many views as you like for use in Process Planning for ETO.

- On the Snapshots page, select the product views, right-click one, and choose **Save as Teamcenter Product View**.
- In the **New Teamcenter Product View Dataset** dialog box, type a name for the dataset, click **OK**, and in the **Information** message box, click **OK**.
- Close Teamcenter Lifecycle Visualization and return to the Teamcenter Easy Plan browser. The snapshot views are available for use in the **Visuals** panel.



Automatically update PMI from NX and Teamcenter JT sources

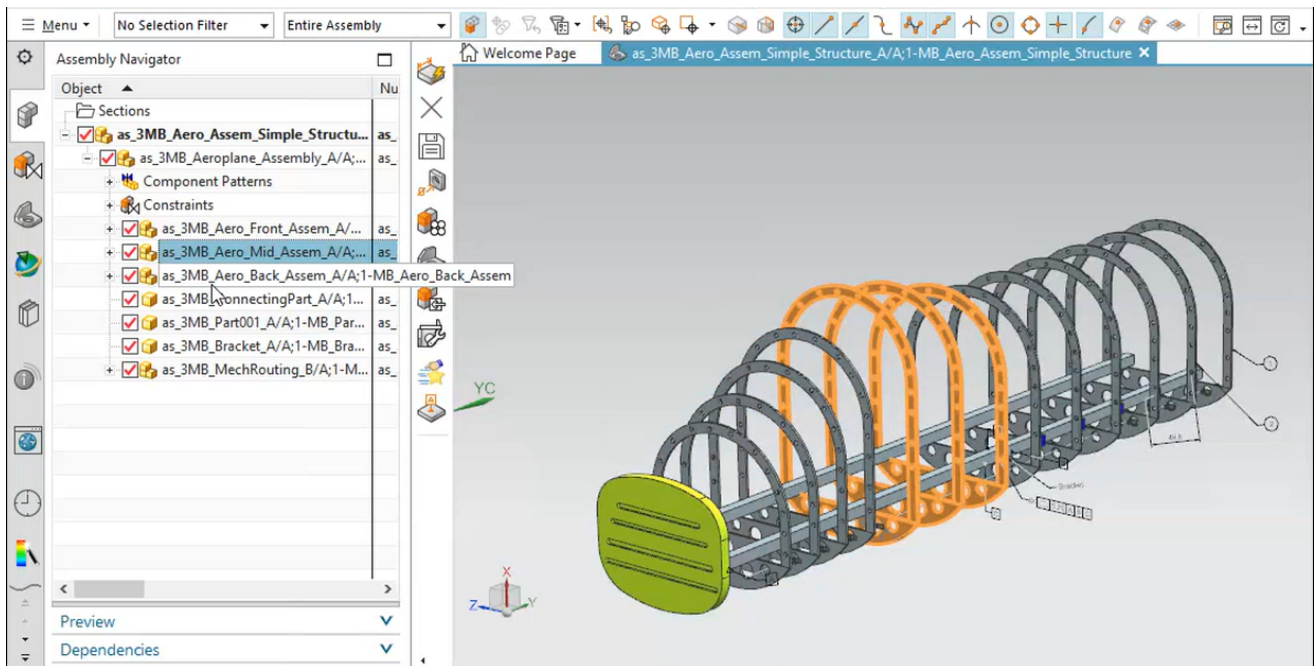
Using a defined workflow in Teamcenter, you can automatically update JT data containing product manufacturing information (PMI) when JT files in a structure are changed and saved in NX and Teamcenter Manufacturing Process Planner. Alternately, you can improve performance and scalability by updating PMI information for a manually created list of specific JT nodes, thus avoiding the need to update PMI information for an entire engineering bill of materials (EBOM).

Note

To update an entire structure, no action is required but to make and save the changes in a modeling program such as NX and in Teamcenter.

1. In the modeling program, update a subassembly in a structure by modifying the preferred subassembly of the EBOM and then saving only that subassembly to Teamcenter.

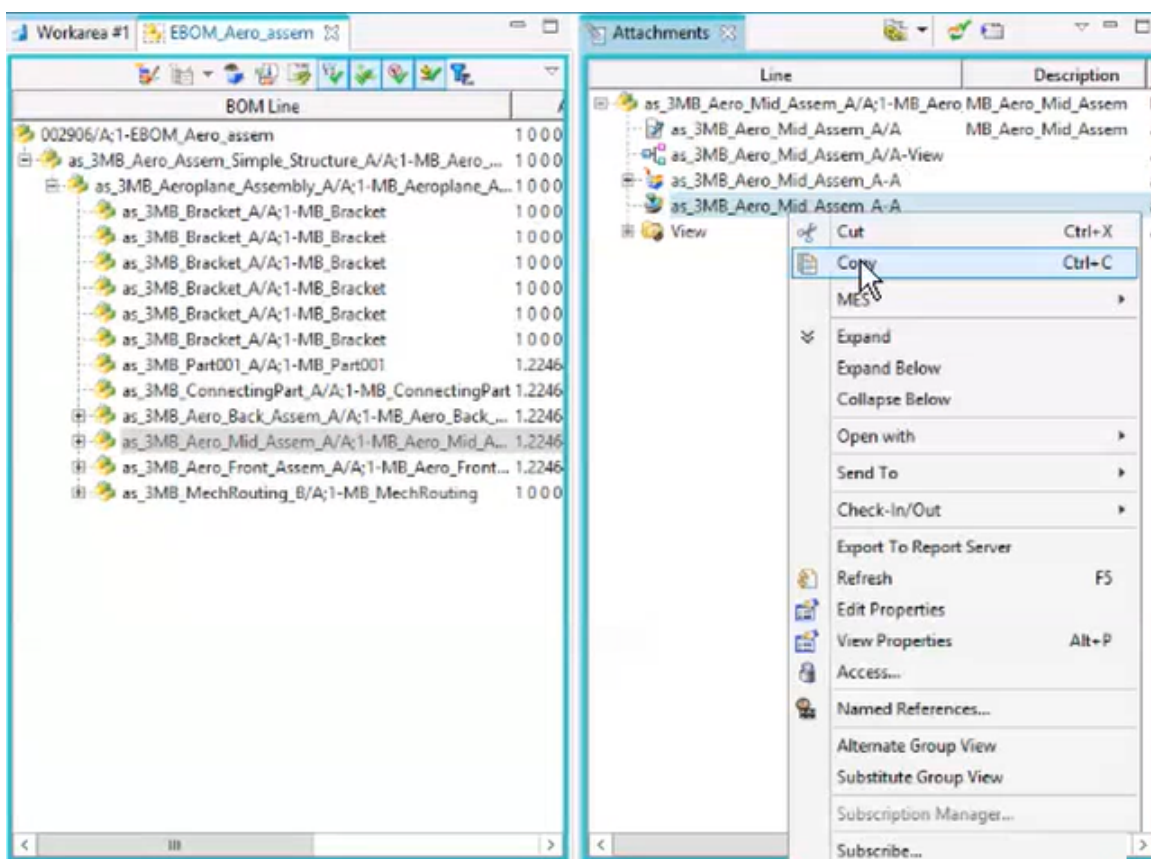
The following example illustrates a selected middle subassembly for which PMI information has been modified.



Note

For more information on PMI in NX, search for *PMI* in the appropriate version of the NX Support Center documentation.

2. In Teamcenter Manufacturing Process Planner, in the EBOM, open the subassembly as an attachment, right-click the subassembly JT file, and then choose **Copy**.



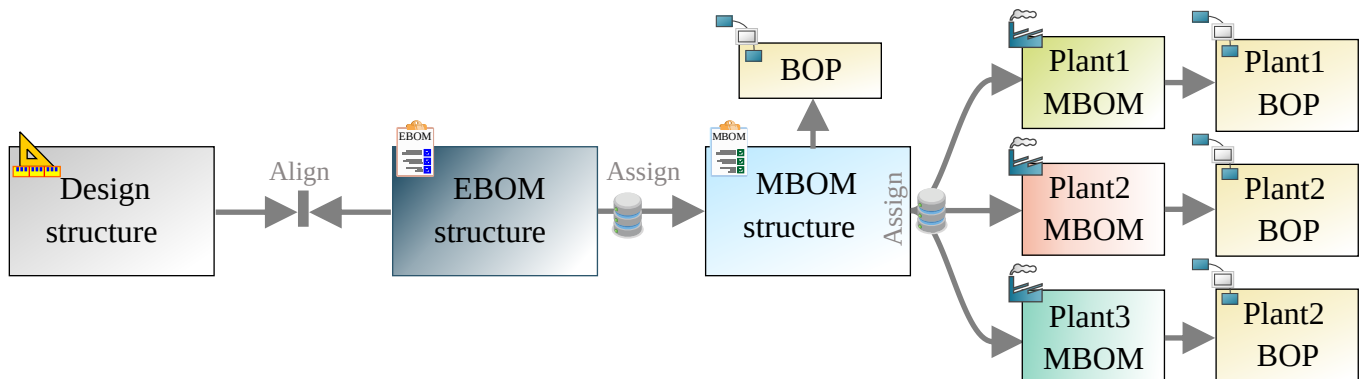
3. In the EBOM, select any node from the structure, press Ctrl + n, and in the **New Process Dialog** dialog box, from the **Process Template** list, select **PMI Characteristics Extractor**.
4. In the **Attachments** tab, right-click the **Targets** folder, choose **Paste** to paste the JT file copy, and click **OK**.

In Teamcenter Easy Plan, the updated PMI is visible in the **PMI Assembly Level** tab of the **Work Instructions Authoring** page.

5. Manage MBOM

Common EBOM-MBOM workflow

The most common EBOM-MBOM workflow involves separate electronic bill of materials (EBOM), manufacturing bill of materials (MBOM), and individual plant structures.



1. A design structure created and maintained in a CAD program, such as NX, is aligned with an EBOM structure.
2. Elements from that structure are assigned to an MBOM, which maintains its own BOP.
3. MBOM elements and processes are assigned to plants, which use these elements in combination with plant-specific MBOM elements and BOPs to manufacture the final product.

Use basic EBOM and MBOM alignment commands

Basic commands allow you to expand or collapse and pack and unpack Engineering Bill of Materials (EBOM) and Manufacturing Bill of Materials (MBOM) assembly levels. If necessary, complete the following before proceeding to the basic commands below.

Search for and open a work package or CC object in Manufacturing-BOM Manager with a linked engineering bill of materials (EBOM) and manufacturing bill of materials (MBOM) displayed on the **EBOM/MBOM Alignment** page.

Expand and contract assembly levels

- In the EBOM or MBOM, select an assembly, and in the panel toolbar, click **Expand** (down arrow icon) → **Expand Below** or **Collapse Below** (up arrow icon).

Note

You can also expand the structure a number of levels below a selected element.

1. In the toolbar, click  → **Expand to Level**.
2. In the **Expand to Level** text box, type a number to indicate the level to which the assembly should be expanded or collapsed.
3. Press Enter.

The assembly expands or collapses to the level you indicated.

Pack and unpack to collapse or expand element lines

Procedure

1. In the EBOM or MBOM, select one or more elements.
2. In the toolbar, click **Expand**  → **Pack** or **Unpack**.
When you choose **Pack**, the number of packed lines is indicated by a number followed by the letter x. For example, **3x** indicates that the packed line contains three packed lines.

When you select a packed assembly and choose **Unpack**, the packed nodes are displayed.

Pack or unpack nodes one level below an assembly

Procedure

1. In the EBOM or MBOM, select an assembly.
2. In the toolbar, click **Expand**  → **Pack Below** or **Unpack Below**.
When you choose **Pack Below**, all nodes one level below the selected assembly are packed into that assembly. The number of packed lines is indicated by a number followed by the letter x (for example, **3x** to indicate that the packed line contains 3 packed lines below it).

When you select a packed assembly and choose **Unpack Below**, the packed nodes expand and are displayed beneath the selected assembly.

Remove elements from the EBOM or MBOM structure

Procedure

1. Select one or more elements in the EBOM or MBOM, and in the EBOM or MBOM toolbar, click **Remove** .
2. In the confirmation dialog box, click **Remove** again.

Results

The elements are removed from the EBOM or MBOM structure.

Manage EBOM and MBOM columns

You can add, resize, remove, and drag columns to a different order in the EBOM or MBOM. For more information, see *Page Layouts and Navigation* in the *Active Workspace Fundamentals* section of the *Active Workspace* help. You can also **match** EBOM and MBOM table properties.

EBOM to MBOM assignment status icons

EBOM to MBOM assignment status icons indicate matches and mismatches between an EBOM and an MBOM, or between an EBOM and an integrated MBOM.

When you assign parts or assembly elements from an engineering bill of materials (EBOM) to a manufacturing bill of materials (MBOM), or from an integrated BOM and an integrated MBOM, assignment indication icons are displayed in the **Assignment State** columns of the applicable panels. These icons indicate assignment statuses and help you to locate and correct problem elements in the MBOM. Orange icons that are displayed in the **Mismatch** column of the MBOM indicate mismatch details; those displayed in the **Mismatch** column of the EBOM often indicate that an element is missing or contains assignments with different revisions. Once you find problems, locate them in the MBOM, and correct them, the error icons are no longer displayed in the MBOM.

Note

- The EBOM is not visible on the **Manage Plant BOM View** page (**integrated MBOMs** use an integrated BOM derived from an EBOM).
- If you are working on the **EBOM-MBOM Alignment** page, you can quickly find problem EBOM elements in the MBOM by clicking the element's **Assignment State** icon in the left column of the EBOM structure so that the MBOM structure is highlighted. If multiple problems exist under the element (for example, 12 of 20 rivets from the EBOM are assigned to one part and 6 of 20 are assigned to another, resulting in a negative sum of 18 of 20 required rivets), you must correct them individually.

In a similar way, you can **find an assigned element** in the EBOM from the MBOM on the **EBOM-MBOM Alignment** page.

(Blank) Unassigned to the MBOM.

-  All selected EBOM element's children are fully assigned to the MBOM.
-  The EBOM element is fully assigned to the MBOM. Click the icon to jump to the MBOM area in the current scope and highlight the element in the **MBOM** panel.
-  Some children of the selected EBOM are assigned to the MBOM, but not all.
-  A partial quantity is assigned to the MBOM element from the selected EBOM element.
-  The MBOM element has a different revision of the part assigned to it.
-  Contains parts assigned to the MBOM with a different revision.
-  The selected element is assigned to the MBOM multiple times.
-  Some descendants of the selected element are assigned to the MBOM, and some are assigned multiple times.

 The selected element is completely assigned to the MBOM multiple times.

 The element was deleted from the EBOM after it was allocated to the MBOM. This is a missing-in-source error.

Find parts or assemblies in the EBOM or MBOM

You can search and find parts and assemblies in an engineering bill of materials (EBOM) or a manufacturing bill of materials (MBOM).

Procedure

1. Open the **EBOM-MBOM Alignment** page.
By default, you are searching by item ID.
2. In the **EBOM** or **MBOM** panel, select an assembly.
3. (Optional) To filter the search to a specific part or assembly of the MBOM, select that part or assembly and in the MBOM toolbar, click **Focus** .

Note

In focus mode, you can search only from the MBOM toolbar.

4. In the EBOM or MBOM toolbar, click .
- By default, the command searches the EBOM or MBOM for a specific keyword or text string.
5. To search only the assembly you selected, select the **Find within** ☐ check box.

Note

If you:

- Select the root node or part in the EBOM or MBOM, the **Find within** ☐ check box is not available.
- **Align domain subassemblies using change management** or **align separate MBOM subassemblies** to an EBOM using the **Focus**  command from the MBOM toolbar, the EBOM search is unavailable.
- Search with focus enabled from the MBOM toolbar, the **Find within** ☐ check box is grayed out in the **Find in MBOM** panel and the search includes parts and assemblies within the focused assembly only.

6. For more options click **Advanced Search** and select a different search option.
 - **Item ID** searches for a full or partial part or assembly item ID.

- **Item Revision** searches for a full or partial part or assembly item revision name.
 - **Quick** locates the first matching item in the tree and lets you jump between next and previous results.
7. In the **Find in EBOM** or **Find in MBOM** panel, type the search term that you want to find in the EBOM or MBOM.

Tip

As in any standard search, you can use asterisks or wild cards to obtain multiple similar results.

Example

Type **bolt_*** to locate **bolt_1**, **bolt_2**, and so on.

8. In the **Results** list, select any preferred part or assembly.
Each selection highlights the selected object in the EBOM or MBOM.
9. (Optional) If the search brings multiple results and you want to review them individually, select a result and in the **Results** subtab, click any of the following buttons.
 -  If the item is associated with a 3D model, shows the selected search result only in the 3D viewer panel.
 -  Shows only the most recent results of structures that are not yet indexed.
 -  Goes to the next or previous item in the search results.
 - 
 -  Selects all search results (closes the search and selects all item results in the EBOM or MBOM tab).
10. (Optional) To perform EBOM or MBOM commands related to search objects:
 - a. Select objects in the search results.
 - b. Select commands in the EBOM or MBOM.
11. Close the panel.

Find an assigned MBOM or EBOM element

You can quickly find an assignment from an engineering bill of materials (EBOM) element in a linked manufacturing bill of materials (MBOM) by clicking the EBOM element's **Show Consumption and Impact State icon**. In a similar way, you can find assigned elements in the EBOM from the MBOM, or vice versa.

Note

Even if you **delay EBOM and MBOM assignment comparisons** using the **Show Assignment State** option, you can locate an EBOM element in a linked MBOM or vice versa. You can locate an assigned EBOM element in the MBOM even if the MBOM scope is filtered using the **Focus**  command in the MBOM toolbar.

Procedure

1. If you have not done so already, **search for and open** an existing work package that contains processes and parts and then open the **EBOM-MBOM Alignment** page.
2. Do one of the following.

- In the EBOM, right-click a part assigned to the MBOM and select **Find in MBOM**.
The part, if assigned, is highlighted in the MBOM.

Note

If the part is assigned multiple times, the **Find in MBOM** command displays a link to each assigned part occurrence. To locate a specific occurrence, click the appropriate link.

- In the MBOM, right-click a non-manufacturing-specific element and select **Find in EBOM**.
The element is highlighted in the EBOM.

Note

- If no IDC exists in the Teamcenter Rich Client, the EBOM element is not directly assigned to the MBOM.
- If you attempt to locate a manufacturing-specific element in the EBOM using the **Find in EBOM** command, a message displays stating that it is an MBOM-specific element that is not represented in the EBOM.
- If an entire packed line in the EBOM is assigned unpacked in the MBOM, the **Find in EBOM** command informs you that the equivalent occurrences in the MBOM are unpacked and prompts you to find any equivalent occurrence in the EBOM by using a **Find an Occurrence** command. The command then highlights any equivalent occurrence in the MBOM. If the occurrences are split between different assemblies in the MBOM, clicking the EBOM element displays a list of assemblies where the packed elements are assigned to the MBOM. You can then use the **Find in EBOM** command and use the **Find an Occurrence** command again to arbitrarily find an equivalent occurrence in the MBOM.

Set advanced accountability check rules

Administrative users *must* specify accountability settings to automatically define which **assignment statuses** are displayed on the engineering bill of materials (EBOM) and manufacturing bill of materials (MBOM) in Manufacturing-BOM Manager.

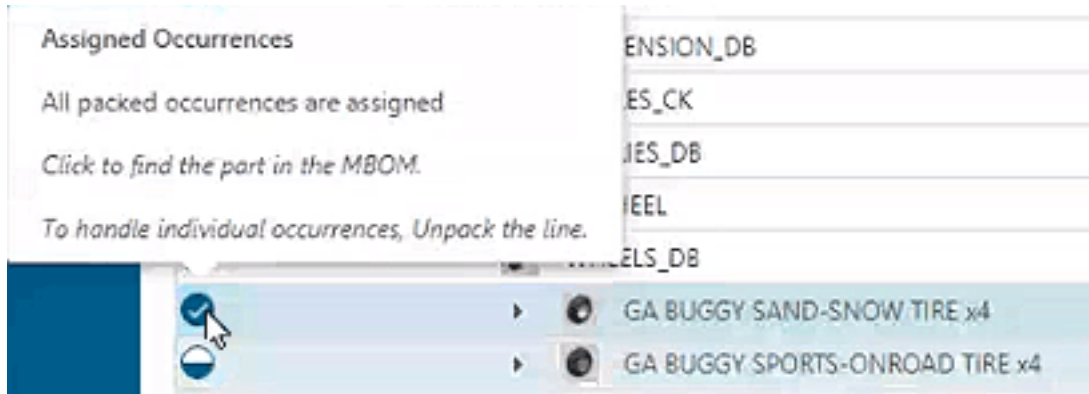
Procedure

1. Log into the Teamcenter Rich Client as an administrative user.
2. Select a work package created in Manufacturing-BOM Manager and send the package to Manufacturing Process Planner.

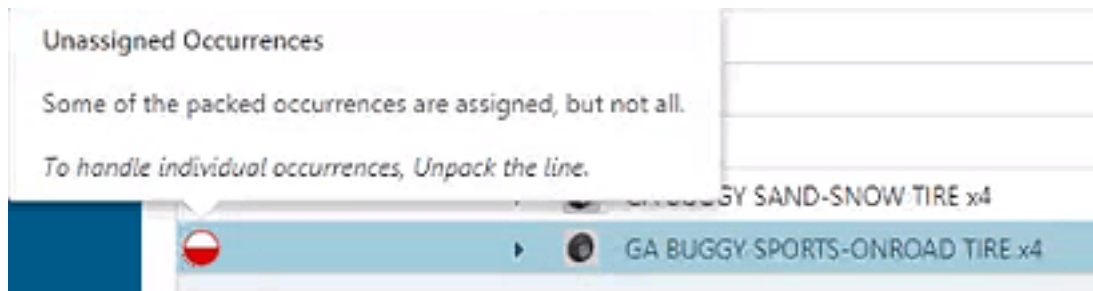
3. Select the top line in the EBOM and then select **Tools→Accountability Check→Advanced Accountability Check**.
4. Select the **Inclusion Rules** tab, and then select the **Search lines per filtering rule**.
5. From the **Source filtering rule** and **Target filtering rule** lists, select **AccountabilityLinkedAssmOrLeaves** to compare leaf nodes and assigned assembly nodes but exclude appearance group lines.
6. Select **Do not compare selected lines** to ensure that lines selected in the EBOM and MBOM are not automatically compared in Manufacturing-BOM Manager.
7. On the **Reporting** tab, select **Display Options** and select the **Consider quality rollup for multiple match** check box ☒ to **work with parts with quantity values**.
8. On the **Partial Match** tab, select which properties should result in partial matches when EBOM and MBOM are compared in Manufacturing-BOM Manager.
9. Click **Save to Available Settings** , and in the **Save to Available Settings** dialog box, give your settings a unique name, and click **OK**.
The defined settings now define which **assignment status icons** appear in your work package's EBOM and MBOM.

Identifying assignment statuses of packed EBOM lines

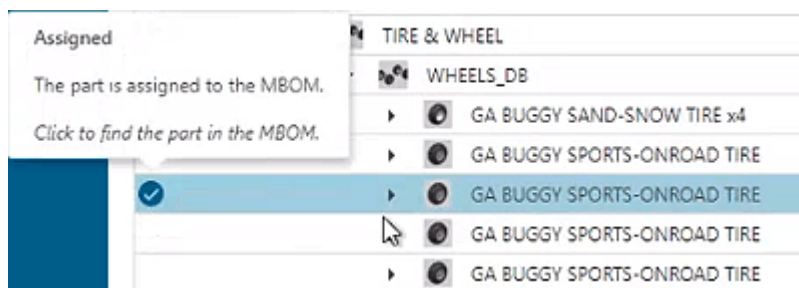
In an engineering bill of materials (EBOM), if you pack a specific structure line or lines, you can view the status of the individual packed lines (occurrences) by pausing your mouse over the EBOM assignment icon. The example below reports that all line occurrences in a packed line with a fully assigned icon  are assigned to the manufacturing bill of materials (MBOM).



Partially assigned line occurrences in a packed line are indicated by the partially assigned icon .



If you select a partially assigned line by clicking  and choosing **Unpack**, any line occurrence partially assigned to the MBOM is displayed. In this example, only a single line occurrence is assigned.



To resolve the issue, click the assignment icon in the EBOM to locate the part in the MBOM where all previously packed lines should be assigned. You can then click each unassigned line in the EBOM, and in the MBOM toolbar, click  to assign each unassigned occurrence line.

If you repack the assembly in the EBOM, it now displays as fully assigned . If you assign a line occurrence more than once it displays an overassigned icon , and if it is packed again the overassigned icon remains. Unpacking partially or overassigned icons in the EBOM and viewing their assignments in the MBOM lets you better understand the nature of their overall statuses.

Review EBOM or MBOM details in a new tab

To review detailed Active Workspace and other information on an engineering bill of materials (EBOM) or manufacturing bill of materials (MBOM), you can select a part or assembly and then open a BOM view and information panel in a new browser tab.

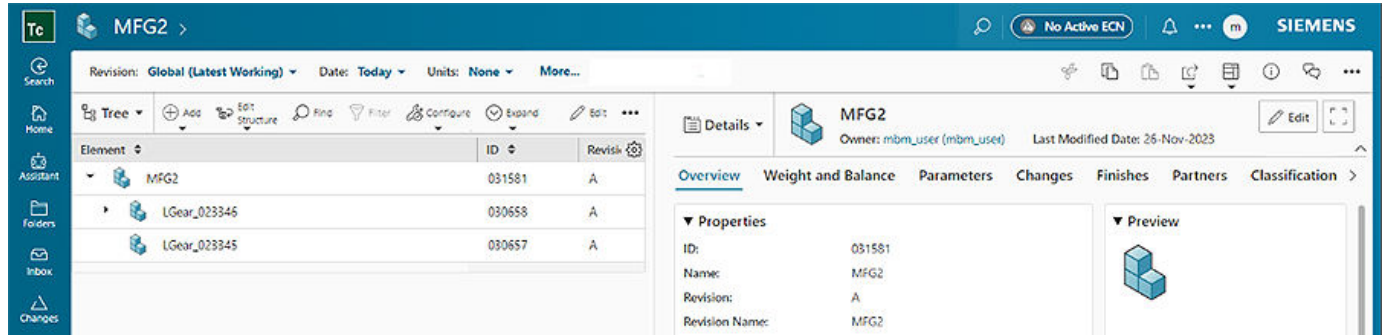
Prerequisites

Any prefs or other rereqs?

Procedure

In the EBOM or MBOM, right-click a part or assembly, and then select **Open in New Tab**.

In the new tab, the selected EBOM or MBOM node and its children are visible as the primary work area. The information overview is displayed in a secondary work area.



Match EBOM and MBOM table properties

Provided that an administrator has set preferences to do so, you can carry over certain properties from the engineering bill of materials (EBOM) to the manufacturing bill of materials (MBOM) when assigning elements so that they display as columns in both structures when you make or change assignments. Preferences in the Teamcenter rich client related to property carry overs include:

- **MEEffectivityAssignmentMode**, which defines the assignment behavior from EBOM to MBOM for the BOM line property **bl_occ_effectivity**. The value of this preference must be set to **1**.
- **MEAlignedPropertiesList**, which specifies the supported BOM line properties for alignment initialization, out-of-synch detection, and synchronization. The value of this preference must be set to **bl_occ_effectivity**.

When you perform the following procedure, you see how column properties set using the preferences described above affect both the EBOM element and any MBOM elements assigned to the MBOM.

Procedure

1. Open a Manufacturing-BOM Manager work package.
2. In the EBOM, select an unassigned assembly with either a specific revision level or a specific occurrence effectivity (a date range or range of units for which the assembly is valid for manufacturing, such as units 1 to 199).

Tip

You can select multiple parts and assemblies as long as they reflect the MBOM parts and assemblies to which you will assign them.

- In the MBOM, select the assembly where the unassigned assembly will be assigned, and in the EBOM toolbar, click **Assign Parts Selected in EBOM** ✓. The number of elements assigned to the MBOM assembly is reported. If the EBOM assembly and parts are the same as those in the MBOM, the EBOM assembly and parts display the full match icon ✓ and the revision and occurrence effectivity columns are carried over.

In the image below, an engineering user has changed the EBOM by for example, removing a part from the EBOM assembly and saving it as a new revision. The EBOM displays a property mismatch icon [?] next to the full match ✓ icon. The property mismatch icon also appears in the MBOM because the EBOM has a **B** revision while the MBOM has an **A** revision. The part removed by the engineer user from the EBOM also displays a missing in EBOM icon [!] in the MBOM.

Element Name	Revision
Eclipse EBOM	A
00_Avionics_System	A
00_Structure	A
57-RH-Wing	A
57-RH-Aileron	A
57-105247-1004_03_4	A
Standard Wingtip	B
WingletAssembly	A
57-105247-1004_03_3	A
57-001001-0002_CL_RH_WING_072604.asm_EXT	A
57-RH-Flap	A
57-001001-0002_CL_RH_WING_072604.asm_LG	A
52_110916_2002_a	A
Rivet x100	A
55-Rudder	A
55-Horizontal-Stabilizer	A
57-LH-Wing	A
53-Fuselage	A
00_Oxygen_System	A
00_Navigation_System	A
00_Interior	A
00_Fuel_System	A

Element Name	Revision
ECLIPSE MBOM	A
NOSE	A
ENGINES	A
NOSE LANDING GEAR	A
WIRE HARNESS	A
WINGS	A
RIGHT WING	A
57-105247-1004_03_3	A
57-RH-Flap	A
57-001001-0002_CL_RH_WING_072604.asm_EXT	A
57-001001-0002_CL_RH_WING_072604.asm_LG	A
52_110916_2002_a	A
57-RH-Aileron	A
Rivet x90	A
Winglet_Wingtip_Rib_Inboard_fs	A
Standard Wingtip	A
LEFT WING	A
EMPENNAGE	A
FUSELAGE	A
FLIGHT CONTROL SYSTEM	A
AIR CONDITIONING SYSTEM	A
ENGINES SYSTEM	A

- Select the part showing a missing-in-EBOM icon in the MBOM, and in the MBOM toolbar, click **Remove** ⊖. The part is removed from the MBOM.

Assign parts to the MBOM

Check out MBOM parts and assemblies

When an administrator sets the value of the preference **MBM_CheckoutCheckForFocus** to **true**, you can check out parts and assemblies to avoid working simultaneously with other colleagues on areas of the same manufacturing bill of materials (MBOM) in the same work package. This capability is similar to manufacturing checkin and checkout in Manufacturing Process Planner.

- In the MBOM panel, press Ctrl or Shift and select one or more parts or assemblies to be checked out, and in the MBOM toolbar, do one of the following.
 - Choose **Manage**  → **Check Out** .
 - Click **Focus** , and when prompted to check out the object or objects and set the focus, click **Check Out and Focus**.

The value **Y** appears in the MBOM **Checked Out** column, and your user ID appears in the **Checked Out by User** column. These values are also visible to other users. If you chose to set focus, the MBOM refreshes to indicate your selection.

Note

- Your administrator can customize the names of the **Checked Out** and **Checked Out by User** columns in the Teamcenter business modeler integrated development environment (BMIDE).
- To undo your checkout, select the part or assembly you checked out and choose **Manage**  → **Cancel Checkout** .
- To check in your work when finished, choose **Manage**  → **Check In** .

Assign and remove EBOM elements in an MBOM

This procedure walks you through the basics of assigning and removing parts from an engineering bill of materials (EBOM) and manufacturing bill of materials (MBOM) using MBOM toolbar commands. This example demonstrates the effect of overassigning a part from the EBOM to the MBOM and how to correct that error.

Note

When assigning nodes from an EBOM to an MBOM in Manufacturing-BOM Manager, ensure that the **Show Assignment State** option is not selected to improve the performance. Use **Show Assignment State** only when you want to check the **partial** or **complete** assignment status between the EBOM and MBOM.

Procedure

1. **Search for and open** a work package with a linked EBOM and MBOM, and then open the **EBOM-MBOM Alignment page**.
2. In the MBOM, select an element that you want to assign from the EBOM.
3. In the EBOM, select a line without a full match assignment indication icon , and in the MBOM toolbar, click **Assign** .

The variant formula of the MBOM element combines the variant formula of the selected element in the EBOM with the variant formula of its aligned design occurrence. A design BOM is a design structure intended to serve as a virtual representation of the product geometry.

Example

The variant formula of the element `Wheel` is `ModelFamily = Sports` in the EBOM. The variant of the corresponding element `Wheel` in the design BOM is `Wheel_Base = Long`.

When the EBOM element is assigned to MBOM, the corresponding element `Wheel` in the MBOM has the following variant formula:

```
ModelFamily = Sports & Wheel_base = Long
```

Once elements are assigned, accountability is calculated automatically. The EBOM line shows a red icon  to indicate that the element is over assigned in the MBOM. **Assignment status** icons help you to locate and correct problem elements in the MBOM.

Note

You can also assign and remove multiple parts and assemblies.

4. With the assembly still selected in the MBOM, do the following.
 - a. In the MBOM toolbar, click **Remove** .
 - b. In the confirmation dialog box, click **Remove** again.

The additional element is **removed** from the MBOM structure and the EBOM icon displays a full match .

Note

You can also remove elements from the EBOM and multiple assigned parts and assemblies.

Run assign and remove actions in the background

You or an administrator can determine when assign and remove actions run in the background. This prevents long delays and possible disconnection from the server when you assign many parts from an

engineering bill of materials (EBOM) to a manufacturing bill of materials (MBOM) at the same time, or when you remove many parts from an MBOM.

Procedure

1. Using the preference **MBMMinimumLimitForBackgroundMode** in Teamcenter, define the minimum number of lines that you can select and assign or remove without any delay.

If you assign or remove more elements than you specify in the preference **MBMMinimumLimitForBackgroundMode**, those actions run in the background without affecting your system's current performance.

Example

If **MBMMinimumLimitForBackgroundMode** = **1000**, when you assign 1000 or more lines from the EBOM to the MBOM, or remove 1000 or more lines from the MBOM, the actions run in the background.

2. **Search for and open** a work package with a linked EBOM and MBOM displayed on the **EBOM-MBOM Alignment** page.
3. On the **EBOM-MBOM Alignment** page, select a number of elements greater than the number defined in the **MBMMinimumLimitForBackgroundMode** preference.
 - From the EBOM list, and in the MBOM toolbar, click **Assign Parts Selected in EBOM** ✓.
 - From the MBOM list, and in the MBOM toolbar, click **Remove** ⊖.

Tip

You can also filter the scope of the EBOM and MBOM alignments that take effect when you define the **MBMMinimumLimitForBackgroundMode** preference, and then assign or remove elements. To filter the scope, select a manufacturing subassembly in the MBOM, and in the MBOM toolbar, click **Focus** ⊕.

A message is displayed, informing you that you may now assign or remove assignments in the background, and that if you choose to do so, you will receive a message when the actions are finished.

4. In the message dialog box, click **Assign in Background** or **Cancel**.
5. (Optional) Assign or remove elements in the background as needed, and perform any other actions, including performing work within another scope in the MBOM or working in a different work package.
6. To verify that the background task is completed, in the lower-left corner of Teamcenter Easy Plan, look for a notification, and if one is available, click **Alerts** 🔔.

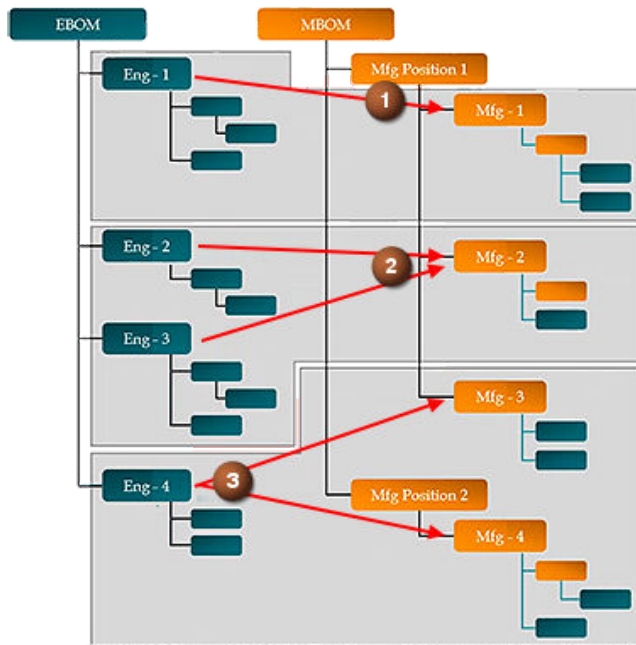


Details of the notification are displayed regarding the background action.

7. In the notification, click the work package link.
The **EBOM-MBOM Alignment** page displays the new assignments where you assigned them.

Understanding domain subassemblies

A domain is a previously defined scope created when you **align** separate MBOM subassemblies to a portion of an EBOM. Assignment domain relations, which are like an accountability check that lets you limit the scope of areas compared, might include:



- 1 An EBOM assembly that is assigned one-to-one to an MBOM assembly.
- 2 Two or more EBOM assemblies that are assigned to a single MBOM assembly.
- 3 An EBOM assembly with assignments distributed across two or more MBOM assemblies.

To define domain subassemblies, you must:

- Set the value of the preference **MBMEnableBOMFiltering** to **true**.
- Set the preference **MBMEnableBOMFilteringDesc** to **true**. This preference performs alignments between subsections of the EBOM and MBOM by showing only relevant nodes based on a relation.
- (Optional) Add item types to the preference **MBMAssignmentDomainMBOMTypes**. This preference specifies which item types in the MBOM structure can be used to define an assignment domain relation. Default values include an empty input format, **ItemRevision**, **CustomPartRevision**, and others.

Pairing a usage EBOM with an MBOM

Many bill of materials (BOM) types are used in Teamcenter. When you use an engineering BOM (EBOM) to assign a part two or more times to a manufacturing BOM (MBOM), there is only one *actual* part, and all copies assigned to the MBOM are simply occurrences or *instances* of that part. These instances do not have their own separate lifecycles, so if you change the actual part, that change affects all instances as well.

Unlike a standard EBOM, a usage EBOM is saved with an item rather than with a BOM view revision (BVR) object. In a usage EBOM, you can revise each occurrence individually, with your own transformation and other properties. A usage EBOM derives from one or more *partitions* of a product BOM (PBOM) and

defines the usages for each design. Partitions divide manufacturing products into useful subcomponents (for example, individual cabins on a ship). All partitions are created within *partition schemes*, which are hierarchical collections of partitions that can be functional, spatial, or physical.

You can pair a *usage EBOM* with an MBOM in the **EBOM-MBOM Alignment** page in a *mixed-mode* state, in which elements in the usage EBOM display part or product usage icons , while the same elements assigned to the MBOM display BVR part  icons.

EBOM | Coffee Machine Product BOM <<

Revision: Latest Working | Date: Today | Units: None | (001

Element	ID
Coffee Machine Product BOM	001096
Display Unit Partition	PTN000010
DISPLAY UNIT x1	P_000755
Pump Assembly Partition	PTN000011

MBOM | 001098/A;1-Coffee Machine MB

Revision: Latest Working | Date: Today | Units: None | (001

Element	ID
001098/A;1-Coffee Machine MBOM	001098
001099/A;1-Display Unit Mfg Asm	001099
DISPLAY UNIT x1	P_000755
Milk-Hose Intake-Fitting x1	P_001001
001100/A;1-Assembly Pump	001100

Assignment status icons  appear and function the same as they do in standard EBOM-MBOM mode. This is also true of all other aspects of managing the MBOM, including **assigning and removing** EBOM elements in an MBOM, **finding** an assigned MBOM element in the EBOM, and **configuring** EBOM or MBOM work structure rules.

Note

- When you select **Configure**  **→ Configuration**  from the EBOM toolbar, the **Configuration** panel for the usage EBOM contains a **PARTITION SCHEME** group. When you select a preferred scheme from the **Physical Partition Scheme** list, all elements specific to that scheme are visible in the EBOM.
- The **PARTITION SCHEME** group is not available if you access the **Configuration** panel from the MBOM toolbar.

Add a serial or lot number to a part or tool

You may be required to apply serial or lot numbers both to parts or tools in a step.

Note

Your Teamcenter administrator determines which parts and tools require serial or lot numbers.

Procedure

1. Display the **Part** or **Tools** list table view, and review the **Quantity** column for any packed lines with values greater than 1.

You cannot apply a serial or lot number to a packed line. You must apply a serial or lot number only to individual parts or tools.

2. Select each packed line and click **Unpack** .
The line is unpacked into separate lines, all of which share the same find number.

Parts



Rev Name 	Revision 	Item Id 	Find No. 
 LGear_666786	A	000164	100
 LGear_666785	A	000165	100
 LGear_666784	A	000166	100
 LGear_666783	A	000167	130

3. Select the line for which you want to add a serial or lot number and click **Edit Serial and Lot Numbers** .

Tip

The **Edit Serial and Lot Numbers** option is only active when a part or tool requires a serial or lot number. If the **Edit Serial and Lot Numbers** button is dimmed, the part or tool does not require a serial or lot number.

4. In the **Serial No.** or **Lot No.** pane, type a value.

Tip

You can also add numbers by clicking in either the **Serial Number** or **Lot Number** text box and retrieving the relevant part bar code from a scanner.

5. Click **Save**.
In the **Parts** panel, the value is in the **SERIAL NUMBER** or **LOT NUMBER** columns.
6. Select one of the unpacked lines and click **Pack** .

Change the quantity of parts

If the quantity property value for a single part in the engineering bill of materials (EBOM) is equal to the sum quantity of multiple parts in the manufacturing bill of materials (MBOM), you can set the EBOM value to appear as equivalent (a full match) in your accountability check results. To allow you to do this, an administrator must select the **Consider quality rollup for multiple match** check box on the **Inclusion Rules** tab of the **Advanced Accountability Check** dialog box in Manufacturing Process Planner and apply the setting to your user profile.

For more information, see *Roll up equivalent line quantities in accountability checks* in the *Manufacturing Process Planner* section of the Teamcenter help.

Example

For an airplane assembly in the EBOM, the quantity for a single part is set to 100. In the MBOM, 85 are assigned to one part in the right wing, and another 15 to the fuselage. The quantity property allows the accountability check to appear as a full match  in the EBOM part because the different quantities assigned to the different MBOM parts are equal to the EBOM quantity.

Procedure

1. Open a work package created in Multi-BOM Manager.
2. In the EBOM, select a part, such as a rivet, with a value in the **Quantity** column.

	 Element Name	 ID	Revision	Revision Name	Quantity
	 Rivet x100	 000036	A	Rivet	100

The selected part shows a full match .

3. In the MBOM, select one of the parts containing a quantity value and in the MBOM toolbar, click **Edit** .

	Element Name		Quantity
	 Rivet x85		85

4. Double-click the value on the **Quantity** column and edit it to 80, and then in the MBOM toolbar, click **Save Edits** .

In the EBOM, the rivet part displays a partial quantity icon  to indicate that the EBOM part quantity is greater than the sum of the MBOM part quantities.

Results

- If the sum of the MBOM quantity is greater than the EBOM part quantity, the part displays an over assigned icon .

- As long as your administrator has **set up your advanced accountability check rules** correctly, when assigning an EBOM part that contains a quantity value to multiple parts in an MBOM, click **Edit**  in the MBOM toolbar to specify quantities for each MBOM part, and when the EBOM part displays the full match icon , click **Save Edits**  to save the MBOM. You can change your MBOM quantities at any time as long as they add up to the EBOM part quantity value.

Add manufacturing specific components to MBOM

Add a manufacturing-specific part or container

Procedure

- You can add a part, assembly, or container to your manufacturing bill of materials (MBOM) without generating errors when accountability checks automatically compare the engineering bill of materials (EBOM) to the MBOM, because manufacturing elements such as welds, resources, and containers do not exist in the EBOM and thus report no assignment indications. You can also create a manufacturing element from an existing element that duplicates that element but simply reuses, or references, that element.

To hide assignment indications, your administrator must specify a **filtering rule** in the **Advanced Accountability Check** dialog box in the Teamcenter Rich Client.

- If you have not done so already, **search for and open** an existing work package and **navigate** to the **EBOM-MBOM Alignment** page.
- To create a new, unreferenced manufacturing element:
 - In the **MBOM** panel, select an assembly, and in the **MBOM** toolbar, click **New**  → **Create Manufacturing Element** .
 - In the **Add** dialog box, type a name and optional description for the element and click **Add**. The new manufacturing element is created in the MBOM under the same node as assembly you initially selected.
- To create a manufacturing element based on a selected element:
 - In the **MBOM** panel, select the source element, and click **New**  → **Create Based On** . In the **Create Based On** dialog box, the ID of the selected element is displayed in the **ID** text box, with a **Revision** value of A.
 - To create a new element with just the ID, do not edit the **ID** text box; to append a name to the same ID, in the **Name** text box, type the name to be appended to the ID and click **Create**. The source element is duplicated in the MBOM under the same node as the source. The new manufacturing element references the same elements with the same IDs and revisions, but does not duplicate any effectivity.

5. Select the new or referenced manufacturing element in the MBOM, and in the MBOM toolbar, click **Edit** .

Results

You can now modify specific properties in the MBOM table columns of your manufacturing element and click **Save**  → **Save Edits** , and then use the element for manufacturing-specific operations, such as adding fixtures and resources.

Remove a manufacturing-specific part or container

You can remove a part, assembly, or container from your EBOM or MBOM.

Procedure

1. Select one or more elements in the EBOM or MBOM, and click **Remove** .
2. In the confirmation dialog box, click **Remove**.

The elements are removed from the EBOM or MBOM structure.

Assign EBOM or manufacturing representation assemblies to an MBOM

You can choose to assign EBOM or manufacturing representation assemblies, or "mini MBOMs," to manufacturing representation lines in an MBOM.

Prerequisites

Note

To enable this functionality:

- The values of the preferences **MBMEnableModularMBOM** and **MbmReleaseStatusForModularBom** must be set correctly.
- The value of the preference **MBMUseEBOMAsIs** must be set to **true**. If **MBMUseEBOMAsIs** = **false**, you can only assign manufacturing representations.

Procedure

1. On the **EBOM-MBOM Alignment** page, in the **EBOM** panel, select the manufacturing representation lines that you want to assign, and in the MBOM toolbar, click **Assign** .

Tip

The manufacturing representation lines are indicated by **Has Manufacturing Representation**  icons.

The **Manufacturing Representations** dialog box is displayed, reporting the number of manufacturing representations that exist for the first line in your selection. The name of the selected line is reported at the top of the dialog box.

Note

When **MBMUseEBOMAsIs** = **false** and the selected EBOM node has only one manufacturing representation, the **Manufacturing Representation** dialog box is not displayed, and the single manufacturing representation is directly assigned to the MBOM.

2. If you selected a single line, select one of the following, and then click **Assign**.
 - Select **Use existing manufacturing representation** to assign the single manufacturing representation.
 - Select **Assign EBOM Assembly** to assign the source EBOM assembly.
3. If you selected multiple lines, do the following.
 - a. To assign a manufacturing representation that exists for the first EBOM line in your selection, select **Use existing manufacturing representation** or **Assign EBOM Assembly**.

Note

The name of the selected line is reported at the top of the dialog box.
 - b. If you chose **Use existing manufacturing representation**, select the preferred manufacturing representation, and click **Assign and Next**.
The name of the second selected line is reported at the top of the dialog box.
 - c. To assign a manufacturing representation that exists for the second line in your EBOM selection, select **Use existing manufacturing representation** or **Assign EBOM Assembly**.
 - d. If you chose **Use existing manufacturing representation**, select the preferred manufacturing representation, and click **Assign**.
 - e. Repeat this process for any additional lines in your EBOM selection.

Results

The relevant EBOM or manufacturing representation assemblies are assigned to the EBOM.

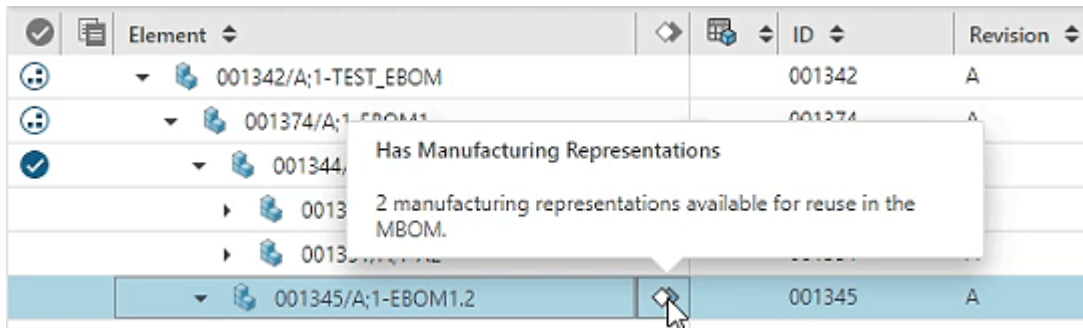
Reuse small MBOM manufacturing representations in a single MBOM

You can assign elements from more than one manufacturing bill of materials (MBOM) previously created from an engineering bill of materials (EBOM) to a single target manufacturing bill of materials (MBOM). Reusing previous work from these manufacturing representations, or "mini MBOMs," saves considerable planning time.

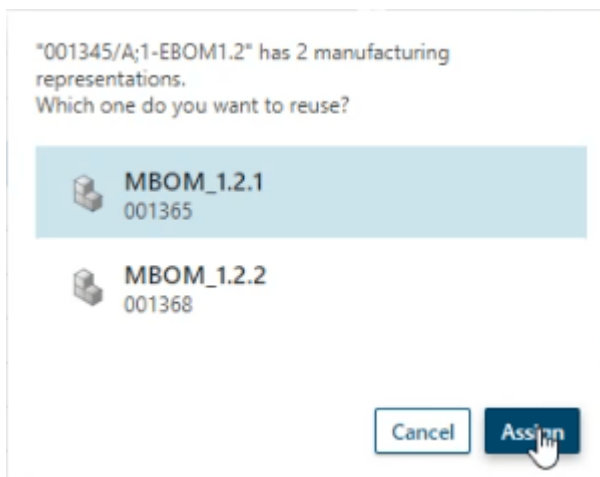
Procedure

1. To allow reuse of existing manufacturing representations taken from a high-level product EBOM, set the value of the preference **MBMEnableModularMBOM** to **true**.
2. Open a work package containing the source EBOM that is used in other mini MBOMs, as well as the preferred target MBOM, in the **EBOM-MBOM Alignment** page.
A column in the EBOM displays **Has Manufacturing Representation** icons  to indicate EBOM source elements that are reused in external manufacturing representations, or mini-MBOMs. These manufacturing representations are available for reuse in your target MBOM.

When you pause your mouse over the **Has Manufacturing Representation** icons, the number of representations available for reuse in your target MBOM is reported.



3. To assign a manufacturing representation from the source EBOM to the target MBOM, select the appropriate line containing representation elements in the EBOM and the line below which it should be added to the MBOM, and in the MBOM toolbar, click **Apply** .
4. At the prompt that appears displaying one or more manufacturing representation MBOMs, select the preferred representation and click **Assign**.



Note

When **MBMUseEBOMAsIs** = **false** and the selected EBOM node has only one manufacturing representation, the **Manufacturing Representation** dialog box is not displayed, and the single manufacturing representation is directly assigned to the MBOM.

The mini-MBOM assembly is assigned under the line you selected in the target MBOM. The **Revision Name** column reports the mini-MBOM manufacturing representation source, and copies that source's unique in context ID (IDIC) and source occurrence effectivity properties.

▼  MFG-10001/A;1-MFG_ASM_1.2	MFG-10001	A	MFG_ASM_1.2
▶  001365/A;1-MBOM_1.2.1	001365	A	MBOM_1.2.1

- Click the assignment icon  on the line that contains the manufacturing representation in the EBOM to highlight the reused element in the target MBOM.
- To assign other manufacturing representations to the target MBOM, repeat steps 3-5 for each line containing manufacturing representations and each target MBOM line.

If multiple manufacturing representations are assigned to a single line, you can assign each instance to different target MBOM lines.

Use BOM recipes

Create a BOM recipe

You can create a *recipe* that defines the search criteria used to automatically assign nodes from an engineering bill of materials (EBOM) to a manufacturing bill of materials (MBOM). This strategy reduces the time required to create or update an MBOM.

Prerequisites

- The **MBMEnableRecipeBasedAssignments** preference must be set to TRUE.
- The EBOM must be **Smart Discovery indexed**. For more information on smart discovery indexing, see *Structure Management Deployment and Administration* in the Active Workspace help.

Procedure

- Search for and open** a work package that contains a linked EBOM and MBOM, and navigate to the **EBOM-MBOM Alignment** page.
The MBOM must be linked to an EBOM structure.
- Enable **Show Assignment State**.
- In the **MBOM** panel, select the part or assembly for which you will define the recipe.
- In the **Information** panel, select the **BOM Recipes** tab.
The tab displays available recipes for the selected MBOM assembly.
- Select a recipe and in the **BOM Recipes** toolbar, click **Create BOM Recipe** .

Tip

BOM recipes can be created for a EBOM.

6. In the **Create BOM Recipe** panel, do the following.
 - a. In the **Name** text field, type a recipe name.
 - b. In the **Usage Address** text box, type the usage address names of the parts you want to update from EBOM to MBOM, separated by semicolons (;).

Example

```
FLOOR MAT;CHARGER;TIRE PRESS
```

Tip

Refer to the EBOM to determine exact usage address names.

- c. Specify other attribute values to be applied from EBOM to MBOM.

Note

- You must specify at least one value.
- Use the preference **MBMPropertiesForRecipeDefinition** to define additional recipe BOM line properties.

- d. Click **Create**.

In the following example, the **Mfg Exterior** assembly displays a **Missing in Source** icon . The **Auto assign Exterior** recipe is created, but not yet resolved, from the EBOM to the MBOM.

MBOM | CROSSKART MBOM > MFG CS 01 > Mfg Exterior

AssignNewEdit StructureExpandHandle MismatchManageExcel Roun...FindEditHide Summary

Element	ID	Revision	Revision Name
CROSSKART MBOM	027157	A	CROSSKART MBOM
MFG CS 01	027158	A	MFG CS 01
Mfg chassis	027160	A	Mfg chassis
CHASSIS-CK	CHASSIS-CK_S...	A	CHASSIS-CK
FUEL SYS CK	FUEL SYS CK_S...	A	FUEL SYS CK
Mfg Exterior	027162	A	Mfg Exterior
Mfg Interior	027163	A	Mfg Interior
MFG CS 02	027159	A	MFG CS 02
Mfg Accessories	027168	A	Mfg Accessories

3DOverviewAttachmentsBOM Recipes

Create BO...Auto-AssignSide Panel

Object
Auto assign Exterior

You can now use your new recipe to **auto-assign** alignment from EBOM to MBOM.

Edit a BOM recipe

Once you create a BOM recipe, you can edit and update that recipe and then use it to resolve your manufacturing bill of materials (MBOM) with updated engineering bill of materials (EBOM) criteria. You can also remove an unwanted recipe from a list of available recipes.

A *recipe* defines the search criteria used to automatically assign nodes from an EBOM to an MBOM.

Procedure

- 1. **Search for and open** a work package and navigate to the **EBOM-MBOM Alignment** page.
- 2. If you have not already done so, **create** a BOM recipe.
- 3. Enable **Show Assignment State**.

- 4. In the **MBOM** panel, select the part or assembly that contains the recipe that defines the EBOM parts that you want to update or edit.
- 5. In the **Information** panel, select the **BOM Recipes** tab.

The tab displays available recipes for the selected MBOM assembly.

MBOM | CROSSKART MBOM > MFG CS 01 > Mfg Exterior

Assign

New

Edit Structure

Expand

Handle Mismatch

Manage

Excel Roun...

Find

Edit

Hide Summary

Element	ID	Revision	Revision Name
CROSSKART MBOM	027157	A	CROSSKART MBOM
MFG CS 01	027158	A	MFG CS 01
Mfg chassis	027160	A	Mfg chassis
CHASSIS-CK	CHASSIS-CK_S...	A	CHASSIS-CK
FUEL SYS CK	FUEL SYS CK_S...	A	FUEL SYS CK
Mfg Exterior	027162	A	Mfg Exterior
Mfg Interior	027163	A	Mfg Interior
MFG CS 02	027159	A	MFG CS 02
Mfg Accessories	027168	A	Mfg Accessories

3D

Overview

Attachments

BOM Recipes

Create BO...

Auto-Assign

Side Panel

Object

Auto assign Exterior

- 6. Select a recipe and in the **BOM Recipes** toolbar, click **Edit BOM Recipe**.
- 7. In the **Edit BOM Recipe** panel, do the following.
 - a. In the **Name** text field, modify the recipe name.
 - b. In the **Usage Address** text box, type the usage address names of the parts you want to update from EBOM to MBOM, separated by semicolons (;).

Example

FLOOR MAT;CHARGER;TIRE PRESS

Tip

Refer to the EBOM to determine exact usage address names.

- c. Specify any other available attribute values to be applied from EBOM to MBOM.
- d. Click **Save**.

You can now **auto-assign** your new BOM recipe.

Note

To remove a recipe, in the **BOM Recipes** tab, select the unwanted recipe and choose **Remove** .

Auto-assign a BOM recipe

To auto-assign a recipe, assign recipe criteria from the engineering bill of materials (EBOM) to the manufacturing bill of materials (MBOM).

A *recipe* consists of search criteria saved on each node of an MBOM template that defines the parts to be assigned from an EBOM to an equivalent node in an MBOM.

Note

To resolve recipes using the **Focus**  command, set the value of the preference **MBMEnableBOMFiltering** to **true**.

Procedure

1. **Search for and open** a work package and navigate to the **EBOM-MBOM Alignment** page.
2. Enable **Show Assignment State**.
3. In the **EBOM** panel, select the assembly that contains the parts you want to resolve to the MBOM from your recipe.
4. In the **MBOM** panel, select the part or assembly that contains the recipe.
5. In the **Information** panel, select the **BOM Recipes** tab.

The tab displays available recipes for the selected MBOM assembly. In the following example, those assemblies that display a **Missing in Source** icon  in the MBOM contain recipes, and are not yet resolved from the EBOM to the MBOM.

MBOM | CROSSKART MBOM > MFG CS 01 > Mfg Exterior

Assign

New

Edit Structure

Expand

Handle Mismatch

Manage

Excel Roun...

Find

Edit

Hide Summary

Element	ID	Revision	Revision Name
CROSSKART MBOM	027157	A	CROSSKART MBOM
MFG CS 01	027158	A	MFG CS 01
Mfg chassis	027160	A	Mfg chassis
CHASSIS-CK	CHASSIS-CK_S...	A	CHASSIS-CK
FUEL SYS CK	FUEL SYS CK_S...	A	FUEL SYS CK
Mfg Exterior	027162	A	Mfg Exterior
Mfg Interior	027163	A	Mfg Interior
MFG CS 02	027159	A	MFG CS 02
Mfg Accessories	027168	A	Mfg Accessories

3D

Overview

Attachments

BOM Recipes

Create BO...

Auto-Assign

Side Panel

Object

Auto assign Exterior

6. Select a recipe and in the **BOM Recipes** toolbar, click **Auto-Assign**.
7. At the prompt, click **Update Now** to update MBOM assignment indications, or click **Switch Off Indications** to disable indications.
Once the recipe is resolved, the relevant parts are assigned from the EBOM to the MBOM.

If you selected **Update Now**, assignment indications are updated and the relevant parts are assigned from the EBOM to the MBOM.

If you selected **Switch Off Indications**, then **Show Assignment State** is disabled but the assignments are successfully resolved.

Restructure the MBOM

Restructure an MBOM

You can move or restructure parts and assemblies in your manufacturing bill of materials (MBOM) by dragging elements to new locations in the MBOM structure.

Procedure

1. If you have not done so already, **search for and open** an existing work package that contains processes and parts, and then open the **EBOM-MBOM Alignment** page.
2. Select one or more parts or assemblies in an MBOM assembly and drag the contents to another assembly.

Results

The selected elements disappear from the first part or assembly and appear in the second.

Cut, copy, and paste MBOM elements

To further **restructure** your manufacturing bill of materials (MBOM), you can cut or copy elements in an MBOM structure and then paste new or referenced elements elsewhere in the same structure.

Procedure

1. **Search for and open** a work package and navigate to the **EBOM-MBOM Alignment** page.
2. (Optional) In the MBOM, select a manufacturing subassembly to limit the scope of your work to that area and click **Focus** .
3. Select one or more elements to be copied or cut, and then do one of the following:
 - To copy an *instance* of an element and paste it as a *referenced copy* of the original element, click **Copy** .
 - To cut and *move* an element to another location, click **Cut** .

You cannot cut or copy the top line element of an MBOM, or an MBOM element for which you do not have permissions.

4. To paste the cut or copied element to another location, right-click the element under which the element should be pasted, and then do one of the following:
 - To paste an instance of a copied element, click **Paste as Reference** .

By default, referenced copies of an element display an **MEOther** relation in the **Occurrence Type** column of the MBOM and display the same ID as the original element.

Tip

Your administrator can define a different relation value (for example, **MEHandle**, **MEAssigned**, or **MECustAssign**) using the preference **MBMPasteAsReferenceType**.

If no value is defined in the preference, no occurrence type value is assigned.

- To paste a cut element, click **Paste** .

Note

- You cannot cut or copy an element and then navigate to a different MBOM page or work package and then paste that element outside the original MBOM.
- When in focus mode, you cannot cut, copy, and paste elements within the focused area to assemblies or elements outside the focused area.

Replace parts and add or remove structure levels in an MBOM

In addition to letting you assign and remove parts using change management tools, Easy Plan lets you replace parts or manufacturing assemblies assigned to your manufacturing bill of materials (MBOM) with other parts or assemblies independent of the engineering bill of materials (EBOM). You can also add or remove structure levels to restructure MBOM parts and manufacturing assemblies.

Note

To avoid broken links in your work package bill of process (BOP), check BOP assignments after part replacement or restructuring.

After part replacement or restructuring, check the link for the consumed nodes in your work package bill of process (BOP).

Procedure

1. **Search for and open** a work package and navigate to the **EBOM-MBOM Alignment** page.
2. (Optional) Enable **Show Assignment State** if you want to visualize assignment statuses between the EBOM and MBOM.
3. Do one or more of the following.

To do this	Do this
Replace a part or assembly in the MBOM with another part or assembly	1. In the MBOM, select the part or assembly to be replaced and choose Edit Structure  → Replace  .

To do this	Do this
	2. In the Replace dialog box, do any of the following. • From the Type list, select an object type and in the Name text box, type a unique name for the new part or assembly. • Click the Palette tab and select the end item from the resulting Clipboard, Favorites, or Recent group. • Click the Search tab to locate the item. • Click the Classification tab to select a classified object to add as a replacement. 3. Click Replace. 4. If Show Assignment State is enabled, at the prompt, do either of the following. • To update changes to assignment indications in the MBOM, click Update Now. • To ignore assignment tracking, click Switch Off Indications. In the MBOM panel, the original part or assembly is replaced. In the EBOM panel, which is independent of the MBOM, the original part or assembly is retained.
Add existing MBOM parts to a new structure level	1. In the MBOM, press the Ctrl and Shift keys to select the parts or assemblies that you want to add to a new structure level, and then choose Edit Structure  → Insert Level . 2. In the Insert Level dialog box, do one of the following. • From the Type list, select an object type and in the Name text box, type a unique name for the new level. • Click the Palette tab and select the end item from the resulting Clipboard, Favorites, or Recent group. • Click the Search tab to locate the item. • Click the Classification tab to select a classified object to add as a new level. 3. In the Insert Level dialog box, click Insert.

To do this	Do this
Remove a level from the MBOM but retain its contents	In the MBOM, a new structure level is displayed. The parts you selected now become children of the new level. In the MBOM, select the level structure to be removed, and choose Edit Structure  → Remove Level . The level is removed but its child objects are now contained in its parent (one level up). The child objects of the selected occurrence are associated directly to the parent object of the selected occurrence. Note If an assembly is assigned from EBOM to MBOM and the parts below this assembly are consumed in the BOP, you must reassign the parts following removal of this level in the MBOM.
Remove a part or assembly level and all its child nodes from the MBOM	In the MBOM, select the level structure to be removed, and choose Edit Structure  → Remove . The level and all its contents are removed from the MBOM.

4. Check the consumption of restructured parts assigned to the BOP.

Use, add, or remove substitute parts in an MBOM

You can add one or more substitute parts to a manufacturing bill of materials (MBOM) node assigned from an engineering bill of materials (EBOM) node, and then use those local substitutes to replace other parts.

A *substitute* is a replacement for an object in a local MBOM assembly, such as an interchangeable bolt of the same diameter but different length that may or may not exist in the EBOM, but that can be used if the original bolt is not available. To replace a part in all EBOM product configurations, use **global alternates**.

Procedure

1. **Search for and open** a work package and navigate to the **EBOM-MBOM Alignment** page.
2. In the **MBOM** panel, select the part for which you want to use, add, or remove substitutes.

Note

- You cannot enable substitutes by selecting the root level.

- In the EBOM, select a part to view substitutes in the EBOM. You cannot create, use, or remove substitutes in the EBOM.
3. In the information panels beneath the **EBOM** and **MBOM** panels, select the **Overview** tabs and scroll down to the **Substitutes** groups.
 4. (Optional) To locate the equivalent part in the EBOM, right-click the selected part in the MBOM, choose **Find in EBOM**, and then reselect the part in the MBOM.
 5. In the MBOM **Substitutes** toolbar, do any of the following.

To do this	Do this
Use an existing substitute for the selected MBOM part	In the Substitutes list, select the replacement part and click Use ⇄. In the MBOM panel, the selected part is replaced with the selected substitute. In the EBOM panel, which is independent of the MBOM, the original part is retained.

Note

To see substitute parts listed in EBOM and MBOM panels, add the **Substitute** or **Substitutes** columns to either panel.

Add a new substitute to a selected manufacturing part

1. Click **Add Substitute** ⊕, and in the **Add Substitute** panel, do one of the following.
 - From the **Type** list, select an object type and in the **Name** text box, type a unique name for the substitute.
 - Click the **Palette** tab and select the end item from the resulting **Clipboard**, **Favorites**, or **Recent** group.
 - Click the **Search** tab to locate the item.
 - Click the **Classification** tab to select a classified object to add as a substitute.

2. In the **Add Substitute** panel, click **Add**.

The substitute is added to the **Substitutes** list.

Remove a substitute from the MBOM

In the **Substitutes** list, select the substitute to be removed, and click **Remove** ⊖.

Export the list of substitutes to Excel

Click **Export To** ➦.

The list is downloaded in Microsoft Excel format.

Add or remove global alternate parts in an MBOM

You can add one or more global alternates to a node in a manufacturing bill of materials (MBOM) to show global alternates for that node.

Global alternates are replacements for an object defined in the EBOM that can be used globally in MBOM assemblies across all EBOM product configurations. For example, a worker at the shop floor level might need a part from the global alternate list to use as an alternate part in the MBOM. To replace a part locally, use *substitute parts*.

Procedure

1. **Search for and open** a work package and navigate to the **EBOM-MBOM Alignment** page.
2. In the **EBOM** panel, select the part for which you want to use, add, or remove alternates.
3. In the information panels beneath the **EBOM** and **MBOM** panels, select the **Overview** tabs and scroll down to the **Global Alternates** groups.
4. (Optional) To locate the equivalent part in the EBOM, right-click the selected part in the MBOM, choose **Find in EBOM**, and then reselect the part in the MBOM.
5. In the MBOM **Global Alternates** toolbar, do any of the following.

To do this	Do this
Add a new global alternate to the selected part	1. Click Add Alternate , and in the Add Alternate panel, do any of the following. • From the Type list, select an object type and in the Name text box, type a unique name for the global alternate. • Click the Palette tab and select the end item from the resulting Clipboard, Favorites, or Recent group. • Click the Search tab to locate the item. • Click the Classification tab to select a classified object to add as a global alternate. 2. In the Add Alternate panel, click Add.
Remove a global alternate from the MBOM	In the Global Alternates list, select the global alternate to be removed and click Remove  .
Export the list of global alternates to Excel	Click Export To  . The list is downloaded in Microsoft Excel format.

Edit MBOM properties in Microsoft Excel

You can export a manufacturing bill of materials (MBOM), or a selected area of that MBOM, as a Microsoft Excel (.xslm) spreadsheet file. You can then modify the properties of objects in Excel and import it back into Manufacturing-BOM Manager to update the original MBOM structure.

Procedure

1. **Search for and open** a work package with a linked EBOM and MBOM displayed on the **EBOM-MBOM Alignment** page.
2. (Optional) To filter the MBOM scope, select a manufacturing subassembly in the MBOM, and in the MBOM toolbar, click **Focus** .
3. On the **EBOM-MBOM Alignment** page, in the **MBOM** panel, select the assembly that contains the properties that you want to modify in Excel.
4. In the MBOM toolbar, select **Excel Round-trip**  → **Export to Excel** .
5. In the **Export To Excel** dialog box, do the following.
 - a. In the **SETTINGS** group, select the **Allow Structure Changes in Excel** check box ☒ to make MBOM line properties editable in Excel.

Note

The **Include ID as Hyperlink** and **Include Outline Numbers** check boxes are not functional.

- b. In the **PROPERTIES** group, do one of the following.
 - From the **Template** list, select an Excel template.
 - Select **Customize** and select a specific property you want to review or modify from the list.
 (Optional) From the **SELECTED PROPERTIES** toolbar, do any of the following.

	Move Up	Move the selected column up in the list for quicker access in the future.
	Move Down	Move the selected column down in the list for quicker access in the future.
	Add Properties	Add additional properties to be edited in Excel by clearing any check boxes that you do not want to include from a list of all available properties and then clicking Add .

- c. Ignore the **Run in Background** ☒ check box, it is not functional.
- d. Click **Export**.
In your browser download location, an .xslm file is generated.
6. Navigate to the file location and open the file in Excel.
7. Edit and modify the object properties as needed.

Warning

Although you can delete an object by deleting a row in Excel, restructure the order of objects by cutting and pasting lines in Excel, or add a new object by copying and pasting a line and defining a unique ID and name for the new line in the **Tc_ObjectID** and **Revision Name** columns, these actions may yield unexpected results and are not recommended.

8. Save and close the Excel file.
9. Return to the **EBOM-MBOM Alignment** page and in the MBOM toolbar, select **Excel Round-trip**  → **Import Changes** .
10. In the **Import Changes** dialog box, click **Choose File** and navigate to the Excel file.
11. With the **Overwrite Conflicts** ☒ check box selected, click **Import**.
The MBOM structure is updated with your modifications. The assignment statuses are updated as well.

Align separate MBOM subassemblies to an EBOM

For large engineering bill of materials (EBOM) structures, assigning elements from an EBOM to a manufacturing bill of materials (MBOM) can be a wide-ranging and time-consuming task. You can more easily break this process into separate subassemblies and perform authoring tasks on smaller structure nodes.

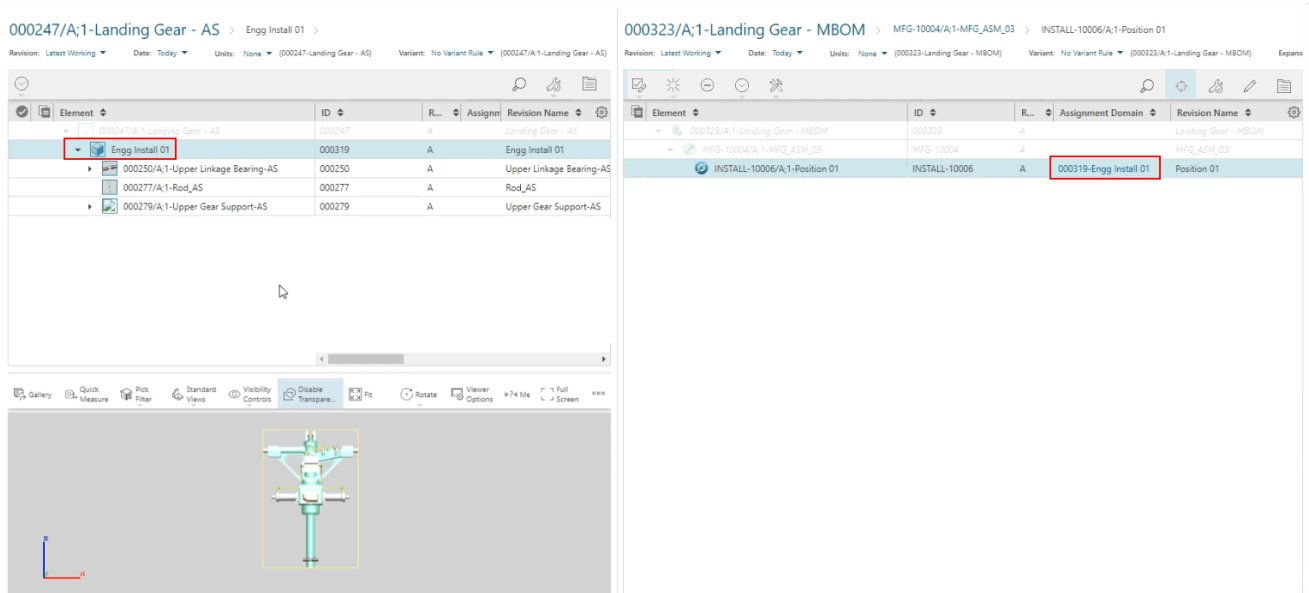
Procedure

1. In Teamcenter, set **domain subassembly** preferences.
2. In Teamcenter Easy Plan, open the **EBOM-MBOM Alignment** page of the work package that contains the subassemblies to be aligned.
3. In the EBOM, select an assembly; in the MBOM, select the subassembly to be aligned; and in the MBOM toolbar, click **Assignment Scope**  → **Associate Assignment Scope** .
An assignment domain relation is created between the engineering assembly and the manufacturing subassembly. You can confirm this assignment by viewing the EBOM assembly name in the MBOM **Assignment Domain** column.

Note

You can remove the assignment at any time by selecting the manufacturing assembly in the MBOM and selecting **Assignment Scope**  → **Remove Assignment Scope** .

4. In the MBOM toolbar, select the manufacturing subassembly, and then click **Focus** .
The EBOM and MBOM panels are filtered to reflect only the scope that you selected and in the MBOM toolbar, standard authoring commands are now available. The EBOM assembly is displayed in the MBOM **Assignment Domain** column. The 3D viewer panel is also filtered to display only elements in the selected scope.



5. From the EBOM, assign parts and other elements to the MBOM subassembly as you would from an EBOM assembly to a full MBOM assembly.

6. To review the effect of your assignments to the complete EBOM-MBOM structure, click **Focus** . You can also redefine the scope of the EBOM assembly to a different subassembly by selecting a different MBOM subassembly and clicking **Focus**  again.

In the EBOM, when the focus is removed, assembly indication icons are not displayed to improve the performance. The MBOM **Assignment Domain** column displays the EBOM assembly for any additional subassemblies assigned to the MBOM.

7. Select the appropriate MBOM subassembly and click **Focus**  again. With the focus applied, the EBOM now displays assignment icons.
-  icons indicate elements that are assigned inside the MBOM subassembly, and you can select these in the EBOM to review their location in the MBOM.
 -  icons indicate elements that are assigned to a different manufacturing assembly that is outside the scope of the MBOM subassembly. Their locations cannot be viewed by clicking them in the EBOM.

Aligning the EBOM to the MBOM

Access EBOM-MBOM alignment data

You can align the engineering bill of materials (EBOM) to the manufacturing BOM (MBOM) before you begin process planning or author work instructions.

Note

Unless you have special permissions, you cannot modify the EBOM. During alignment tasks, you must make all of your changes in the MBOM.

Procedure

1. Search for a work package, and select it in the results list.
2. Click **EBOM-MBOM Alignment**.
3. Select **Work without tracking changes**, and click **Continue**.

Tip

To use change management during EBOM-MBOM alignment, select **Track with change notice**, then select a change notice and click **Continue**.

4. Perform EBOM and MBOM alignment tasks.

EBOM-MBOM Alignment page

The default **EBOM-MBOM Alignment** interface may look different from that displayed below because your administrator can configure many aspects of it. The page consists of two panels, an engineering bill of materials (EBOM, left) and a manufacturing bill of materials (MBOM, right). Both EBOM and MBOM configurations are independent, as are the toolbar options above either panel. While manufacturing engineers do not have write access to the read-only EBOM, they can access toolbar navigation commands that allow them to compare and update EBOM-MBOM using structure and 3D graphic views, and can make MBOM-related changes using:

- New and existing work packages that contain EBOM and MBOM data.
- Assignment status icons that indicate the current status of assembly and part elements that are unassigned or fully, partially, and over assigned from the EBOM to the MBOM. Assignment statuses also indicate element changes that impact the MBOM, such as revisions and deletions.
- The ability to restructure, revise, and release one or more MBOM structures or the entire MBOM.
- Table columns that allow you to manually match EBOM and MBOM properties, and change part quantities.
- Change management.

A change notice records engineering design changes to a product. You can associate work packages with change notices or propagate changes from EBOM to MBOM using tree structures rather than change notices.

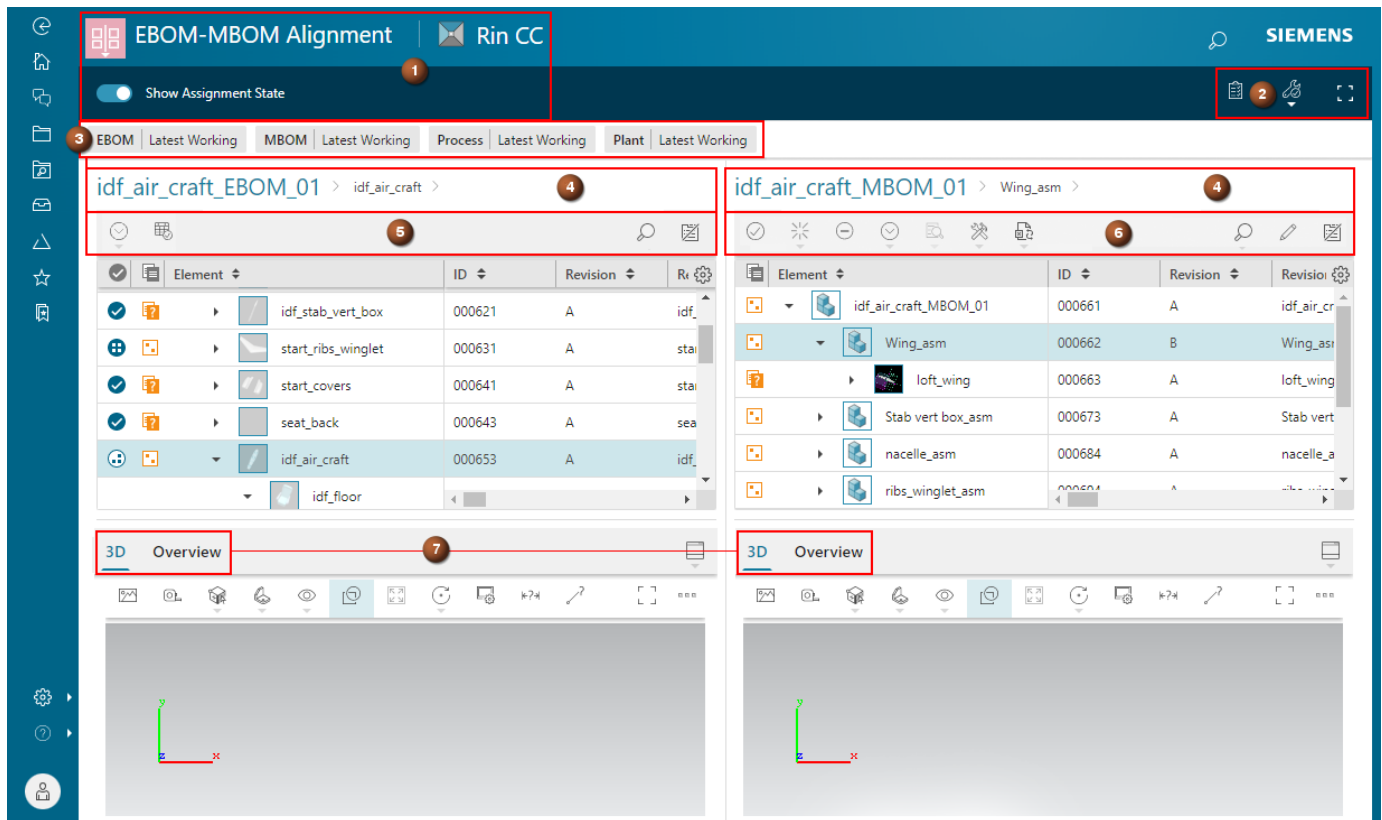
- Variants, revisions, and occurrence effectivity settings for selected elements.

Note

- Authoring of variant rules is not supported.
- Using a mixture of legacy and product configurator variants can cause data corruption. By default, the system uses the preference **ME_EnableMixVariantModelCheck** to prevent loading structures that use a mixture of these variants. If you are using only one variant, or no workflow results in mixed variants, change the value of **ME_EnableMixVariantModelCheck** to **false**. This value enables the system to open structures without a check.

- Visual comparisons of differences between MBOM and EBOM CAD models using separate 3D viewer panels for each.

For more information on 3D viewer options, see the *Visualizing 3D Product Data* section of the Active Workspace online help.



- 1 The top line displays the work package name. Above each panel, a bread crumb indicates where you are in each structure (in this case, **idf_air_craft** for the EBOM and **Wing_asm** for the MBOM). When **Show Assignment State** is enabled, indications in the first few columns of the tables below the configuration areas and toolbars show **assignment status and property mismatches**.
- 2 The **Configuration** button  lets you **configure** EBOM, MBOM, BOP, and other structures. The **Full Screen** button lets you expand the interface to hide or show everything but the task and the EBOM and MBOM panels.
- 3 The **configuration headers** display current values and functions that you can modify using the **Configuration** button  above. You can change revision list, date, units, and variants.
- 4 The areas above the EBOM and MBOM are task-related, meaning that the manufacturing engineer can make alterations to some properties. You can move between parent and child elements in the panel trees using the bread crumb trail > or the tree navigation in either panel.
- 5 The EBOM toolbar lets you review part and assembly elements to be assigned to appropriate locations in the MBOM. You can **validate** effectivity coverage, **find** parts or assemblies in the EBOM, change **configuration** EBOM rules, and **view** selected EBOM part or assembly properties.
- 6 The MBOM toolbar lets you author and configure MBOM parts and assemblies by:
 - **Assigning** EBOM elements to an MBOM by navigating EBOM/MBOM structures.

- **Adding** and removing manufacturing elements such as containers and welds (phantom nodes) not used in the EBOM.
- **Matching** EBOM and MBOM table properties.
- **Revising** manufacturing assemblies.
- **Releasing** MBOM changes to a workflow or **submitting** MBOM changes to a workflow.
- Configuring EBOM or MBOM rules such as **occurrence effectivities** and **equivalent assignment scopes**.
- **Finding** parts or assemblies in the MBOM, or **finding** an assigned MBOM element in the EBOM.
- **Viewing** selected MBOM parts or assemblies in the 3D viewer panel, or viewing detailed part or assembly summary properties.
- **Restructuring** an MBOM by moving assigned parts and MBOM-specific nodes as needed.
- **Associating** a work package with a change notice and **using** the **Change Summary** panel to decide which changes are updated from the EBOM in an MBOM.
- **Editing** selected object properties in Microsoft Excel.
- **Configuring** variant conditions on MBOM nodes just as you would on operations from the **Process Planning** page.

Learn more about navigating.



By default, the panels below the EBOM and MBOM screen display summary overviews and attachments related to the element selected in either panel. From the EBOM or MBOM toolbars, you can use the **Show Summary**  button to **view** part or assembly summary properties. These include the ability to use, add, or remove **substitute** or **global alternate** parts in an MBOM.

You can also switch to the 3D viewer panel below the EBOM or MBOM panels. The 3D viewer panel lets you explore 3D data (JT) associated with parts and assemblies. You can use the panel to manipulate views, query and measure parts and features, view part and assembly level product and manufacturing information (PMI), and create 3D sections through your data.

For details on using the 3D viewer common to Active Workspace, see the *Visualizing 3D Product Data* section in the *Active Workspace* help.

Partially comparing in-scope elements with no assignment domains

You can compare subassemblies with no defined assignment domains.

In the example, the third line in the EBOM has connected assignment domains and shows partial assignment icons. The next line has no connected assignment domains and also shows partial assignment icons. The subassemblies show partial comparisons only when both are selected in focus mode.

EBOM | GS_000849/A;1-57-RH-Wing << 001239/A;1-57-001001-0002_CI_RH_WING_072604_2 >

Element	Assignment Domain
GS_000849/A;1-57-RH-Wing	
GS_000849/A;1-57-RH-Wing-Subs	
001239/A;1-57-001001-0002_CI_RH_WING_072604_2	001894/A;1-MFG_Install-003, 001889/A;1-MFG_Install-001
001240/A;1-57-001001-0002_CI_RH_WING_072604_3	

Revise manufacturing parts or assemblies

When you want to apply changes to a manufacturing bill of materials (MBOM) from an engineering bill of materials (EBOM), you can implement all change revisions for a single part or assembly or multiple parts or assemblies from the MBOM.

- In the MBOM, select one or more part or assembly lines and in the MBOM toolbar, select **Manage**  → **Revise** , and in the prompt, click **Revise** again.

The revision updates to reflect the changes (for example, A changes to B, B to C).

Note

Unless you have special access, you can only revise assemblies in the MBOM, not the EBOM.

Collaborate using Teamcenter Share

Share project files

Teamcenter Share is a collaborative cloud application that allows you to share project files with your partners, team members, and manufacturers, from anywhere, at any time.

With a simple browser-based collaboration, you can work on new products and designs, and then share your projects with customers for approval or with manufacturers for production. File sharing with Teamcenter Share is secure because you control access to the files. The sharing history is available, and the file exchange and location is tracked and recorded.

Example

For example purposes, you are a manufacturing engineer using Teamcenter and Teamcenter Easy Plan to create a project. You work with a supplier, who does not use Teamcenter or Teamcenter Easy Plan, but needs to review and provide feedback about the files you create for the project.

By leveraging the Teamcenter Easy Plan integration to Teamcenter Share, you can share:

- CAD part files (NX and Solid Edge)
- Documents (Microsoft Office, PDFs)
- Image files (JPG, PNG, TIFF, etc.)
- Visualization files (JT)

Set up Teamcenter Share with Teamcenter Easy Plan

You must set up Teamcenter Share with Teamcenter Easy Plan before you can use it.

Prerequisites

Before you set up Teamcenter Share, you must have:

- An Teamcenter Share license.
- An account with Teamcenter Share.
- A Webkey account.

Setting up Teamcenter Share with Teamcenter Easy Plan

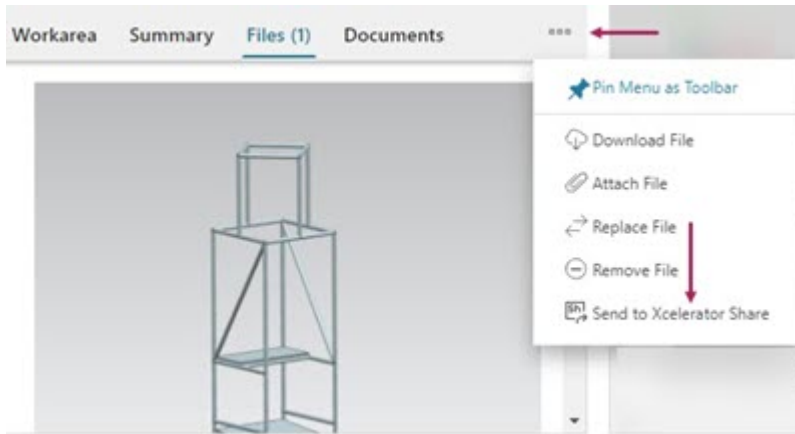
To set up Teamcenter Share, see *Install Teamcenter Teamcenter Share* in the Active Workspace documentation.

Share files from Teamcenter Easy Plan to Teamcenter Share

As the manufacturing engineer, you can share JT files, Microsoft Office documents, and PDFs from Teamcenter Easy Plan to Teamcenter Share. Then you can invite a supplier to collaborate with you on those files.

Procedure

1. If you have not done so already, **search for and open** an existing work package that contains processes and parts and then **navigate** to the **Process Planning** or **Work Instructions Authoring** page.
2. In the **Process** panel or tab, select a process, and click the **Files** tab at the bottom of the page.
3. Select the file that you want to share in the **Files** tab.
4. Click **More** ^{□□□}, and select **Send to Teamcenter Share**.



A new browser tab is opened. If you are not logged into Teamcenter Share, Teamcenter Easy Plan prompts you to log in. Use your WebKey account credentials for log-in.

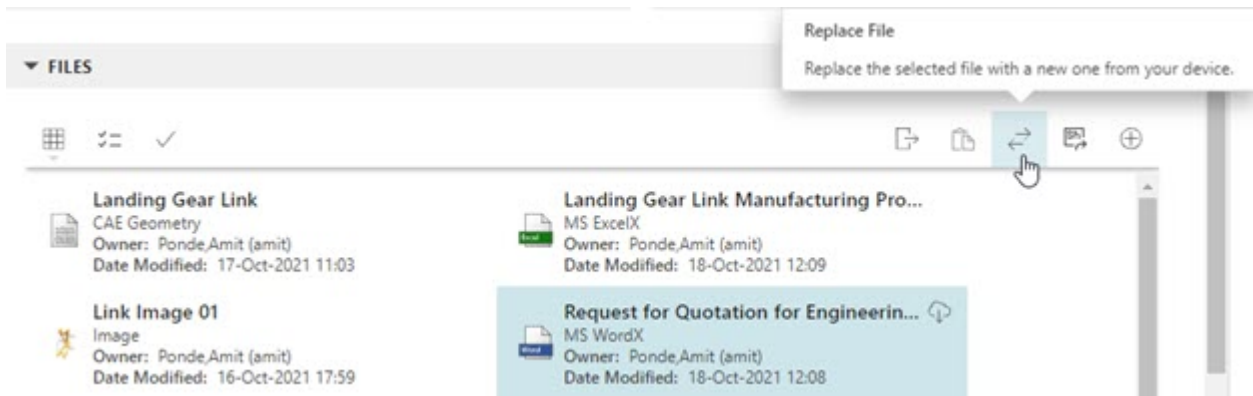
5. On the **Teamcenter Share** page, perform one of the following actions:
 - Select an existing project from the **Teamcenter Share Project** list.
 - Create a new project.
6. Click **Share**.
Teamcenter Easy Plan uploads the file to **Teamcenter Share** page.
7. On the **Teamcenter Share** page select the file you want to send to your supplier and click **Share** .
8. On the **Add Users** page, select your supplier from the **Available Users** list and click **Add**.
The supplier receives an alert that a file is uploaded to the cloud. The supplier logs into Teamcenter Share to collaborate on the file.

Share and send files from Teamcenter Easy Plan to Teamcenter Share

After the supplier reviews, revises, and uploads the file, Teamcenter Share notifies you that an updated file is in the cloud. You can replace the existing file in with the updated file from the supplier.

Procedure

1. **Search for and open** a work package, navigate to the **EBOM-MBOM Alignment** page, and in the manufacturing bill of materials (MBOM) panel, select the assembly with the file that you want to replace.
2. In the MBOM toolbar, click **Show Summary** , and select the **Attachments** tab.
3. Select the file you want to replace and click **Replace File** .



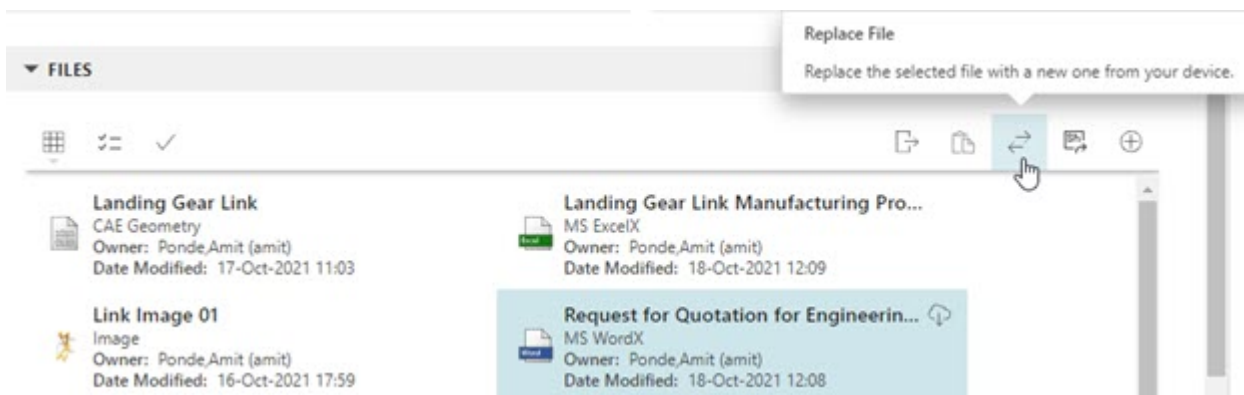
4. In the **Replace** dialog box, select **Choose** and then select **Browse Teamcenter Share**^[Sh]. All Teamcenter Share projects to which you have access are listed. Locate the projects to find the files that are shared by the supplier.
5. Select the replacement file the supplier uploaded to Teamcenter Share and click **Replace**. The existing file is replaced with the revised file from Teamcenter Share.
6. Download the file and review the changes the supplier made to the file.

Replace files in Teamcenter Easy Plan with files imported from Teamcenter Share

After the supplier reviews, revises, and uploads the file, Teamcenter Share notifies you that an updated file is in the cloud. You can replace the existing file in Teamcenter Easy Plan with the updated file from the shop floor engineer.

Procedure

1. In Teamcenter Easy Plan, navigate to and expand the assembly that contains the file that you want to replace.
2. Select a process and click the **Files** or **Attachments** tab at the bottom of the page.
3. Select the file you want to replace, click **More** , and select **Replace File**.
4. In the **Replace** dialog, select **Browse to Teamcenter Share**.



Teamcenter Easy Plan lists the files in your Teamcenter Share project.

5. Select the file the supplier uploaded to Teamcenter Share and click **Replace**.
6. Click **Edit > Replace File** to display the **Replace** panel.
7. In the **Replace** panel, click **Choose File** and then **Browse Teamcenter Share** to view all projects in Teamcenter Share.
8. Download the file and review the changes the supplier made to the file.

For example, the supplier might ask for more details in the file, to ensure that their team members can correctly build the component for you.

Modify the file as needed, and continue to use Teamcenter Share to collaborate with the supplier on your project.

Import files to Teamcenter Easy Plan from Teamcenter Share

Suppliers can upload and share additional files with you. You can locate the Teamcenter Share project and attach these files to the manufacturing assembly as new datasets.

Procedure

1. **Search for and open** a work package, and on the **EBOM-MBOM Alignment** page, in the manufacturing bill of materials (MBOM) panel, select the assembly with the file that you want to add.
2. In the MBOM toolbar, click **Show Summary** , and select the **Attachments** tab.
3. Select the file you want to add and then click **Add to** .
4. In the **Add** dialog box, click **Choose** and then select **Browse Teamcenter Share** . All Teamcenter Share projects to which you have access are listed. Locate the projects to find the files that are shared with the supplier.
5. Select the file the supplier uploaded to Teamcenter Share and select a relation, and then click **Add**.

Tip

You can also search for a project using the **Filter** box.

A new dataset is created and the file is attached to the manufacturing assembly with the relation you selected.

6. Download the file and review the content in the file that the supplier uploaded.

Release an MBOM assembly or entire MBOM

You can submit a workflow assembly or an entire manufacturing bill of materials (MBOM) to allow your system to approve processes through which a piece of work or an entire MBOM passes from initiation to completion.

Procedure

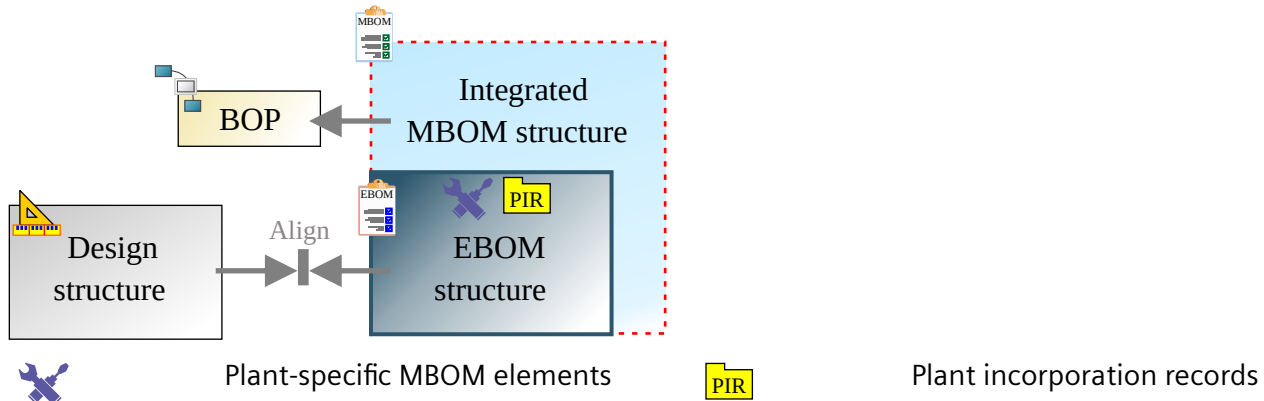
1. In the MBOM on the **Align** page, select the MBOM, or one or more assemblies or manufacturing container elements, and select **Manage**  **→Submit to Workflow** .
2. In the **Submit to Workflow** panel, in the **Workflow** group, select a workflow template.
3. (Optional) Type a description, verify that assignments and targets are correct, and click **Submit**. The elements are submitted to the workflow and once approved, each element originally selected from the MBOM displays a  icon to indicate that it has been successfully submitted.

Using integrated MBOMs

Integrated MBOM overview

An integrated manufacturing bill of materials (MBOM) is useful for products that are manufactured at multiple plants, because it ensures that changes and validations are maintained from a central company location to avoid duplicate effort at local plants.

Many manufacturing planning engineers copy the engineering bill of materials (EBOM) and create a **common MBOM** that uses new elements, but is modified with manufacturing-related information. An integrated MBOM uses a single data source that contains an MBOM derived from the EBOM, using plant incorporation records (PIRs). The integrated MBOM uses a mandatory manufacturing change notice (MCN) to track workflow progress.



The process for creating, maintaining, validating, and releasing a integrated MBOM is as follows.

1. **Create an integrated MBOM work package.**
2. **Author an integrated MBOM** by adding parts and assemblies from the EBOM.
3. **Check assignments and add EBOM elements.**
4. **Validate and release** the integrated MBOM.

Create an integrated MBOM work package

You can create a work package that contains an integrated bill of materials (MBOM).

Prerequisites

You must:

- Have an **integrated BOM** and set the preference **EP_WorkPackageContentType** to *IntegratedBOM:PSBOMViewRevision*.
- Generate a **Smart Discovery index** for the EBOM (an integrated BOM has the same structure as an engineering bill of materials, or EBOM.). Smart Discovery Indexing and sync services must be running.

Note

For an integrated MBOM to work, you must:

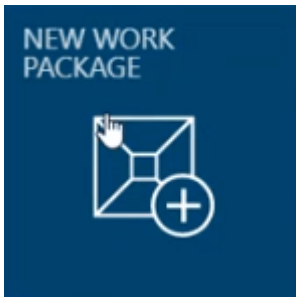
- Install integrated manufacturing BOM templates and Teamcenter applications. For more information, see the document *Install Teamcenter applications for engineering BOM and color BOM management* in the 2024 *Engineering BOM Management — Deployment and Administration* help.
- Ensure that part occurrences in the structure are managed as part usages at all levels. For more information, see the document *Set the structure management mode for parts* in the 2024 *Engineering BOM Management — Deployment and Administration* help. An integrated BOM is

supported with an engineering bill of materials (EBOM) in which usages are present at all levels, not just the first level.

- Define the integrated BOM as either an integrated MBOM or a plant BOM. Your administrator must use the site preference **EP_IntegratedBOMsupportedMBOM_types** to specify which type of integrated MBOM is available in Easy Plan. Valid values include **GlobalMBOM** or **PLANTBOM** (default = **GlobalMBOM**).

Procedure

1. On your **Home** page, click **New Work Package**.

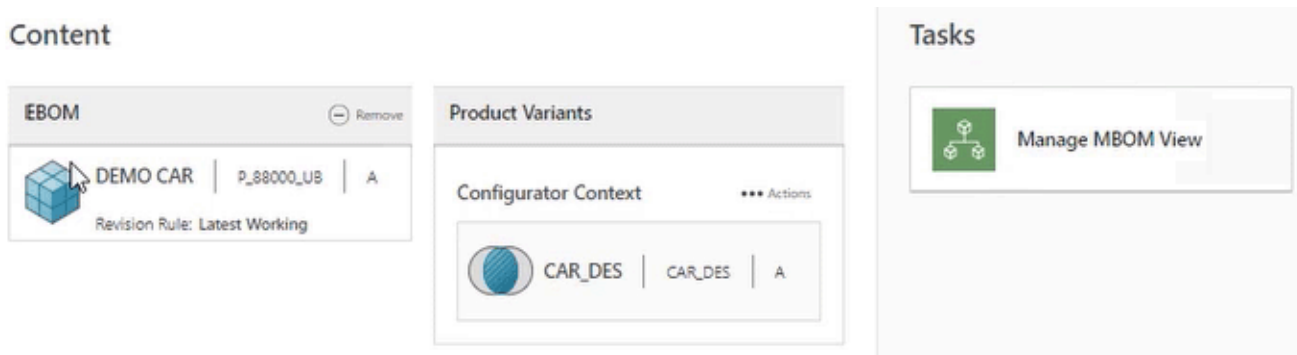


Note

For more information on related work package details, see [Create a work package](#).

2. In the **New Work Package** dialog box, from the **Type** list, select **MECollaborationContext**, or an appropriate subtype.
3. In the **Properties** group, type a name for the work package, and then click **Create**. The **Manage Work Package** page is displayed.
4. In the **EBOM** group, click **Add** , and then do the following.
 - a. In the **Add Product** dialog box, type the text to search.
 - b. Select an appropriate EBOM.
 - c. Click **Add Product**.

On the **Manage Work Package** page, the integrated MBOM is added to the **Content** panel. Depending on whether your work package uses an integrated MBOM or a plant BOM, a **Manage MBOM View** tile or **Manage Plant BOM View** appears in the **Tasks** list.



Note

No **MBOM configuration header** exists yet on the **Manage Work Package** page.

5. Do one of the following. in the work package.
 - **Author an integrated MBOM.**
 - **Author a location-specific plant BOM.**

Author an integrated MBOM

Author an integrated manufacturing bill of materials (MBOM) from a collaborative product engineering bill of materials (EBOM), known as a usage BOM.

An integrated MBOM shares release effectivities with secondary plant MBOMs. Plants manage their own regional and manufacturing-specific elements in their MBOMs and bills of processes (BOPs).

Procedure

1. If you have not already done so, **create an integrated MBOM work package** and on the **Manage Work Package** page, click **Manage Plant BOM View**.
The **Track Your Work** dialog box is displayed.
2. In the **Track Your Work** dialog box, select a manufacturing change notice (**MCN**).
MCN tracking is required when creating an integrated MBOM. Shared release effectivity defined at the MCN level is populated on plant incorporation records as manufacturing element effectivity. This effectivity is displayed in the **Manufacturing Element Effectivity** column when the integrated MBOM is created.

When you click **Changes**  in the left vertical toolbar, the MCN planning task page displays a new workflow, **MBOM Release Process With CN**.

The screenshot displays the SAP Teamcenter MBOM interface for a change task. The top navigation bar includes tabs for Overview, Affected Items, Reference Items, Participants, Workflow, Dependencies, and Relations. The left sidebar contains icons for Changes, Home, Assistant, Folders, Inbox, and Reports. The main content area shows the 'Task to Perform' section with the following details:

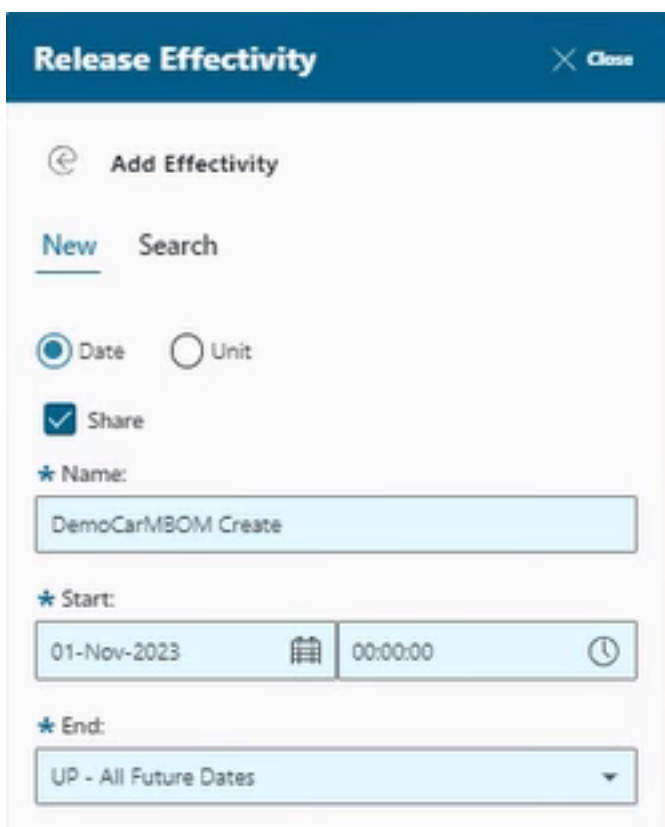
- Workflow:** MBOM Release Process With CN : MCN-000006/A;1-DEMO CAR MBOM
- Name:** Validate change task
- Task Instructions:** After performing further BOM updates, if needed, select one of the following actions:
 1. Validate Change: Choose this action to verify if the change is valid as per the defined business rules.
 2. After Validating, Release Change.
 Only a valid change can be released
- Workflow Description:** MBOM Release Process With CN : MCN-000006/A;1-DEMO CAR MBOM
- Comments:** A text area for additional comments.

At the bottom of the task details, there are two prominent blue buttons: 'Cancel Change' and 'Validate Change'.

- Click **Release Effectivity**  to add or remove the shared release effectivity that is populated on plant incorporation records when the integrated MBOM is created.

Caution

When you add a release effectivity, select the **Share** ☒ check box.



Release Effectivity ✕ Close

↶ Add Effectivity

New Search

☒ Date ☐ Unit

☒ Share

★ Name:

★ Start:

★ End:

4. In the **Track Your Work** dialog box, click **Continue**.

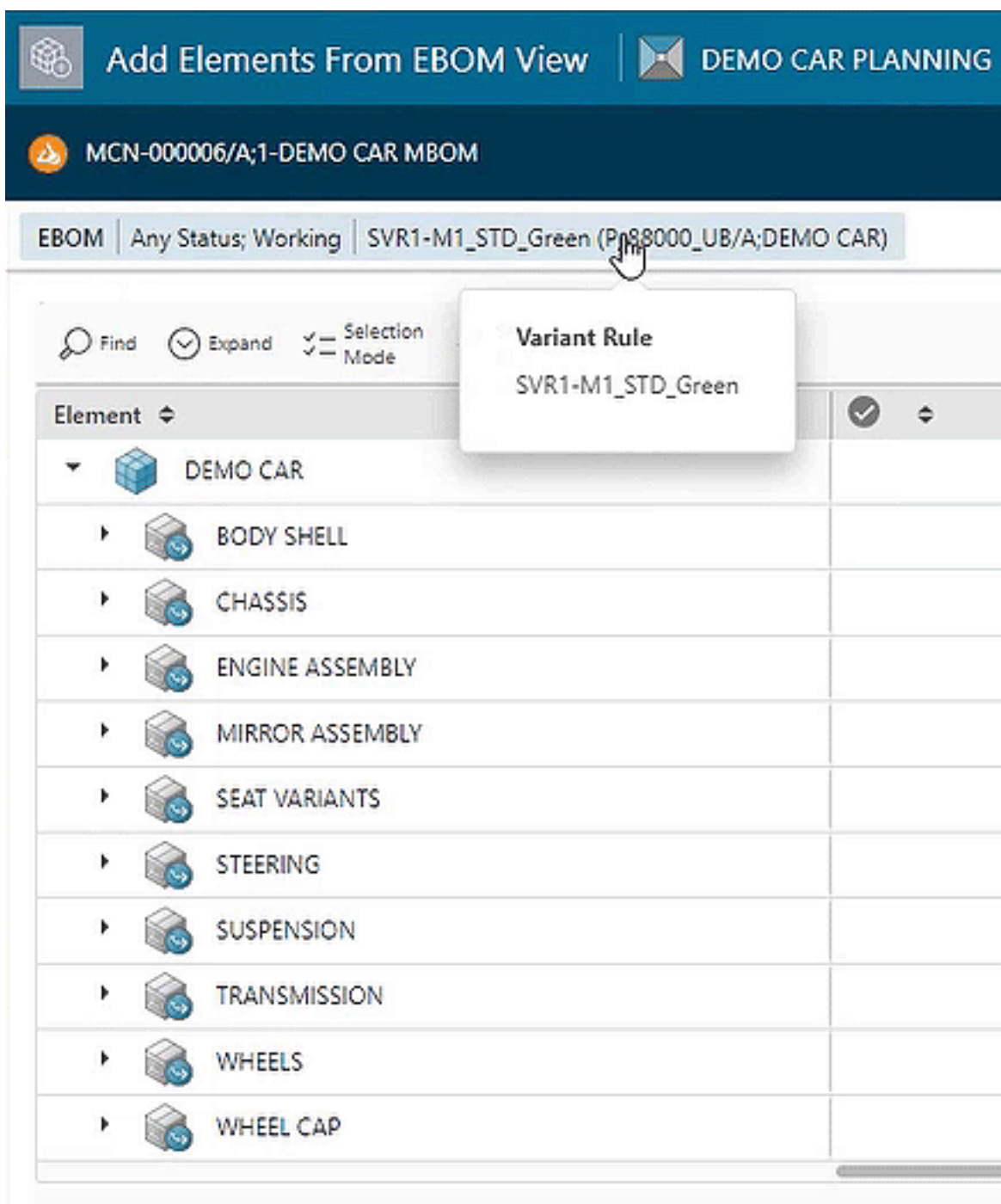
On the **Manage Plant BOM View** task page, the integrated MBOM displays the source EBOM, but the integrated MBOM is not yet created.

5. Click **Open EBOM View**.

The **Add Elements From EBOM View** page is displayed, with the **Configuration** panel visible.

6. **Configure** the EBOM task page structure, and when you are finished, click **Configure**.

Your settings are displayed in the **EBOM configuration header**.



7. Press Ctrl and select the EBOM elements that you want to add to the integrated MBOM.
8. Click **Add to integrated MBOM**.

The new integrated MBOM is displayed, with the selected parts and **MBOM** configuration header shown on the **Manage Plant BOM View** page.

Element	ID	Object	Object Type	Revision	Revision Name
DEMO CAR	P_88000_UB	P_88000_UB/A;DEMO CAR	Collaborative Product EBOM	A	DEMO CAR
BODY SHELL	P_88210_UB	P_88210_UB/A;1-BODY SHELL	UB Part	A	BODY SHELL
CHASSIS	P_88517_UB	P_88517_UB/A;1-CHASSIS	UB Part	A	CHASSIS
ENGINE ASSEMBLY	P_88867_UB	P_88867_UB/A;1-ENGINE ASSEM...	UB Part	A	ENGINE ASSEMBLY
MIRROR ASSEMBLY	P_881056_UB	P_881056_UB/A;1-MIRROR ASSE...	UB Part	A	MIRROR ASSEMBLY
SEAT VARIANTS	P_881146_UB	P_881146_UB/A;1-SEAT VARIANTS	UB Part	A	SEAT VARIANTS
STEERING	P_881441_UB	P_881441_UB/A;1-STEERING	UB Part	A	STEERING
WHEELS	P_882184_UB	P_882184_UB/A;1-WHEELS	UB Part	A	WHEELS
WHEEL CAP	P_882358_UB	P_882358_UB/A;1-WHEEL CAP	UB Part	A	WHEEL CAP

Note

You can **configure plant BOM view columns**. The **Manufacturing Element Effectivity** column displays the shared release effectivity defined on the MCN; you can ignore the **Element Effectivity** column, which displays engineering dates rather than manufacturing effectivity dates. Other useful columns include **Manufacturing Release Status**, **Manufacturing Usage Release Status**, **Manufacturing Release Date**, and **Manufacturing Usage Release Date**.

- (Optional) **Check assignments and add EBOM elements** to the integrated MBOM.

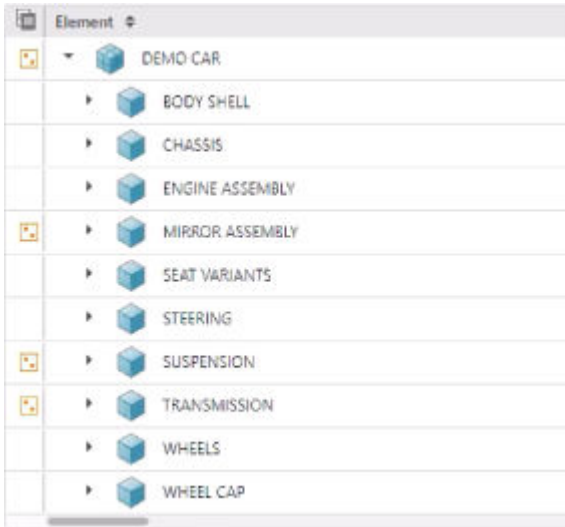
Check assignments and add EBOM elements to an integrated MBOM

Run a full assignment check on an integrated manufacturing bill of materials (MBOM) to verify that assignments from the engineering bill of materials (EBOM) to the integrated MBOM are complete.

Procedure

- In your **integrated MBOM work package**, navigate to the **Manage Plant BOM View** task page.
- Click **Add Elements from EBOM View**.

The EBOM view opens with an **Assignment Status** column that displays **assignment status icons** that indicate parts and assemblies currently assigned to the integrated MBOM.



Note

Only the fully assigned  and partially assigned  icons are employed in the **Assignment Status** column.

- (Optional) Select additional elements to add to the integrated MBOM, and click **Add to MBOM View** .

Add consumables to an integrated MBOM

You can add manufacturing consumables such as oils, sealants, tapes, and adhesives to an integrated MBOM.

Procedure

- In your **integrated MBOM work package**, navigate to the **Manage Plant BOM View** task page.
- In the MBOM, select the assembly to which you want to add a consumable.
- In the MBOM toolbar, click **Add**  → **Add Consumables** .
- In the **Add Consumable** panel, click **New**.
- In the **Type** text box, select the type of consumable, type a name, and click **Add**.
- Do any of the following.
 - From the **Type** list, select an object type and in the **Name** text box, type a unique name for a new consumable.
 - Click the **Palette** tab and select the end item from the resulting **Clipboard**, **Favorites**, or **Recent** group.
 - Click the **Search** tab to locate the item.

- Click the **Classification** tab to select a classified object to add as a replacement.

The consumable is added to the selected MBOM assembly, but not to the EBOM. A **plant incorporation record** is also created and effectivity appropriately applied.

Author a location-specific plant BOM

In cases where the same product is produced or assembled at multiple plants, you can create one or more location-specific plant bills of material (BOMs) from an engineering BOM, and then use plant-specific revision rules to configure unique criteria for each.

A plant manufacturing bill of material (MBOM) is not an **MEPlant** object, but a plant location object. Plant location is now a part of the configuration and revision rule criteria. Each plant BOM can also use different effectivities to produce different configurations, for example, **Plant1** might produce *Sedan, Mini*, while **Plant2** produces *Sedan, Sport*.

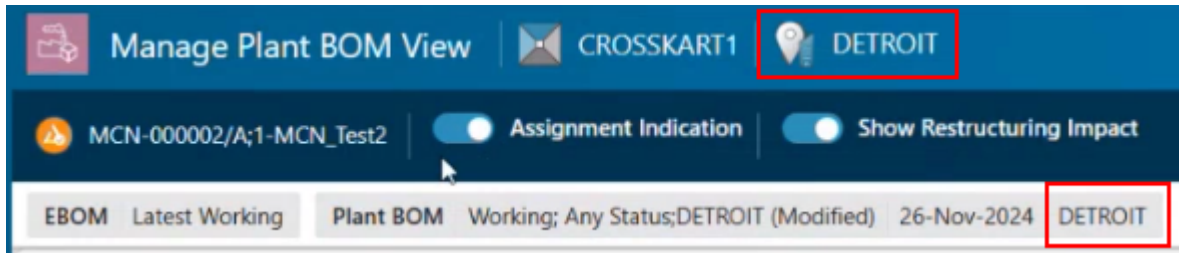
Procedure

1. If you have not already done so, **create an integrated MBOM work package** with an active manufacturing change notice (MCN), and on the **Manage Work Package** page, click **Manage Plant BOM View**.
2. In the **Track Your Work** dialog box, do the following.
 - a. Select a **Plant Location**.
 - b. From the **Revision Rule** list, select a plant-specific revision rule.
 - c. If it is not already selected, select an MCN to track changes.
 - d. Click **Continue**.
3. In the **Manage Plant BOM View** page, select the node where you want to add EBOM elements, and click **Open EBOM View**.

4. In the **Add Elements from EBOM View** page, select parts and assemblies to be added to the plant BOM and click **Add to Plant BOM View**.

On the **Manage Plant BOM View** page, the items you added are displayed beneath the node that you selected in step 3.

5. (Optional) To remove a part or assembly from this location-specific plant BOM, but not from the EBOM or other plant BOMs using that part or assembly, select that object, click **Remove** , and at the confirmation prompt, click **Remove** again.
6. Plant location is displayed in the header next to the work package name, and in the plant BOM **configuration header**.



Restructure an integrated MBOM or plant BOM

In a feature that is currently being developed, you can restructure an integrated manufacturing bill of materials (MBOM) or plant bill of materials (BOM) by adding, creating, and moving structures from an engineering assembly to a manufacturing assembly. Changes apply only to the specific integrated MBOM or plant BOM that you are editing.

Restructuring lets you work with only those parts or assemblies that are needed at a specific plant location. For example, if an engineering assembly has ten parts, you can move five to an integrated MBOM or plant BOM manufacturing assembly. You can then assign the remaining five to another integrated MBOM or plant BOM manufacturing assembly. When restructuring is complete, the engineering assembly is automatically removed.

Caution

Restructuring and its documentation are in progress. Issues may arise if you experiment with this functionality.

Procedure

1. In your **integrated MBOM work package**, with an active manufacturing change notice (MCN) and an integrated MBOM or plant BOM, on the **Manage Work Package** page, click **Manage MBOM View** or **Manage Plant BOM View**.



2. In the **Track Your Work** dialog box, from the **Track with this change notice** list, select an MCN and click **Continue**.
3. On the **Manage MBOM View** or **Manage Plant BOM View** page, click **Add Elements** .
4. In the **Add Elements from EBOM View** page, in the EBOM panel, select any elements that you want to add and click **Add to MBOM View**.
5. On the **Manage MBOM View** or **Manage Plant BOM View** page, enable the **Assignment Indication**  comparison control.

The parts and assemblies you added display missing-in-source  icons. Assignment symbols are similar to **EBOM to MBOM assignment status icons**.

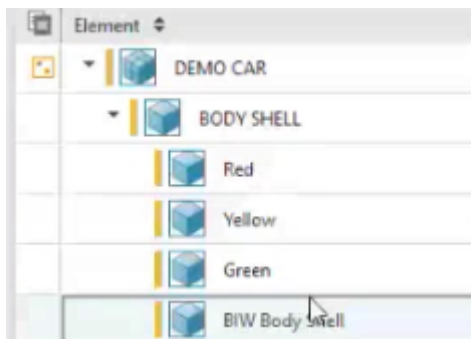
6. (Optional) To add a phantom assembly for use in manufacturing, do the following:
 - a. Select the root BOM element and click **Add**  → **Create Manufacturing Assembly** .
 - b. In the **Create Manufacturing Assembly** dialog box, type a **Name**, deselect the **Design Required** check box, and click **Add**.

The phantom assembly you added displays a missing-in-source  icon.

7. To move parts and assemblies to a different location in your plant BOM or integrated MBOM, select those elements to be moved, select **Cut** , select the node below which you want to paste the elements, and click **Paste** .

8. Enable the **Show Restructuring Impact**  comparison control.

The parts and assemblies you moved are highlighted, as well as the parent node to which you moved them.



9. To remove parts or assemblies, select them in the structure, click **Remove** , and at the confirmation prompt, click **Remove** again.

Validate and release an integrated MBOM

Using the work package's manufacturing change notice (MCN), validate that all assignments from the engineering bill of materials (EBOM) to the integrated manufacturing bill of materials (MBOM) are complete, and release the integrated MBOM.

Releasing the integrated MBOM releases the MCN.

Procedure

1. Open the MCN page associated with your integrated MBOM and review the MCN progress.

In this example, a new integrated MBOM has been created and the MCN is tracking plant incorporation records. These records are manufacturing specific and allow the integrated MBOM to differ from the integrated EBOM structure.

▼ Progress
 Closure: Open Disposition: Approved
 Elaborating Reviewing **Executing** Complete Ready Superseded

▼ Change Summary

☒ Update Alignment
 ☐ Full Screen
 ☒ Add to

ID	Action	Revision	Element	Revision Name
 10510	New	A	PlantIncorp_BODY SHELL	PlantIncorp_BODY SHELL
 10482	New	A	PlantIncorp_BODY SHELL	PlantIncorp_BODY SHELL
 10485 	New	A	PlantIncorp_CHASSIS	PlantIncorp_CHASSIS
 10513	New	A	PlantIncorp_CHASSIS	PlantIncorp_CHASSIS
 10511	New	A	PlantIncorp_ENGINE ASSEMBLY	PlantIncorp_ENGINE ASSEMBLY
 10483	New	A	PlantIncorp_ENGINE ASSEMBLY	PlantIncorp_ENGINE ASSEMBLY
 10519	New	A	PlantIncorp_Electric Engine	PlantIncorp_Electric Engine
 10488	New	A	PlantIncorp_Electric Engine	PlantIncorp_Electric Engine
 10492	New	A	PlantIncorp_Engine Closure	PlantIncorp_Engine Closure
 10523	New	A	PlantIncorp_Engine Closure	PlantIncorp_Engine Closure

- (Optional) Review and modify the integrated MBOM.

Note

You can **check assignments and add EBOM elements** to the integrated MBOM.

- Click **Validate**.
- Once validation problems are resolved, click **Release Change**.

The MCN progress is now set to **Complete**. If you navigate to the **Manage Plant BOM View** task page, manufacturing release statuses and dates are reported.

Element	MFG Element Effectivities	MFG Release Effectivity	MFG Release Status	MFG Date Released
DEMO CAR				
BODY SHELL	01-Sep-2024 00:00 to UP (NONE)	TCM Released 01-Sep-2024 00:00 to UP (NONE)	TCM Released	23-May-2024
CHASSIS	01-Jun-2024 00:00 to UP (NONE)	TCM Released 01-Jun-2024 00:00 to UP (NONE)	TCM Released	22-May-2024
ENGINE ASSEMBLY	01-Sep-2024 00:00 to UP (NONE)	TCM Released 01-Sep-2024 00:00 to UP (NONE)	TCM Released	23-May-2024
MIRROR ASSEMBLY	01-Sep-2024 00:00 to UP (NONE)	TCM Released 01-Sep-2024 00:00 to UP (NONE)	TCM Released	23-May-2024
SEAT VARIANTS	01-Sep-2024 00:00 to UP (NONE)	TCM Released 01-Sep-2024 00:00 to UP (NONE)	TCM Released	23-May-2024
STEERING	01-Sep-2024 00:00 to UP (NONE)	TCM Released 01-Sep-2024 00:00 to UP (NONE)	TCM Released	23-May-2024
SUSPENSION	01-Sep-2024 00:00 to UP (NONE)	TCM Released 01-Sep-2024 00:00 to UP (NONE)	TCM Released	23-May-2024
TRANSMISSION	01-Sep-2024 00:00 to UP (NONE)	TCM Released 01-Sep-2024 00:00 to UP (NONE)	TCM Released	23-May-2024
WHEELS	01-Sep-2024 00:00 to UP (NONE)	TCM Released 01-Sep-2024 00:00 to UP (NONE)	TCM Released	23-May-2024

Note

- Columns specific to your integrated MBOM are prefixed by **MFG**.
- The integrated MBOM is configured based on:
 - MFG Element Effectivities**
 - MFG Release Effectivity**
 - MFG Release Status**
 - MFG Date Released**

6. High level work breakdown

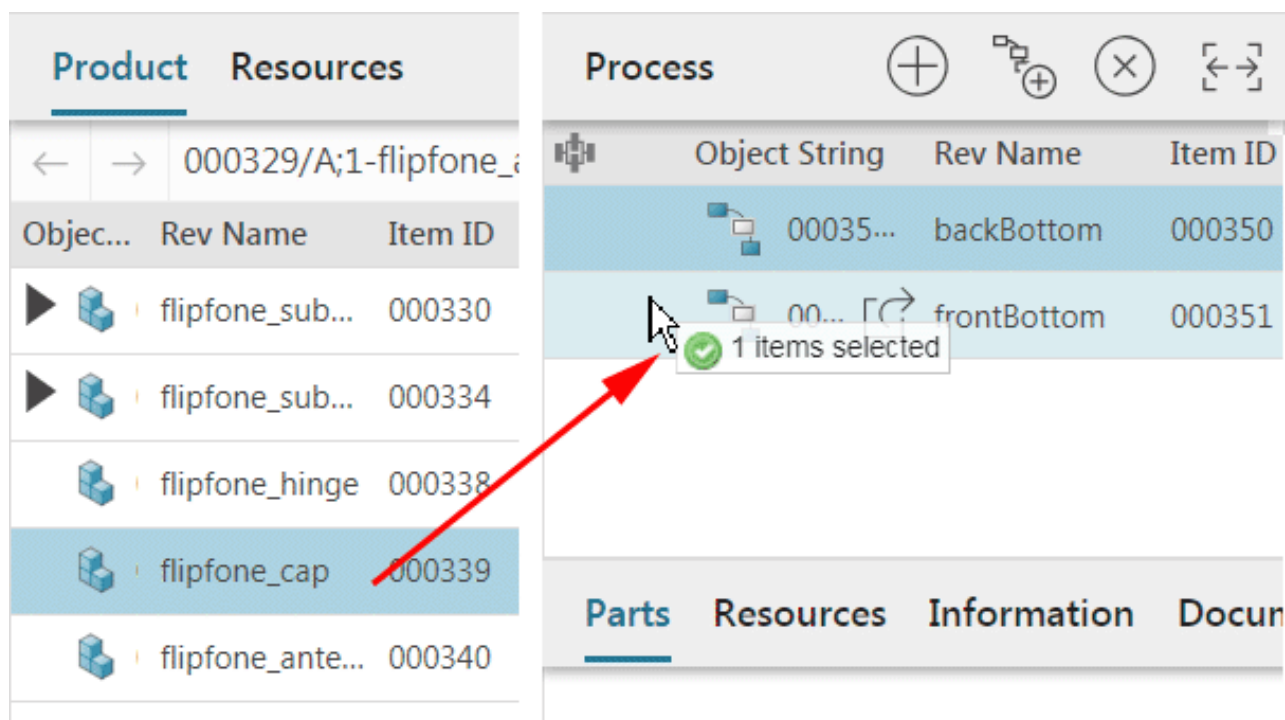
Author a process plan

Procedure

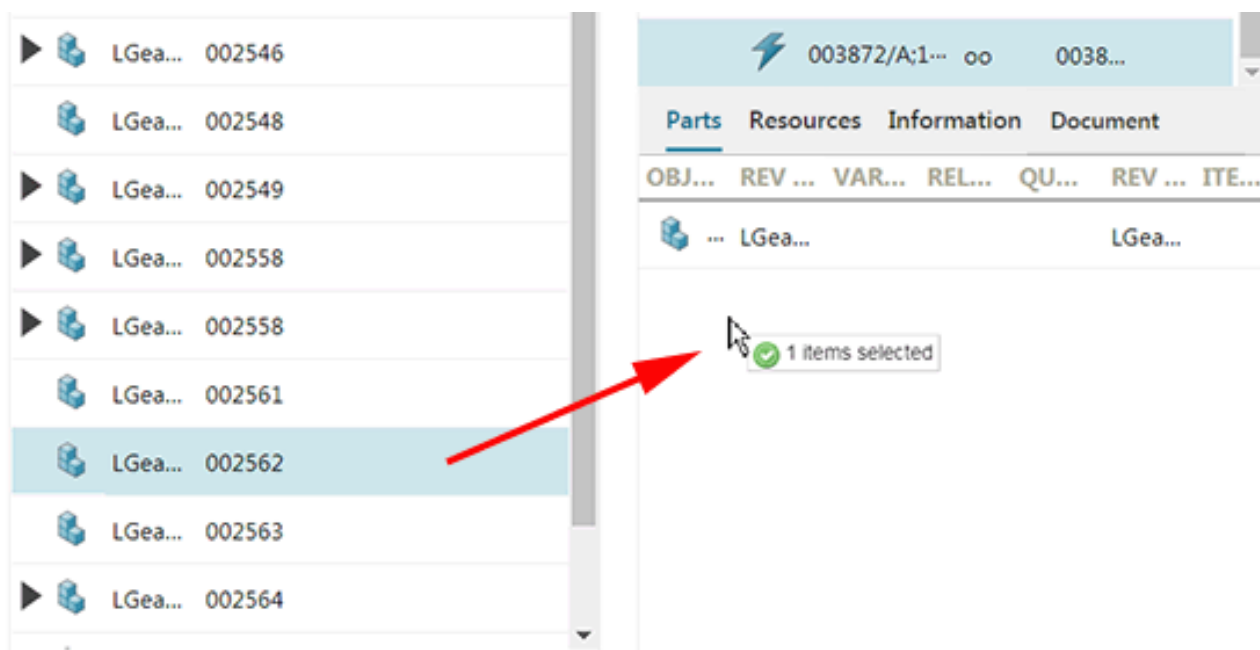
1. **Open** an existing work package, or **create** one and open it.
The **Planning** page displays.
2. In the **Process** panel, select a process.
3. To add or remove processes or operations to the **Process** panel, do the following.
 - a. In the **Process** panel toolbar, click  to create a process,  to create an operation, or  to delete a selected process or operation.
 - b. If you decided to create a process or operation:
 - i. In the **Create Process** or **Create Operation** dialog box, select a process or operation type and click **Next**.
 - ii. Type a **Name** and optional **Description** for the process or operation.
 - iii. To create an additional process or operation, click **Create & Add More**; to create a single process or operation, click **Create**.

Note

If a process or an operation has mandatory properties (including customized properties), those will automatically appear in the new object dialog.
 - iv. If you decided to delete a process or operation, click **Delete**.
4. To drill down in the planning window to show details for a specific process or operation, hover over the element and click .
The window changes to display only the selected element's child elements in the **Process** panel, and only relevant details in the **Parts**, **Resources**, **Information**, **Document**, and **Details** tabs.
Optionally, you can select a child element in the **Process** panel and drill down further using .
5. Click  in the left toolbar to return to previous planning views.
6. To add a part to a process or operation, from the **Product** tab, select the process or operation in the **Process** panel and drag:
 - One or more product parts to a process or operation in the **Process** panel.



- One or more product parts or resources to the **Parts** or **Resources** tab below the **Process** panel.



7. To remove a part or resource from a process or operation selected in the **Process** panel, in the **Parts** or **Resources** tab, select a part or resource and click **Remove** ⊖.

Search for a process without expanding the BOP in the high level planning page

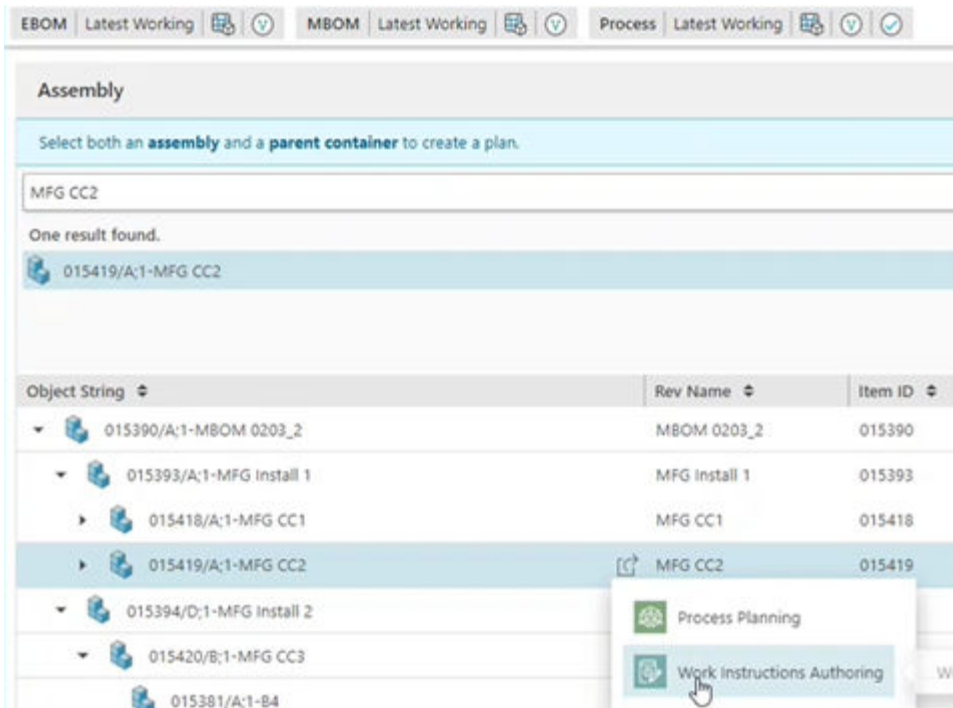
You can locate a process in the bill of process (BOP) without manually expanding the BOP.

Prerequisites

Before you begin, you must have a bill of process (BOP) with an assembly linked to it, and you must know the name of that assembly.

Procedure

1. **Search for and open a work package** and navigate to the **High Level Planning** page.
2. In the **Assembly** panel, type a full or partial name for the assembly and click **Search**. Teamcenter Easy Plan displays a list of objects that match your search query.
3. In the search results click the linked process you want and select **Open in Work Instructions Authoring**.



Teamcenter Easy Plan displays the **Open in Work Instructions Authoring** dialog box.

4. Select the process that is linked to the correct BOP and click **Find in BOP**. Teamcenter Easy Plan highlights the process in the BOP panel for you.
5. (Optional) Move or copy the highlighted process to a different process area.

7. Clone objects

View and analyze clone indication data

You can use clone indication information to identify a source and its cloned object, and then propagate those changes with a traceability view. The clone indication feature supports cloning during the copy and paste process, during a search, and during classification.

The **Copy**  and **Paste**  commands are available, respectively, from the bill of materials (BOM) and bill of process (BOP) toolbars. In Easy Plan, the ability to drag files or objects to other objects works the same way as it does in other applications. For more details on resequencing and moving elements, see [Rules for cloning, moving, and resequencing objects in the BOM or the BOP](#).

In this page	You can clone these objects
Process Planning	• Process • Operation • Compound operation • Execution step

Restrictions and limitations

You must be working with a classic bill of process (BOP) to use this feature.

Prerequisites

You must set the **EP_ShowCloneIndication** and **TC_CLONE_CREATE_BASED_ON** values to **true**. In addition, you must add the **EP_ShowCloneIndication** and **TC_CLONE_CREATE_BASED_ON** preferences to the **AWC_Startup_preference** in the Teamcenter rich client.

See the *Preferences* section in the *Active Workspace Administration* documentation for a description of preferences and how to set them.

Procedure

1. If you have not done so already, [search for and open an existing work package](#), and then [navigate to the Process Planning page](#).
2. In the **Process** panel, expand the assembly, select the object you want to clone, and use one of the following methods.

Note
You can clone an object into the same work package or a different work package.

- Clone objects using copy and paste
- Search for and clone objects
- Clone objects from classification

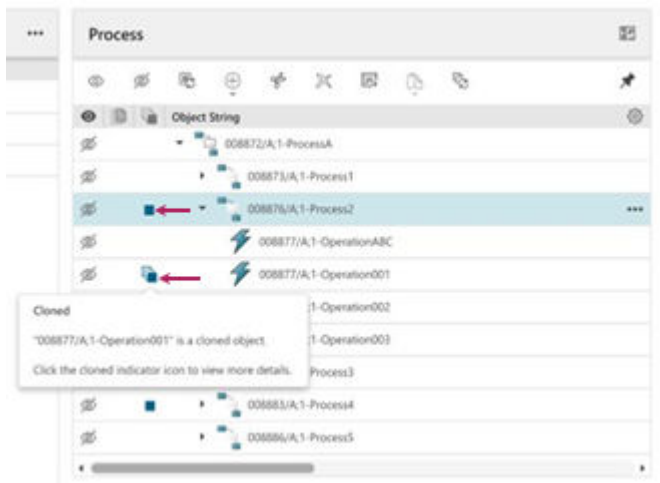
Easy Plan adds the cloned items into the selected process resource and displays a message to indicate that changes were made to the clone indications.

3. Click **Sync Clone** .

Easy Plan updates the clone indication icons for objects in the **Process** panel. There are two types of clone indications in Easy Plan:

- **One square**  —This icon indicates that although the object itself is not cloned, child objects under the object are cloned. You cannot click the icon to see more details about the objects.
- **Two squares**  —This icon indicates that the object is a cloned object. You can click this icon to see "cloned from" and "cloned to" information.

4. Hover on a child-level clone indication icon.



Easy Plan displays information about the cloned object on which you are hovering.

5. Click the clone indication icon and review the information.

000167/A;1-proc1

Cloned From

Work Package : CC_eff_EBOM_MBOM_1

proc1
000109
Revision: A

Cloned To

Object String	Work Package	Change Notice
000174/A;1-proc1	CC_eff_EBOM_MBOM_1	

Cancel

Propagate

Easy Plan displays information about where the object was cloned from, and where the object is being cloned to.

- 6. **Propagate changes from a master object to its clones.**

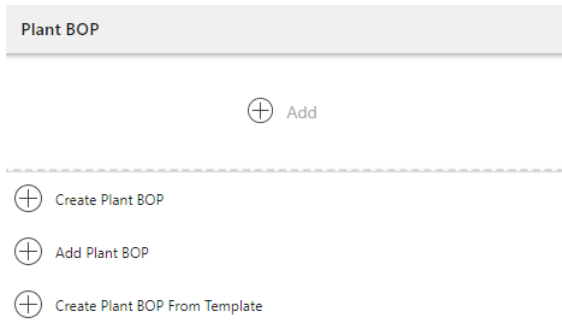
Clone a plant BOP

This task uses an existing plant bill of process (BOP) as a template to create a new plant BOP. The new plant BOP is a clone of the existing plant BOP.

Note

When you clone an existing plant BOP, its consumed parts and assigned resources are not copied to the new plant BOP.

- 1. Search for a work package, and click **Manage Work Package**  in the results list.
- 2. In the Plant BOP tile, click **Add**  and select **Create Plant BOP from Template**.



3. Type the partial or full name of the plant BOP you want to clone, and click **Search** .

Tip

Use asterisks * as wild cards during any search.

4. Select a plant BOP from the results, and select a revision rule.

Note

The revision rule that you select is applied to the cloned plant BOP.

5. Type in a **Name** for the plant BOP.
6. (Optional) Type information in the **Description** field.
7. Click **Create Plant BOP**.
Process Planning for BTO/BTS/CTO clones the existing plant BOP, and adds the cloned plant BOP to the work package.
8. (Optional) Click **Submit to Workflow**  to **send the plant BOP directly to a workflow** from this page.

Clone or reference a plant BOE while creating an alternative plant BOP

While creating an alternative plant bill of process (BOP), you can also clone or reference the plant bill of equipment (BOE).

You can create an alternative work package that contains a fully cloned plant, or a partial alternative from a selected process or work area in the **Process Planning** and **Line Balancing** task pages.

Prerequisites

- This feature is available only for work packages that contain a plant BOP.
- To enable the **Create in background** ☒ check box in the **Create Alternative** dialog box, you must set up a dispatcher with asynchronous mode in the environment and you must define the relevant preference **DISPATCHER_CLIENT_INSTALLED_ALTERNATIVE**.

EP_CreateAlternativeTemplateNameForBOE

Cloning rule when creating an alternative plant BOE from a master.

The default value is
ProjectWorkAreaTemplate.

EP_CloneAlternativeTemplateNameForBOE

Cloning rule when cloning an alternative plant BOE from another alternative plant BOE.

The default value is
EP_ProjectCloneAlternativeTemplateForBOE.

EP_CreateAlternativeTemplateName

Cloning rules for plant BOP when creating an alternative plant BOP from a master plant BOP.

The default value
is **ProjectPlantBOPTemplate.**

EP_CloneAlternativeTemplateName

Cloning rules for plant BOP when creating an alternative plant BOP from another alternative plant BOP.

The default value
is **EP_ProjectCloneAlternativeTemplate.**

Procedure

1. If you have not already done so, **search for and open the work package** from which you want to create an alternative work package with a full or partially cloned plant BOP and/or plant (BOE).
2. On the **Manage Work Package** page, do one of the following.
 - To create a full alternative, on the **Manage Work Package** page, click **Create Alternative** .

Note

If you are working with an alternative work package, the command name **Create Alternative** is renamed **Clone Alternative**.

- To create a partial alternative, from a master work package, **navigate** to the **Process Planning**, **High Level Planning**, or **Line Balancing** task page, and do one of the following.
 - On the **Line Balancing** page, from the header toolbar, click **Manage Partial Alternatives**  → **Create Partial Alternative** .
 - On the **Process Planning** page, in the **Process** panel, select a process line or process area station, and then click **Manage Partial Alternatives**  → **Create Partial Alternative** .

- On the **High Level Planning** page, in the **BOP** panel, select a process line or process area station, and then click **Manage Partial Alternatives**  → **Create Partial Alternative** .

From any of these locations, you can search for and select partial alternative data for the selected line or process area station by selecting **Manage Partial Alternatives**  → **Search Partial Alternatives** , and then selecting that partial alternative.

3. (Optional) In the **Create Alternative** dialog box, in the **Name** text box, modify the default value.
4. In the **Alternative Scope** group, select the **Item Type** check boxes ☒ for those structures that you want to carry over to the alternative work package.

Selected Scope Details lists the plant BOP and plant in the work package line or process area station you selected as the plant. Whatever work area has been assigned to the line or process area station object you selected is considered in the scope.

5. For the **Plant BOP** and **Plant** bill of equipment (BOE), from the **Cloned/Referenced** list, specify whether each structure must be cloned or referenced.

Note

- If you are partially cloning the plant (BOE), the work area assigned to the selected plant BOP node is considered for cloning. If a work area is not assigned, details for fixing this problem are displayed in the **Plant** section of the **Selected Scope Details** group.
- Only plant BOP and plant structures can be cloned or referenced. Other item types can only be referenced.
- To keep a fully cloned, stand-alone plant, deselect all item type check boxes except **Plant**.

6. From the **Cloning Rule** lists, select a preferred template for each applicable structure, and click **Create**.

Cloning rules are customizable. If no custom cloning rules are defined, the default cloning rule is applied.

7. (Optional) To open the alternative work package by default in a new tab, select the **Upon creation, open in another tab** ☒ check box.

Note

If your browser window is in a private browsing mode, the automatic opening of the new tab might be blocked.

8. (Optional) If you selected the **Upon creation, open in another tab** ☒ check box, select the **Create in background** check box to create the alternative work package asynchronously.

Once the alternative work package is created, an alert is displayed in your **Alerts** and the work package from which it was created lists the alternative as a link in the work package **Overview**.

Clone a process using copy and paste during process planning

If you have authored a process, you can use that object as a template to create a new object. The **Copy**  and **Paste**  commands are available, respectively, from the BOM and BOP toolbars. In Easy Plan, the ability to drag files or objects to other objects works the same way as it does in other applications. For more details on resequencing and moving elements, see [Rules for cloning, moving, and resequencing objects in the BOM or the BOP](#).

Prerequisites

You must set the **MEProcess.MEProcess.PasteDuplicateTemplate** preference to the correct values to control cloning rules:

- **MEProductBOP.MEProductBOP.PasteDuplicateTemplate**—defines cloning rules for the product BOP.
- **MfgMEPlantBOP.Mfg0MEPlantBOP.PasteDuplicateTemplate**—defines cloning rules for the plant BOP.

In addition, you must add the **MEProcess.MEProcess.PasteDuplicateTemplate** preference to the **AWC_Startup_preference** in the Teamcenter rich client.

See the *Preferences* section in the *Active Workspace Administration* documentation for a description of preferences and how to set them.

Procedure

1. If you have not done so already, [search for and open](#) an existing work package that contains processes and operations, and [navigate](#) to the **Process Planning** page.
2. In the **Process** panel, select the process that you want to clone.

Note

You can select and clone multiple processes only if they are under the same parent object.

3. Click **Copy**, and then select one of the following:
 - To add the processes within a current process resource, select another object under the process resource and click **Paste** → **Paste Before** or **Paste After**.
The cloned item is added to the process resource before or after the item you selected.
 - To add the processes to a different process resource, select the process resource into which you want to move the operations and click **Paste** →  → **Paste Into**.
The cloned item is added to the process resource as the last item in that process resource.

Clone a process during process planning or work instructions authoring

If you have authored a process or operation, you can use that object as a template to create a new object. You can also select a cloning rule, which determines whether consumed parts and resources are assigned to the cloned object.

The **Copy**  and **Paste**  commands are available, respectively, from the bill of materials (BOM) and bill of process (BOP) toolbars. In Easy Plan, the ability to drag files or objects to other objects works the same way as it does in other applications. For more details on resequencing and moving elements, see [Rules for cloning, moving, and resequencing objects in the BOM or the BOP](#).

Prerequisites

You can use the **Process.Template** preference to define which process template rule is used to clone a process structure. Cloning rule options include:

- **Mapping_Consume**—Clones all consumed objects referenced by the template to a new object in the cloned structure.
- **Referencing_Consume**—References all consumed objects from the manufacturing bill of materials (MBOM) into the cloned structure.
- **Ignoring_Consume**—Clones the process from the template, but ignores all consumed objects in the original process.

In addition, you must add the **Process.Template** preference to the **AWC_Startup_preference** in the Teamcenter rich client.

See the *Preferences* section in the *Active Workspace Administration* documentation for a description of preferences and how to set them.

Procedure

1. If you have not done so already, search for and open an existing work package that contains processes and operations, and navigate to the **Work Instructions Authoring** or **Process Planning** page.
2. If you are on the **Work Instructions Authoring** page, do the following.
 - a. In the **Process** tab or panel, select a process or operation.
 - b. In the **Editor** tab, next to the process or operation name you just selected, click , then select **Add Clone**.
3. If you are on the **Process Planning** page,
 - a. In the **Process** panel, select the process or operation beneath which you want to create a clone.
 - b. Click  and select **Add Process** or **Add Operation** from the drop-down menu.

4. In the **Add** panel click the **Search** tab, and then search for the process or operation that you want to clone.
- Tip**

You can use wildcard characters in your search. For example, type ***STN*** to search for a work area item name that begins with STN. To ensure the best search results, create a query with narrow parameters.
5. From the results list, select the object you want to clone, and then click **Next**.
6. (Optional) Click **Revision Rule**, and select an option from the list.
7. Click **Cloning Rule**, and select an option from the list.
- **Mapping_Consumes**—Clones all consumed objects into the new object.
 - **Referencing_Consumes**—References all consumed objects into the new object.
 - **Ignoring_Consumes**—Ignores any consumed objects in the clone template, and only clones the process or operation.
8. Click **Add as Clone**.
- The cloned object is added to the structure.

Search for and clone existing process objects

You can search for an existing process object that was created in a process plan by its name or process ID, and clone that object into a selected process node. You can also choose which cloning rule to apply when you create objects from a template.

The **Copy**  and **Paste**  commands are available, respectively, from the bill of materials (BOM) and bill of process (BOP) toolbars. In Easy Plan, the ability to drag files or objects to other objects works the same way as it does in other applications. For more details on resequencing and moving elements, see [Rules for cloning, moving, and resequencing objects in the BOM or the BOP](#).

You can use this feature to clone specific objects in each page.

In this page	You can clone these objects
Process Planning	• Process • Operation • Compound operation • Execution step
Work Instructions Authoring	Operation

In this page	You can clone these objects
Plant BOP Authoring	• Process • Operation • Process area • Process line • Process station
Product BOP Authoring	• Process • Operation • Functional group

Prerequisites

You must define which cloning rule process template is used to clone items in a process structure, using the **Process.Template** preference. Cloning rule options include:

- **Mapping_Consumes**—Clones all consumed objects referenced by the template to the new object. Consumptions are mapped from the bill of materials (BOM) of the target work package.
- **Referencing_Consumes**—References all consumed objects from the template to the new object.
- **Ignoring_Consumes**—Clones the process object from the template, but ignores all consumed objects in the template.

In addition, you must add the **Process.Template** preference to the **AWC_Startup_preference** in the Teamcenter rich client.

See the *Preferences* section in the *Active Workspace Administration* documentation for a description of preferences and how to set them.

Procedure

1. If you have not done so already, **search for and open an existing work package** that contains processes and operations, and **navigate to the task page in which you want to work**.
2. Perform one of the following steps.
 - In the **Process Planning** page, in the **Process** panel, select the object beneath which you want to create a clone and click **Add** ⊕.
 - In the **Work Instructions Authoring** page, in the **Process** tab, select an operation and then in the **Editor** tab click **Add** ⊕, and select **Add Clone**.
 - In the **Product BOP Authoring** page, in the **Product BOP** panel, select the object beneath which you want to create a clone and click **Add** ⊕, then select an option from the list.

- In the **Plant BOP Authoring** page, in the **Plant BOP** panel, select the object beneath which you want to create a clone and click **Add** ⊕, then select an option from the list.

The **Add** panel is displayed.

3. Click the **Search** tab and type the process name or process ID in the search box.
4. From the results list select one or more objects to use as clone templates, and then click **Next**.
5. (Optional) Click **Revision Rule**, and select an option from the list.
6. Click **Cloning Rule** and select an option from the list.
 - **Mapping_Consumes**—Clones all consumed objects into the new object.
 - **Referencing_Consumes**—References all consumed objects into the new object.
 - **Ignoring_Consumes**—Ignores any consumed objects in the clone template, and only clones the process object.
7. Click **Add as Clone**.
The cloned object is added to the structure.

Propagate changes to a master operation or process to its clones

You can propagate changes made to a master operation or process to any or all of its clones within or across work packages. You can also control whether a released, cloned object can be revised and edited directly or only initiated via propagation from the master source. By default, propagation is executed in asynchronous mode, so you must set up a dispatcher with asynchronous mode in the environment. Only a limited scope of occurrence level properties, assignments, and attachments can be propagated.

Such propagation is available only:

- For classic BOPs.
- From the master to the first level of clones. Propagation from clone to clone is not supported.
- If both the master and clones are in a released state.

Prerequisites

You must define the relevant preference. Key preferences include the following.

ME_EditClonedReleasedBOPObjectOnlywithPropagate	Controls revision and update of clones only via propagation from master.
EP_ShowSelectionCheckboxforClonedPropagate	Enables you to select one or more clones to which you want to propagate master changes.
MEReleaseStatusForSkipCheckForRevisingClonedObject	Controls whether a cloned, revised object can be independently revised and edited,

MEReleaseStatusListForAutoRevise

and whether it is exempt from changes propagated from the master.

EP_ShowCloneIndication

Controls the release status to be considered for triggering the revision of a released, cloned object.

TC_CLONE_CREATE_BASED_ON

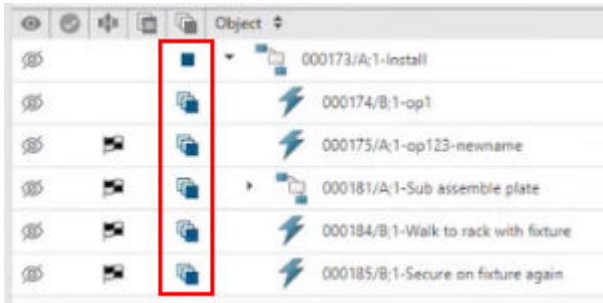
Enables the **Sync Clone** command, which lets you view and then click on the clone indication to further access the **Propagate** command.

Controls the relation created between master and clones. For clones with this specific relation only, propagation is enabled.

Procedure

1. If you have not already done so, **navigate** to the **Process Planning** task page.
2. In the **Process** panel, click **Sync Clone** .

Clone indication icons are displayed in the **Process** list.



3. In the **Process** list, click a clone indication icon.
4. In the resulting information window, in the **Cloned From** section, note the name of the **Work Package** master object and click **Cancel**.

If you start from a master bill of process (BOP), the **Cloned From** section is blank and only a **Cloned To** section is populated. Propagation can only be initiated from the master.
5. Search for the master BOP object noted in step 4 and navigate to the master **Process Planning** page.
6. In the **Process** panel, select the master BOP object and click **Sync Clone** .
7. In the resulting information window, in the **Cloned To** section, review the object strings and work packages to which changes will be applied from the master.

Note

If the target work package is associated to a manufacturing change notice (MCN) that is still open, and one that the user is a participant in, change propagation can be tracked via any change notice selected from the **Change Notice** list.

8. If the preference **EP.ShowSelectionCheckboxforClonedPropagate** is enabled, you can select one or more clones for propagation.

If the preference is not enabled, all clones are propagated.

Note

Master and clones must be released to initiate propagation. Clones will be auto-revised during propagation. Clones with a release status listed in the preferences **MEReleaseStatusForSkipCheckForRevisingClonedObject** and **MEReleaseStatusListForAutoRevise** are exempt from propagation.

9. Click **Propagate**.

Once propagation is completed, the **Alerts** section in the Active Workspace page displays an alert message. If propagation has failed, the alert is still displayed and clicking on the alert will display an instruction to review the syslog to analyze further failure related details.

Clone objects from classification

During process planning, you can search the classification hierarchy for pre-classified objects and then clone those items and place them in a selected location.

The **Copy**  and **Paste**  commands are available, respectively, from the BOM and BOP toolbars. In Easy Plan, the ability to drag files or objects to other objects works the same way as it does in other applications. For more details on resequencing and moving elements, see [Rules for cloning, moving, and resequencing objects in the BOM or the BOP](#).

You can use this feature to clone specific objects in each page.

In this page	You can clone these objects
Process Planning	• Process • Operation • Compound operation • Execution step
Work Instructions Authoring	Operation
Plant BOP Authoring	• Process • Operation

In this page	You can clone these objects
	• Process area • Process line • Process station
Product BOP Authoring	• Process • Operation • Functional group

Prerequisites

You must define which cloning rule process template is used to clone items in a process structure, using the **Process.Template** preference. You can use the format **Process.Template.Mapping_<cloning_rule>** to set this preference. Cloning rule options include:

- **Mapping_Consumes**—Clones all consumed objects referenced by the template to the new object.
- **Referencing_Consumes**—References all consumed objects from the template to the new object.
- **Ignoring_Consumes**—Clones the process object from the template, but ignores all consumed objects in the template.

In addition, you must add the **Process.Template** preference to the **AWC_Startup_preference** in the Teamcenter rich client.

See the *Preferences* section in the *Active Workspace Administration* documentation for a description of preferences and how to set them.

Procedure

1. If you have not done so already, **search for and open an existing work package** that contains processes and operations, and **navigate to the task page in which you want to work**.
2. Perform one of the following steps.
 - In the **Process Planning** page, in the **Process** panel, select the object beneath which you want to create a clone and click **Add** ⊕.
 - In the **Work Instructions Authoring** page, in the **Process** tab, select an operation and then in the **Editor** tab click **Add** ⊕, and select **Add Clone**.
 - In the **Product BOP Authoring** page, in the **Product BOP** panel, select the object beneath which you want to create a clone and click **Add** ⊕, then select an option from the list.
 - In the **Plant BOP Authoring** page, in the **Plant BOP** panel, select the object beneath which you want to create a clone and click **Add** ⊕, then select an option from the list.
3. In the **Add** panel, perform the following steps.

- a. Click the **Classification** tab.
 - b. Expand the classification list.
 - c. Select a specific class.
 - d. Select an object from the results list and click **Next**.
4. (Optional) Click **Revision Rule**, and select an option from the list.
 5. Click **Cloning Rule**, and select an option from the list.
 - **Mapping_Consumes**—Clones all consumed objects into the new object.
 - **Referencing_Consumes**—References all consumed objects into the new object.
 - **Ignoring_Consumes**—Ignores any consumed objects in the clone template, and only clones the process object.
 6. Click **Add as Clone**.
The cloned object is added to the structure.

Clone functional groups and process area objects during process planning

During process planning, you can clone and reuse desired functional groups, process areas, process lines, and operations in the **Product BOP Authoring** and **Process Planning** pages.

The **Copy**  and **Paste**  commands are available, respectively, from the bill of materials (BOM) and bill of process (BOP) toolbars. In Easy Plan, the ability to drag files or objects to other objects works the same way as it does in other applications. For more details on resequencing and moving elements, see [Rules for cloning, moving, and resequencing objects in the BOM or the BOP](#).

Prerequisites

You must set the **MEProcess.MEProcess.PasteDuplicateTemplate** preference to the correct values to control cloning rules:

- **MEProductBOP.MEProductBOP.PasteDuplicateTemplate**—defines cloning rules for the product BOP.
- **MfgMEPlantBOP.Mfg0MEPlantBOP.PasteDuplicateTemplate**—defines cloning rules for the plant BOP.

In addition, you must add the **MEProcess.MEProcess.PasteDuplicateTemplate** preference to the **AWC_Startup_preference** in the Teamcenter rich client.

See the *Preferences* section in the *Active Workspace Administration* documentation for a description of preferences and how to set them.

Procedure

1. **Search for and open** a work package, and then **navigate** to the **Process Planning** or **Product BOP Authoring** page.
2. Select the item that you want to clone.

Note

You can only select and clone multiple items if they are under the same parent object.

3. Click **More** → **Copy**, and then select one of the following:
 - To add the operations within a current process resource, select another operation under the process resource and click **Show Menu**  → **Paste** →  → **Paste Before** or **Paste After**.
The cloned item is added to the process resource before or after the item you selected.
 - To add the operations to a different process resource, select the process resource into which you want to move the operations and click **Show Menu**  → **Paste** →  → **Paste Into**.
The cloned item is added to the process resource as the last item in that process resource.

Clone a process from a template while working in small product mode

When you work in small product mode you can load and work on a component that is part of a larger assembly, and not load and view the full assembly.

The **Copy**  and **Paste**  commands are available, respectively, from the BOM and BOP toolbars. In Easy Plan, the ability to drag files or objects to other objects works the same way as it does in other applications. For more details on resequencing and moving elements, see **Rules for cloning, moving, and resequencing objects in the BOM or the BOP**.

Restrictions and limitations

You must be working in small product mode to use this feature.

Prerequisites

You must set the value for the **EP_PlanningForSmallProduct** preference to **true**. In addition, you can also use the **Process.Template** preference to define which cloning rule process template is used to clone a process structure. Cloning rule options include:

- **Mapping_Consume**—Clones all consumed objects referenced by the template to a new object in the cloned structure.
- **Referencing_Consume**—References all consumed objects from the manufacturing bill of materials (MBOM) into the cloned structure.

- **Ignoring_Consume**—Clones the process from the template, but ignores all consumed objects in the original process.

In addition, you must add the **EP_PlanningForSmallProduct** and **Process.Template.Mapping** preferences to the **AWC_Startup_preference** in the Teamcenter rich client.

See the *Preferences* section in the *Active Workspace Administration* documentation for a description of preferences and how to set them.

Procedure

1. **Create** or **search for and open an existing work package** search for an existing work package.
2. In the **Process** tile, click **Add → Create Process from Template**.
Teamcenter Easy Plan displays the **Create Process from Template** dialog box.
3. In the **Search for Process** field, type a value and search for the process you want to clone.

Tip

You can use wildcard characters in your search. For example, type ***STN*** to search for a work area item name that begins with **STN**. To ensure the best search results, create a query with narrow parameters.

4. Select the process you want to clone from the search results, and then select a **Cloning Rule** from the drop-down list.
 - **Mapping_Consumes**—Clones all consumed objects into the new object.
 - **Referencing_Consumes**—References all consumed objects into the new object.
 - **Ignoring_Consumes**—Ignores any consumed objects, and only clones the process.
5. (Optional) Update values in any of the following fields, and then click **Create Process**.
 - **Revision Rule**—Select a different revision rule than the one applied to the template. The default revision rule is **Latest Working**.
 - **Name**—Type in a name for the cloned process. If you leave this field blank, Teamcenter Easy Plan provides a name.
 - **Description**—Type in a description.
 - **Process ID**—Type in a process ID for the cloned process. If you leave this field blank, Teamcenter Easy Plan provides a process ID.
 - **Revision ID**—Type in a revision ID for the cloned process. If you leave this field blank, Teamcenter Easy Plan provides a revision ID.

Teamcenter Easy Plan clones the new process and adds it to the work package. In the **Manage Work Package** page, the **Process Planning** tile is now available.

6. (Optional) Click the **Process Planning** tile to navigate to the **Process Planning** page to continue planning in the work package.

Tip

You can click the **Show Consumption and Impact State** button to **review consumed items** in the cloned process.

Clone a full BOP to use in small product mode

You can clone and reuse the bill of process (BOP) for a full product and modify it as needed when you are working in small product mode. When you work in small product mode you can load and work on a component that is part of a larger assembly, and not load and view the full assembly.

The **Copy**  and **Paste**  commands are available, respectively, from the BOM and BOP toolbars. In Easy Plan, the ability to drag files or objects to other objects works the same way as it does in other applications. For more details on resequencing and moving elements, see **Rules for cloning, moving, and resequencing objects in the BOM or the BOP**.

Restrictions and limitations

You must be working in small product mode to use this feature.

Prerequisites

You can use the must set the value for the **EP_PlanningForSmallProduct** preference to **true**. In addition, you can use the **Process.Template** preference to define which cloning rule process template is used to clone items in a process structure. Cloning rule options include:

- **Mapping_Consume**—Clones all consumed objects referenced by the template to a new object in the cloned structure.
- **Referencing_Consume**—References all consumed objects from the manufacturing bill of materials (MBOM) into the cloned structure.
- **Ignoring_Consume**—Clones the process from the template, but ignores all consumed objects in the original process.

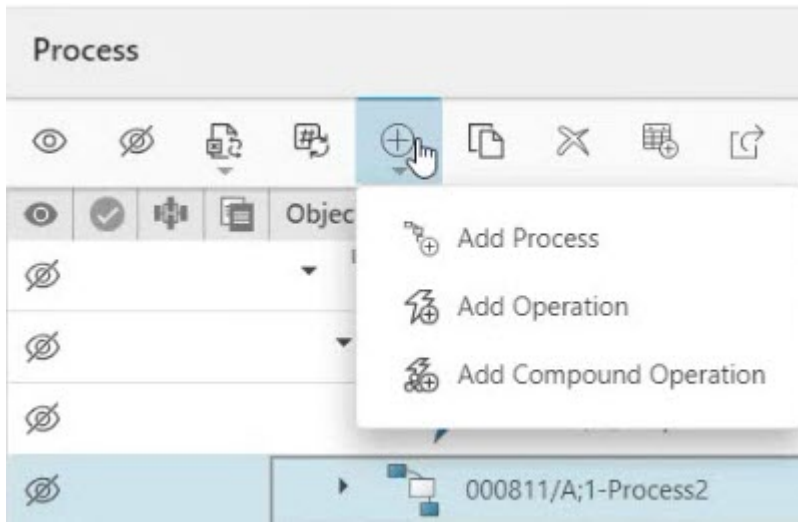
In addition, you must add the **EP_PlanningForSmallProduct** and **Process.Template.Mapping** preferences to the **AWC_Startup_preference** in the Teamcenter rich client.

See the *Preferences* section in the *Active Workspace Administration* documentation for a description of preferences and how to set them.

Procedure

1. If you have not done so already, **search for and open** an existing work package that contains processes and operations, and **navigate** to the **Process Planning** or **Work Instructions Authoring** page.

2. If you are on the **Work Instructions Authoring** page, do the following.
 - a. In the **Process** tab or panel, select a process or operation.
 - b. In the **Editor** tab, next to the process or operation name you just selected, click $\oplus$, then select one of the following options.
3. If you are on the **Process Planning** page, in the **Process** panel, select the process or operation beneath which you want to create the clone and click $\oplus$.
4. From the drop-down menu select a cloning option.



The **Add** panel is displayed.

5. Type the full or partial name of the process you want to clone or type its ID and click **Search**.

Tip

You can use wildcard characters in your search. For example, type ***STN*** to search for a work area item name that begins with **STN**. To ensure the best search results, create a query with narrow parameters.

6. Select a BOP from the results and type a **Name** for the cloned BOP.
7. (Optional) Select a revision rule.

Note

The revision rule you select is applied to the cloned BOP.
The default revision rule is **Latest Working**.

8. Click **Cloning Rule** and then select an option from the list.
 - **Mapping_Consumes**—Clones all consumed objects into the new BOP.
 - **Referencing_Consumes**—References all consumed objects into the new object.

- **Ignoring_Consumes**—Ignores any consumed objects in the clone template, and only clones the BOP.
9. (Optional) Update values in any of the following fields and then click **Create BOP**.
 - **Description**—Type in a description for the cloned BOP.
 - **Process ID**—Type in a process ID for the cloned BOP. If you leave this field blank, Teamcenter Easy Plan provides a process ID.
 - **Revision ID**—Type in a revision ID for the cloned BOP. If you leave this field blank, Teamcenter Easy Plan provides a revision ID.
 10. (Optional) Click the **Process Planning** tile to navigate to the **Process Planning** tile to continue planning in the work package.

8. Manage BOP

Product assignment

Product BOP functional planning

Add functional groups

The data in a product BOP is organized using the product's function or system, such as electrical, or by what parts are typically added in a certain area of the manufacturing line.

Procedure

1. **Search and open or navigate to a product BOP.**
2. In the **Structure** section of the **Product BOP** page, click **Create Functional Group** ⊕.
3. Choose **Sibling** or **Child** if an existing functional group was selected.
4. In the **Create Functional Group** dialog box, type a name in the **Name** box.
5. (Optional) Type additional information in the **Description** box.
6. Click **Create**.
7. (Optional) To rename a functional group, double-click it and type a new name.

Delete functional groups

Procedure

1. **Search and open or navigate to a product BOP.**
2. In the **Structure** section of the **Product BOP** page, select a functional group.
3. Click **Delete Functional Group** ✕.
Click **Delete** to verify that you want to delete the functional group.

Resequence functional groups

You can resequence functional groups within a hierarchy, which allows you to maintain existing operations.

The **Copy**  and **Paste**  commands are available, respectively, from the BOM and BOP toolbars. In Easy Plan, the ability to drag files or objects to other objects works the same way as it does in other applications. For more details on resequencing and moving elements, see [Rules for cloning, moving, and resequencing objects in the BOM or the BOP](#).

Note

If an object within the structure is **Released**, you must revise the object before you can move the functional group. Process Planning for BTO/BTS/CTO displays a dialog box that prompts you to revise the object. Click **Yes, Revise** to revise the object and move the functional group, or click **Cancel**.

Procedure

1. **Search and open or navigate** to a product bill of process (BOP).
2. Select a functional group and click **Cut** .
The functional group dims, and a dashed border displays around it.
3. Perform one of the following actions.
 - To paste the functional group at the root level, click a blank area below the product hierarchy, and then click **Paste** .
 - When you do not select an object in the hierarchy, the functional group is pasted at the root level of the structure.
 - To paste the functional group anywhere else in the hierarchy, select the functional group where you want to move the object, click **Paste**, and select an option:
 - **Paste before**—Pastes the object before the selected item in the structure, as a sibling object.
 - **Paste after**—Pastes the object after the selected item in the structure, as a sibling object.
 - **Paste into**—Pastes the object into the selected functional group, as a child object of the selected functional group.

Clone functional groups and process area objects during process planning

During process planning, you can clone and reuse desired functional groups, process areas, process lines, and operations in the **Product BOP Authoring** and **Process Planning** pages.

The **Copy**  and **Paste**  commands are available, respectively, from the bill of materials (BOM) and bill of process (BOP) toolbars. In Easy Plan, the ability to drag files or objects to other objects works the same way as it does in other applications. For more details on resequencing and moving elements, see [Rules for cloning, moving, and resequencing objects in the BOM or the BOP](#).

Prerequisites

You must set the **MEProcess.MEProcess.PasteDuplicateTemplate** preference to the correct values to control cloning rules:

- **MEProductBOP.MEProductBOP.PasteDuplicateTemplate**—defines cloning rules for the product BOP.
- **MfgMEPlantBOP.Mfg0MEPlantBOP.PasteDuplicateTemplate**—defines cloning rules for the plant BOP.

In addition, you must add the **MEProcess.MEProcess.PasteDuplicateTemplate** preference to the **AWC_Startup_preference** in the Teamcenter rich client.

See the *Preferences* section in the *Active Workspace Administration* documentation for a description of preferences and how to set them.

Procedure

1. **Search for and open** a work package, and then **navigate** to the **Process Planning** or **Product BOP Authoring** page.
2. Select the item that you want to clone.

Note

You can only select and clone multiple items if they are under the same parent object.

3. Click **More → Copy**, and then select one of the following:
 - To add the operations within a current process resource, select another operation under the process resource and click **Show Menu** ^{□□□} → **Paste** →  → **Paste Before** or **Paste After**.
The cloned item is added to the process resource before or after the item you selected.
 - To add the operations to a different process resource, select the process resource into which you want to move the operations and click **Show Menu** ^{□□□} → **Paste** →  → **Paste Into**.
The cloned item is added to the process resource as the last item in that process resource.

Create operations in a product BOP

You can either **create operations directly in the plant BOP** or you can add operations from a functional plan (product BOP) to the plant BOP.

To add operations from the product BOP, perform these steps:

Procedure

1. **Search and open or navigate to a product BOP.**

The process station page is displayed.

2. In the **Structure** section of the **Product BOP** page, select a functional group to be the parent of the operations you create.
3. In the **Operations** section of the **Product BOP** page, click **Create Operation** ⊕.
4. In the **Create Operation** dialog box, select an operation type.
5. Type a name in the **Name** box.
6. (Optional) Type additional information in the **Description** box.
7. Click **Create**.

Analyze operation times

To complete the product bill of process (BOP) functional planning, perform the following tasks to analyze operation time:

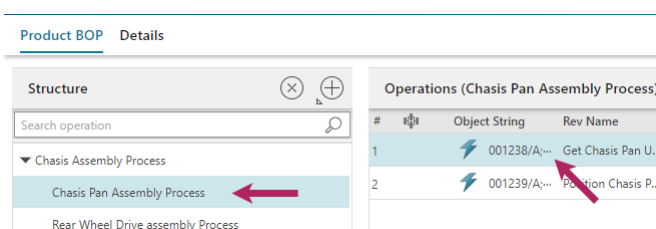
- **Add content to an operation** – **Create content and assign time to an operation** using standard elements from a supported time system and a time category.
- **Analyze activity time** – **Analyze and calculate activity time for the operation**.
- (Optional) **Change time categories** – **Change the time category for an activity**.

Navigate the product BOP to complete operations

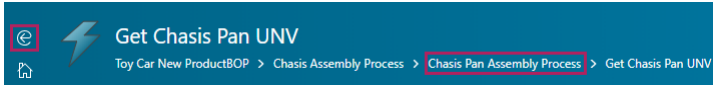
During planning, you might first create processes and operations in the product bill of process (BOP), and then later navigate through the product BOP structure to complete and detail operations.

In prior releases, each time you returned to the product BOP page, the structure was collapsed, and you had to drill down to return to the area in the structure where you were working. Now, you can easily navigate between areas within the product BOP.

1. **Search and open or navigate to a product BOP.**
2. In the **Structure** section, expand the product BOP to a process, and open an operation associated with the process.



3. Click the **back** button  or click on the breadcrumb in the header to return to the correct process level in the structure.



Navigate from the product BOP to the Line Balancing page

During balancing, you may need to create or modify operations. After you navigate the product bill of process (BOP) and complete planning tasks, you can quickly return to line balancing.

- Click **Back to Balancing**  to return to the **Line Balancing** page.

Note

The **Back to Balancing** button is only available when you open the product BOP from the **Line Balancing** page.

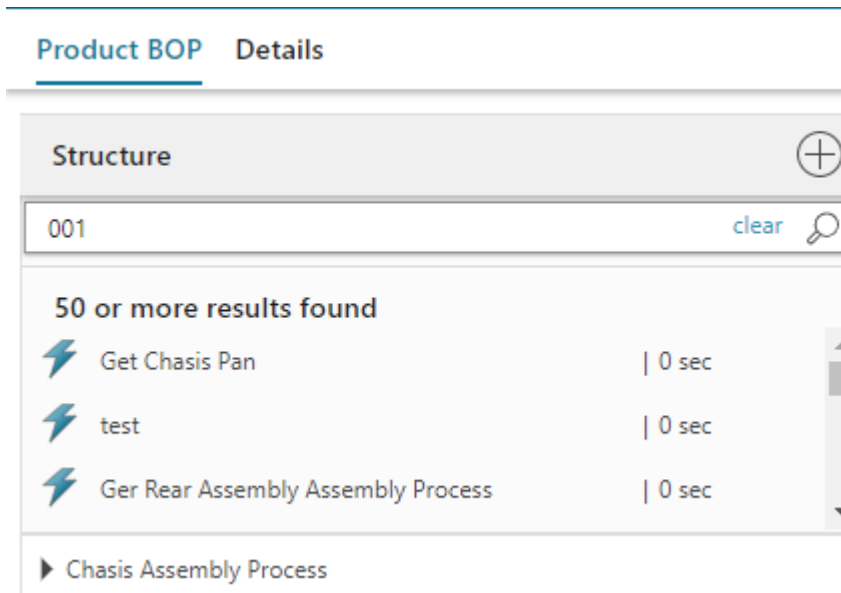
Move or copy operations between functional groups

Procedure

1. **Search and open or navigate to a product BOP.**
2. In the **Structure** section of the **Product BOP** page, select the functional group that is the parent of the operation you want to move or copy.
3. In the **Operations** section of the **Product BOP** page, select the operation.
4. In the **Operations** section of the **Product BOP** page, click **Cut**  or **Copy** .
5. In the **Structure** section of the **Product BOP** page, select the destination functional group.
6. In the **Operations** section of the **Product BOP** page, click **Paste** .

Search for operations within a product BOP

1. **Search for or navigate to a product bill of process (BOP).**
2. In the **Structure** section of the Product BOP page, type a full or partial item ID or revision name and click **Search**.



3. (Optional) Select and open a search result to continue authoring the operation.

Search for and allocate operations in a product BOP

You can search the product bill of process (BOP) instead of navigating through the structure to locate operations. This helps increase efficiency when you allocate operations from the product BOP to the plant BOP.

Note

You can search for operations by item ID or revision name. Process Planning for BTO/BTS/CTO returns results based on full or partial search criteria.

Use this procedure to search for and allocate operations from a product BOP into a plant BOP.

1. Open or navigate to a process area or process line that contains process stations.
2. Click **Balancing**.
3. Click **Show Product BOP**.
4. Type a full or partial item ID or revision name, and click **Search**.
5. Select a process station.
6. In the product BOP section, select one or multiple operations to allocate to a station.
7. Drag the selected operations from the product BOP and insert them in the **Operations** section, in the order in which they should be performed.

Search for allocated operations in the product BOP from the plant BOP

From the plant bill of process (BOP), you can quickly locate and display allocated operations in the **Product BOP** pane. This feature allows you to see if the operation is allocated anywhere else, and to find other operations in the same functional group that need to be allocated.

1. In the plant BOP, open or navigate to a process area or process line that contains process stations.
2. Select a process station.
3. Click **Balancing**.
4. Click **Show Product BOP**.

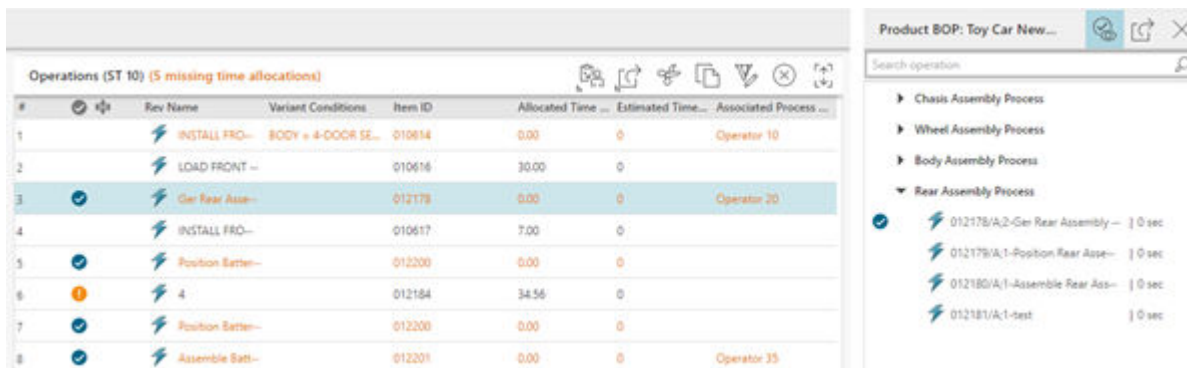
5. In the **Product BOP** toolbar, click **Show indication information** .

Process Planning for BTO/BTS/CTO displays icons next to operations that are allocated to a process area in the line you are balancing. Depending on which icon is next to an operation, you perform a slightly different action to locate the operation in the product BOP.

6. (Optional) Hover over the  icon, then click it to expand the operation in the **Product BOP** pane.

Note

The  icon indicates that the operation is allocated to this station.



#	Rev Name	Variant Conditions	Item ID	Allocated Time	Estimated Time	Associated Process
1	INSTALL FRO--	BODY + 4-DOOR SE--	010614	0.00	0	Operator 10
2	LOAD FRONT --		010616	30.00	0	
3	Ger Rear Asse--		012178	0.00	0	Operator 20
4	INSTALL FRO--		010617	7.00	0	
5	Position Eater--		012200	0.00	0	
6	4		012184	34.56	0	
7	Position Eater--		012200	0.00	0	
8	Assemble Bati--		012201	0.00	0	Operator 35

Product BOP: Toy Car New...

Search operation

- Chassis Assembly Process
- Wheel Assembly Process
- Body Assembly Process
- Rear Assembly Process
 - 012178/A2-Ger Rear Assembly -- | 0 sec
 - 012179/A1-Position Rear Asse-- | 0 sec
 - 012180/A1-Assemble Rear As-- | 0 sec
 - 012181/A1-test | 0 sec

7. (Optional) Hover over the  icon and click it, then select **Find source in Product BOP** to expand the operation in the **Product BOP** pane.

Note

The  icon indicates that the operation is allocated to this station, and the properties in the product BOP differ from the properties in the plant BOP.

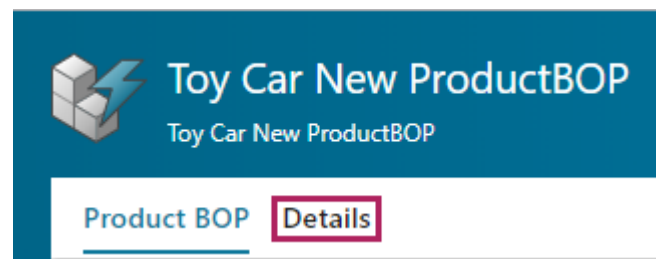
Operations (ST 10) (5 missing time allocations)

#	✓	⚙	Rev Name
1		⚡	INSTALL FRONT SUSPENSION ...
2		⚡	LOAD FRONT AXLE TO SUB CO...
3	✓	⚡	Ger Rear Assembly Assembly P...
4		⚡	INSTALL FRONT SUSPENSION ...
5	✓	⚡	Position Battery Pack on Chasi...
6	!	⚡	4
7		⚡	Find source in Product BOP
8		⚡	Compare with source in Product BOP

Edit product BOP properties

You can edit basic properties for a product bill of process (BOP).

- 1. Search for or navigate to a product BOP.
- 2. In the top bar on the page, click **Details**.

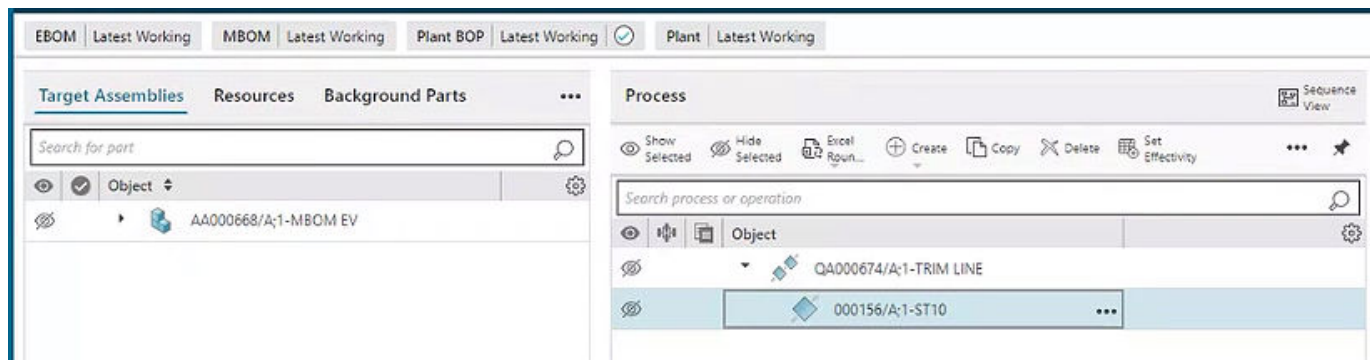


- 3. Click **Start Edit**
- 4. Modify product BOP properties as needed.
- 5. Save or cancel your edits.

Replace target assemblies with a product BOP in process planning

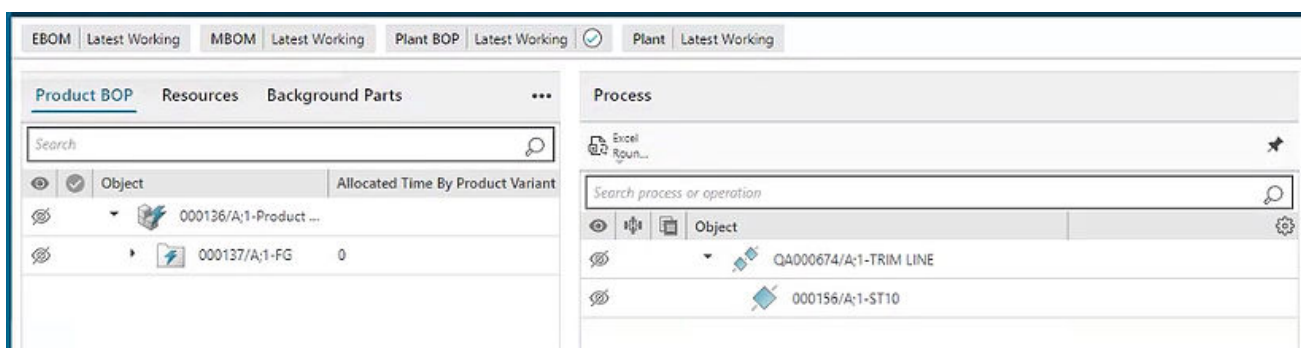
If your organization works primarily with a product bill of process (BOP) structure, you can replace the default manufacturing bill of materials (MBOM) view in the left panel of the **Process Planning** page with a product BOP structure. You can then allocate product BOP processes and operations to plant BOP elements in the **Process** panel, just as you can in the **Line Balancing** page.

By default, the **Process Planning** page displays MBOM elements in the **Target Assemblies** tab, which can be dragged to **Process** (plant BOP) elements:



Procedure

1. In the Teamcenter rich client, log on with administrator credentials, create a preference named **EP_ShowProductBOPInProcessPlanning**, and set its value to **true**.
If the product BOP is defined in your work package, the **Process Planning** page displays that product BOP's structure:



2. Add the preference name **EP_ShowProductBOPInProcessPlanning** to **AWC_StartupPreferences**.
3. (Optional) To associate product BOP and process elements, drag:
 - Product BOP processes from the product BOP to **Process** panel stations and process resources.
 - Product BOP operations from the product BOP to **Process** panel stations, process resources, and processes.

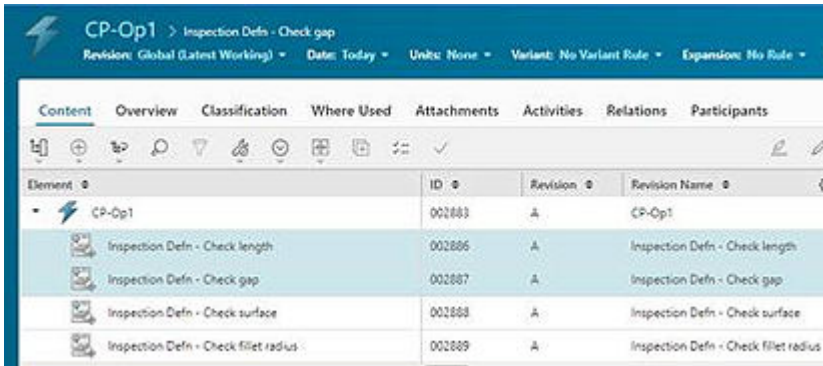
Plant BOP process area planning

Add or remove inspection definitions

Add or remove inspection definitions from operations. These definitions are the basis for quality inspections.

Procedure

1. If you have not done so already, **search for and open** an existing work package that contains operations, and **navigate** to the **Work Instructions Authoring** or **Process Planning** page.
2. On another browser tab, in Active Workspace, open the control plan or bill of quality that contains the inspection definitions that you want to add.



3. **Note**
The administrator or bill of quality author must define relations between processes or operations and inspection definitions to reference the data in other tasks or downstream applications.
4. Select one or more inspection definitions, right-click the selection, and choose **Copy** to copy them to the clipboard.
5. In the Easy Plan tab, do one of the following.
 - If you are working on the **Process Planning** page, in the **Process** panel, select an operation.
 - If you are working on the **Work Instructions Authoring** page, in the **Process** tab in the **Assembly** panel, select an operation.
6. **Note**
If you are copying inspection definitions to **compound operations** in a classic BOP in either page, you can also select an execution step in the **Process** panel or tab.
7. In the **Information** panel, in the **Inspection** tab, click **Paste as Inspection** .
The inspection definitions are referenced in the **Inspection** tab. Inspection definition properties are carried over, but are again referenced rather than cloned.

Parts (1)	Resources	Work Area	Summary	Files (1)	Documents	External Flows	Inspection (2)	DCD: ...
Object String				Sample Size		Sample Frequency		Skippable
	002886/A;1-Inspection Defn - Check length			1		100 Percent		False
	002887/A;1-Inspection Defn - Check gap			1		100 Percent		False

8. To remove an inspection definition from a selected operation, click **Remove** .
The association between the operation and the inspection definition is removed.

Start work in an existing BOP

You can work with a plant BOP or product BOP structure placed in a work package object. You search for work package object types to locate the top-level (root object) of your data. Once you find your data, you can directly use it, save the search results for later use, or pin the object to the **Home** page.

To open a plant BOP or product BOP, search for its work package object:

Procedure

1. Above the search box on the top of the page, click **Category** and select **Work Packages**.



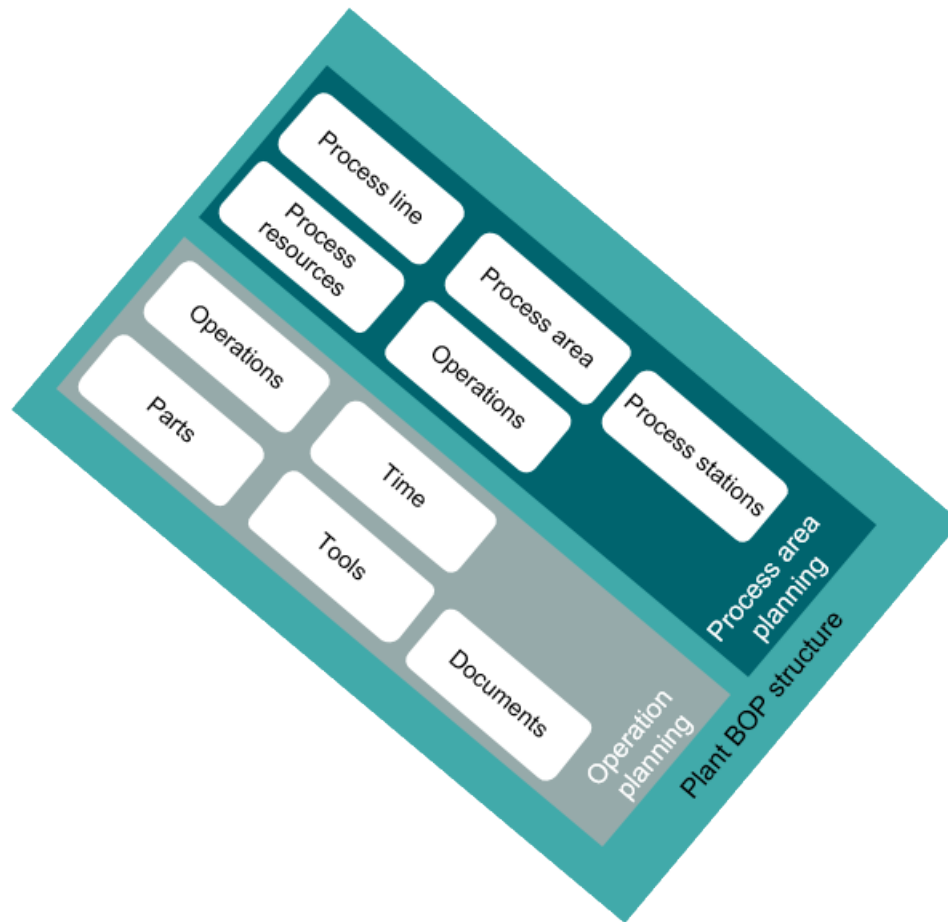
2. In the search box, type a search string, such as **test***, and click **Search** .
3. Verify that **List with Summary**  is selected. The default setting is whatever you selected the last time.
4. On the **Results** tab, select a work package object to view its overview properties.
5. Select the work package object you want and click **Open** .

Opening a work package object displays the following content:

- If the work package contains a product BOP, but not a plant BOP, then the product BOP is displayed.
- If a work package contains a plant BOP, then the plant BOP within it is displayed regardless if it contains a product BOP.

View process area planning

In the plant BOP, process area planning is performed on the process station and process area pages. This includes the process stations, the process resources, and the operations to be performed in the process area.



- **Process areas**

The plant BOP contains a hierarchy of process areas, such as process lines, process areas, or process station objects. The lowest level of this hierarchy is the process station where the work is performed.

- **(Optional) Process resource**

A process resource object is used to group operations in a station that are assigned to a specific active resource, such as a worker or robot. For example, **Station 10** could contain these two process resources: **Left side worker** and **Right side worker**.

- **Operation**

Each process station object contains operations that describe the high-level tasks to perform. Operations can be sequenced. For example, the **Station 10** process station could contain this operation: **Add Instrument Panel**.

Create a process area, line, or station

During process area planning, you can create process areas, process lines, and process stations if they do not already exist in the plant bill of process (BOP).

Procedure

1. Navigate to the plant BOP.
2. Click **Create Process Area** .
3. Type a station name.

Process Planning for BTO/BTS/CTO automatically fills in the **ID** and **Revision** fields.

4. (Optional) Type a description.
5. Click **Create**.

What to do next

Next, **create operations inside the station**.

Note

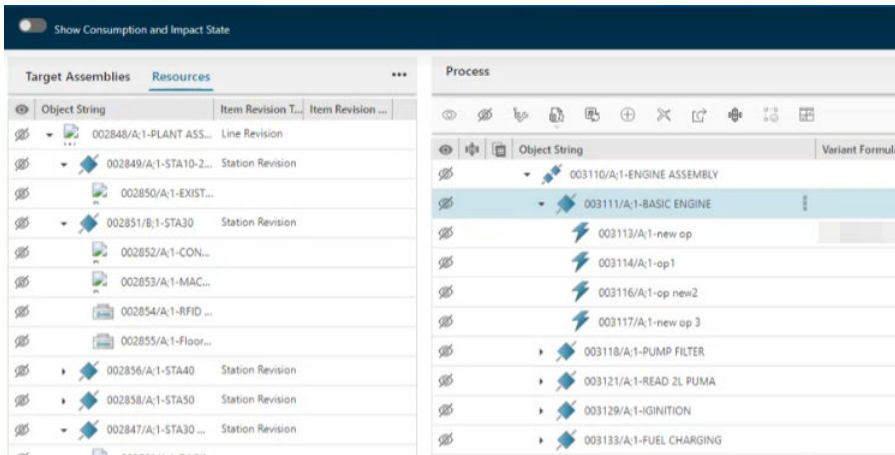
To remove a process area, line, or station, select the item in the **Areas** table and click **Delete** .

Add a work area and assign resources to a target assembly

You can assign resources from the bill of equipment (BOE) to a target assembly.

Procedure

1. **Search for and open an existing work package** and then **navigate to the Assembly Planning or Process Planning page**.
2. Under **Process**, select a target assembly.
3. Click **Add Work Area**.
Teamcenter Easy Plan displays the **Add Work Area** dialog box.
4. In the search box at the top of the dialog box, search for an existing work area using wild cards (*), select the work area you want to associate with the BOP item, and click **Add**.
Teamcenter Easy Plan populates the work area in the **Resources** tab and assigns the work area to the scope of the assembly.



5. Under **Process**, select an item in the assembly.
6. Select parts and resources and then add them to the assembly item.

Tip

To add a work area to a process station, select the process station and then add the work area to it.

Assign target assemblies to a plant BOP

You can assign one or more target assemblies to a plant bill of process (BOP) in the **High Level Planning** page and then load them into the **Process Planning** page. This lets you work with the plant structure and the assembly structure data.

Procedure

1. **Search for and open** an existing work package and then **navigate** to the **High Level Planning** page.
2. Select a process from the **BOP** panel.
3. Assign target assemblies to the selected process by selecting an assembly from the **Assembly** panel and dragging it to the **Target Assembly** tab in the information panel.
A **Target Assembly** tab is displayed in the information panel below the **BOP** panel. If a target assembly is not assigned from the **Assembly** panel to the selected process in **BOP** panel, the target is inherited by default from the plant **BOP** root item.
4. Select the process from the **BOP** panel, and **navigate** to the **Process Planning** page.
The plant **BOP** opens in a **Process Planning** page.

Results

The **Process Planning** page displays the target assembly from the **High Level Planning** page in the **Target Assembly** tab. The selected process is displayed in the **Process** panel.

Assign resources to a process resource

You can assign resources from the bill of equipment (BOE) to a process resource.

Procedure

1. **Search for and open an existing work package** and then **navigate to the Process Planning page**.
2. Under **Process**, expand a station and select a process resource.
3. Under **Resources**, select a resource from the BOE and drag it to the **Workarea** tab.
Easy Plan populates the **Workarea** tab and assigns the resource to the process resource.

Assign a work area to a process station

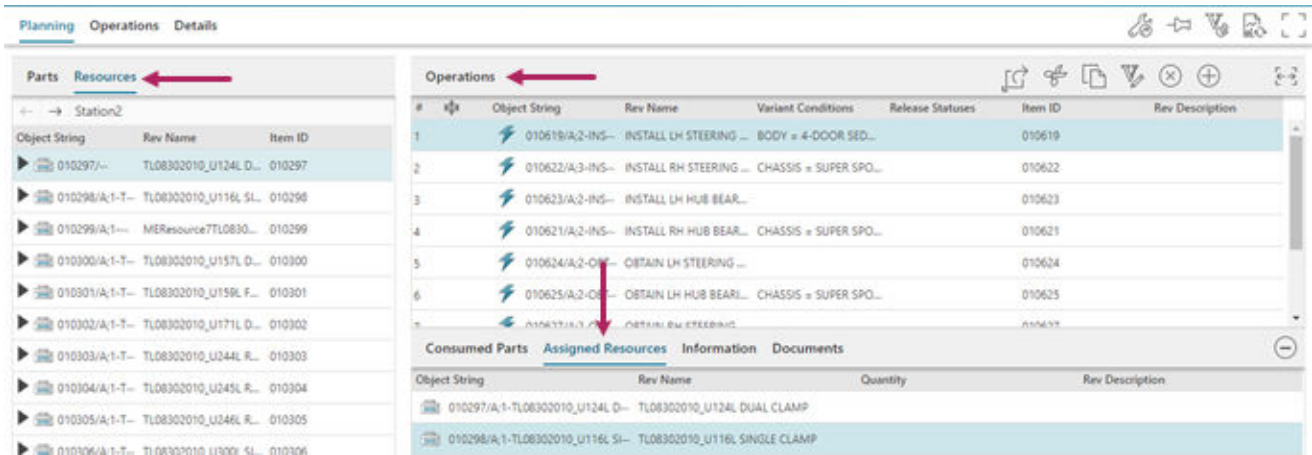
You can link a work area from the bill of equipment (BOE) structure to a process station. The linked work area allows you to easily assign resources to operations.

1. Navigate to the plant BOP.
2. Open the process area or process line in which you want to work.
3. Open the process station.
4. Select the **Resources** subtab.
5. Click **Link Workarea** .
6. In the **Link Workarea** dialog box, expand the process line, select the process station, and click **Link Workarea**.

All resources associated to the work area are available to the process station, so they can be assigned to operations in that station.

7. **Create operations** for the station.
Next, you assign resources to operations.
8. Select an operation in the **Operations** table, and click the **Assigned Resources** tab in the lower table.
9. Select and drag a resource in the **Resources** subtab to the **Assigned Resources** tab.

Process Planning for BTO/BTS/CTO assigns the resource to the operation.



Consume a part to an operation

You can select multiple parts for consumption to an operation in a single step.

Prerequisites

You must set the **MERelationTypePartsConsumed** preference to include all occurrence type values:

- MEConsumed
- MEAssign
- MEAssemble
- MEDisassemble
- MEHandle
- MEOther
- METarget

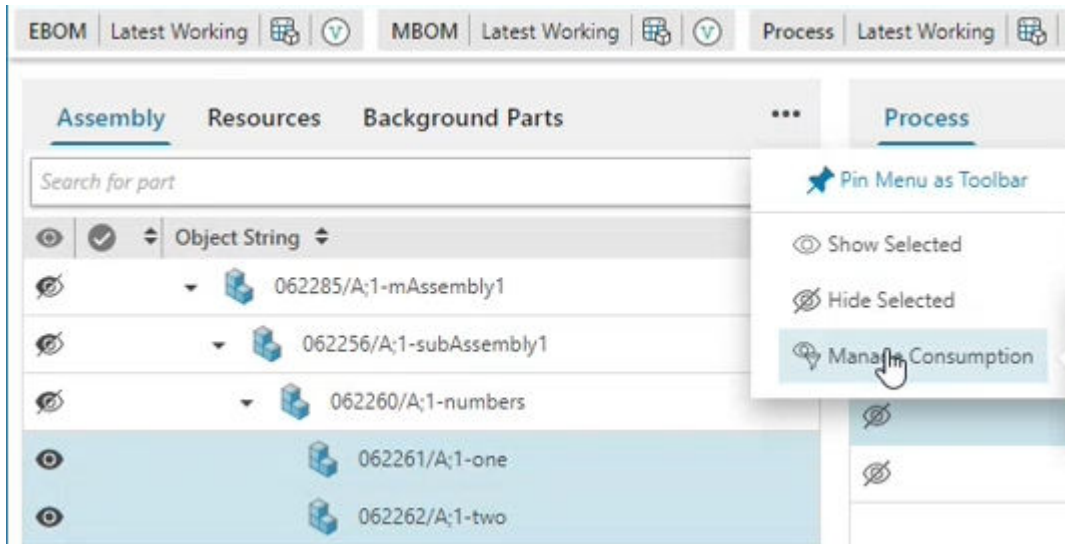
You must also set the **EP_AssignedPartsAreaColumnConfiguration** preference to include the value to **ImanItemBOPLine.bl.occ_type**.

In addition, you must add the **MERelationTypePartsConsumed** and **EP_AssignedPartsAreaColumnConfiguration** preferences to the **AWC_Startup_preference** in the Teamcenter rich client.

See the *Preferences* section in the *Active Workspace Administration* documentation for a description of preferences and how to set them.

Procedure

1. **Search for and open an existing work package** and then navigate to the **Process Planning** or **Work Instructions** page.
2. In the **Process** panel, expand the process and select an operation.
3. In the **Assembly** tab, click **Show Selected**  to indicate which lines you want to display in the **Viewer** panel.
4. On the **Assembly** subtab, click **More**  and then select **Manage Consumption**.



Tip

Use the **Manage Consumption** command to review and update the list of highlighted parts in the **Viewer** while you work.

5. Select a part and click **Assign Selection**.

Note

You can select and assign one or multiple parts to an operation.

Teamcenter Easy Plan assigns the parts to the operation. When you select the operation in the **Process** table, the assigned parts are displayed in the **Parts** tab.

6. (Optional) To remove a part from an operation, select the part in the **Parts** tab, and click **Unassign** .
7. (Optional) To assign a part to multiple operations, select a part and drag it to the **Part** subtab for each operation.
In the **Show managed consumption** list, Teamcenter Easy Plan shows the part as consumed in both operations.

Assembly Resources Background Parts		
Showing managed consumption list. Switch to loaded assembly.		
Parts	Consumed In	Find Number
062262/A;1-two	062651/A;1-op2	20
062262/A;1-two	062652/A;1-op3	30
062261/A;1-one		

Assign resources to an operation

During process planning, you must assign the resources used during an operation to create parts. You assign resources to an operation in the plant bill of process (BOP) structure.

Procedure

- 1. Navigate to a process area or process line that contains process stations.
- 2. Open a process station.
- 3. On the **Planning** tab, under the **Resources** subtab, navigate to display the resources you want to assign.

Planning ← Operations Details

Parts Resources ←

← → Station1

Object String	Rev Name	Item ID
001232/...	ROBOT Gripper	001232
001233/...	ABB S4 CONTRO...	001233
001234/...	IRB6650 130	001234
001235/...	POWER ROLLER...	001235
001236/...	ROBOT BASEPLA...	001236
001237/...	TI 00202010 EII	001237

Operations ←

#	Object String	Rev Name
1	000927/A;1...	LOAD FRONT A
2	ID0000001...	Get Chasis Pan
3	000331/A;1...	Get Battery Pac

Consumed Parts Assigned Resources

Object String	Rev Name
001232/A;1-ROBOT Gripp...	ROBOT Gripper

- 4. In the **Operations** table, select the target operation.
- 5. Select and drag from the **Resources** subtab to the **Assigned Resources** tab for the selected operation.
- 6. (Optional) To remove a resource from an operation, select the resource in the **Assigned Resources** tab, and click **Unassign** ⊖.

Drag or copy resources to assign them to process stations

You can assign one or more resources to process stations, either by dragging or copying from available work package resources, or by copying from a manufacturing resource library (MRL) .

Prerequisites

To be able to assign resources to process stations, you must add the value **Mfg0BvrProcessStation** to the preference **EP_AllowCopyPasteResourceOnTarget**.

Procedure

1. If you have not already done so, **navigate** to the **Process Planning** task page.
2. From the **Resources** tab, select one or more resources from a station.
3. Do any of the following to assign resources.
 - Drag the selected resources to one or more process stations in the **Process** panel.
 - Click **☰** → **Copy** , and in the **Process** panel, select a station and click **Paste** .
 - Copy assigned resources from one process station to another process station.
 - a. In the **Process** panel, select the station from which you want to copy resources.
 - b. In the Information panel, on the **Resources** tab, select the resources that you want to copy and click **☰** → **Copy** .
 - c. In the **Process** panel, select the station to which you want to paste the resources and click **Paste** .
 - Copy resources from a manufacturing resource library (MRL).
 - a. In the Information panel, in the **Resources** tab, right-click a resource and choose **Classification Search**.
The Teamcenter **Classification** page is displayed in a new browser window.
 - b. Using the classification **Class Navigator**, locate, select, and copy the preferred MRL resources.

Note

For more information, see the *Basic and Advanced Classification on Active Workspace - Usage* online help.

- c. Close the **Classification** page and in the **Process** panel of **Process Planning** task page, select a process station and paste the MRL resources assign them to that station.

In the Information panel, in the **Resources** tab, the dragged or copied resources are displayed for the station selected in the **Process** panel.

Filter components during process planning or work instructions authoring

You can filter consumed parts, assigned resources, and assigned work areas in the **Information** panel while working in the **Process Planning** or **Work Instructions Authoring** pages.

You can filter data based on attribute values and you also can apply multiple filters to your data.

Note

This topic uses parts consumed to an operation in the example.

However, you can also use this functionality to search and filter assigned resources in the **Resources** tab or assigned work areas in the **Work Area** tab.

Restrictions and limitations

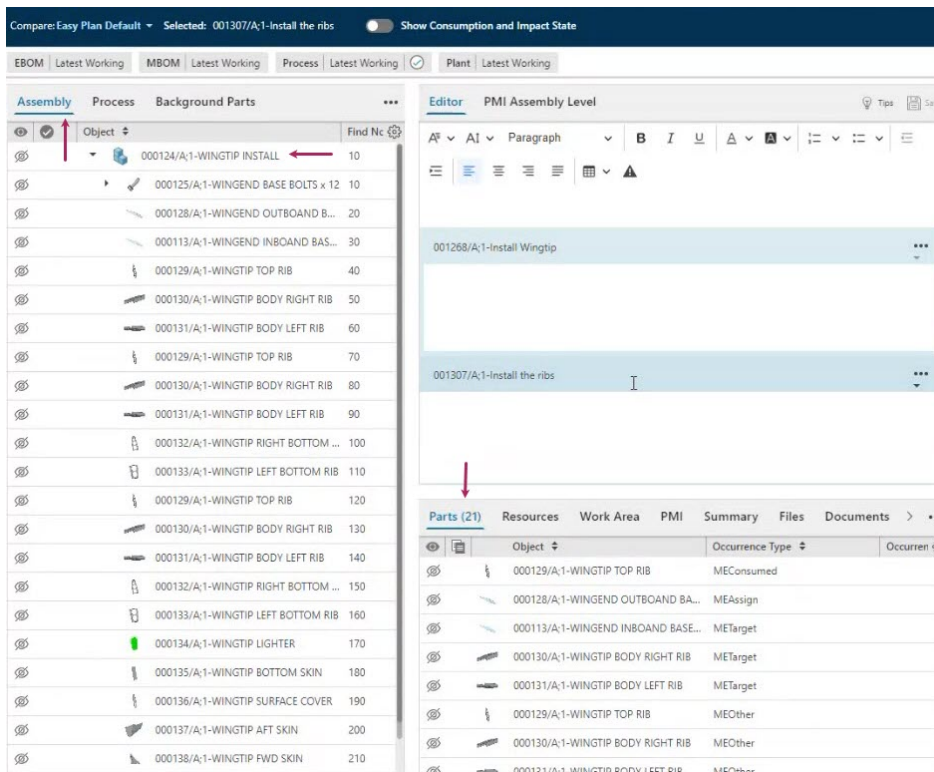
The objects on which you want to search or filter must be assigned or consumed within the work package in which you are working.

Procedure

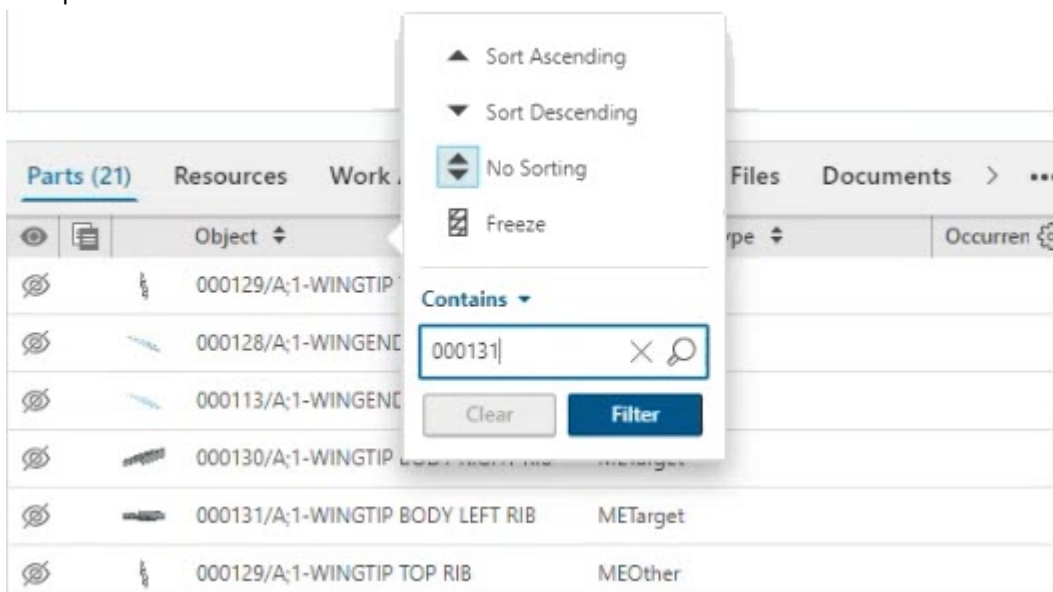
1. **Search for and open** a work package, and then **navigate** to the **Process Planning** or **Work Instructions Authoring** page.
2. If you are in the **Work Instructions Authoring** page do one of the following.
 - In the **Assembly** panel, expand the structure and select an operation.
 - In the **Process** panel, expand the structure and select a process.
3. If you are in the **Process Planning** page, in the **Process** panel select an operation or a process.

Tip

In this example, the **Parts** tab displays the number of parts consumed by the operation.



- In the **Parts** tab click on the table column header on which you want to filter data. For example, you can click on the **Object** column header. Teamcenter Easy Plan displays a dialog box you can use to filter consumed parts or assigned components.



- Type a value in the **Contains** field and then click **Filter**. The **Parts** tab updates the number of parts listed in the table after data filtering is applied. In addition, the **Object** column header contains a filter icon to indicate that data in the column is filtered.

Parts (3)				Resources	Work Area	PMI	Summary	Files	Documents	>	...
		Object	Occurrence Type	Occur							
		000131/A;1-WINGTIP BODY LEFT RIB	METarget								
		000131/A;1-WINGTIP BODY LEFT RIB	MEOther								
		000131/A;1-WINGTIP BODY LEFT RIB	MEConsumed								

- (Optional) Click on a different column header in the **Parts** table and use steps 4 and 5 to apply another filter to the data in the table.
- (Optional) In the **Parts** tab click on a table header that contains filtered data, and then click **Clear** to remove data filtering from that data column.

Edit basic BOM line properties

This feature allows you to edit basic properties for a bill of materials (BOM) line and its associated objects.

Note

To use this feature, you must be running Teamcenter Active Workspace 4.1.1 or later and your Teamcenter administrator must also install the EasyPlan Active Workspace Infrastructure using the Teamcenter Environment Manager.

- Navigate to your plant BOP.
- Open the process line, process station, or operation that you want to edit, and click the **Details** tab.
- Click **Start Edit** .

Note

If the object is released, a message displays to suggest that you revise the object before you start editing.

- Modify properties associated with the object as needed.
- Click **Save**  or **Cancel**  when you complete the property changes.

Search the MBOM for an assembly or a part

In prior releases you had to drill down through the structure to locate a part within the manufacturing bill of materials (MBOM). Now, you can search for parts by name or revision ID, and Teamcenter Easy Plan will expand the structure for you.

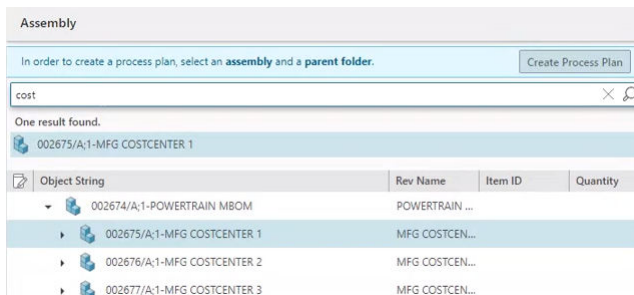
Note

We use a part for this example, but you can perform the same steps to locate an assembly.

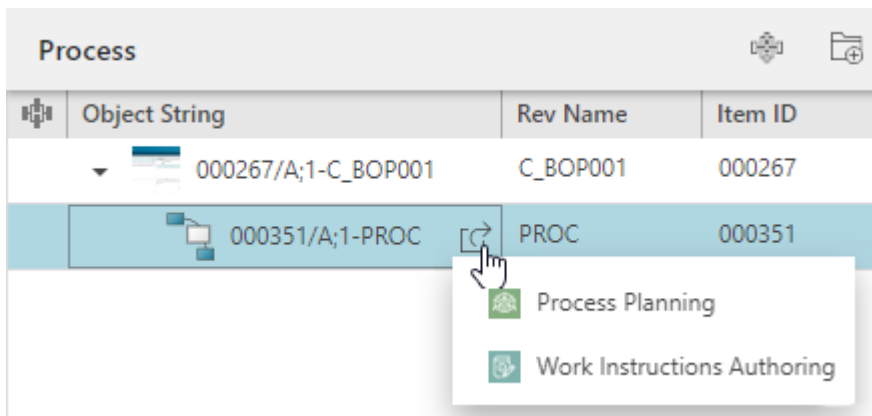
Procedure

1. Search for a work package and select it from the list.
2. Click **High Level Planning**.
3. In the **Assembly** panel click in the **Search** box and type in a full or partial search term, and click **Search**.

Teamcenter Easy Plan displays a list of results that match your search criteria.



4. Select the correct part or assembly.
Teamcenter Easy Plan expands the structure and highlights the object you selected.
5. (Optional) Click the object, click **Open** , and then select an option from the menu.



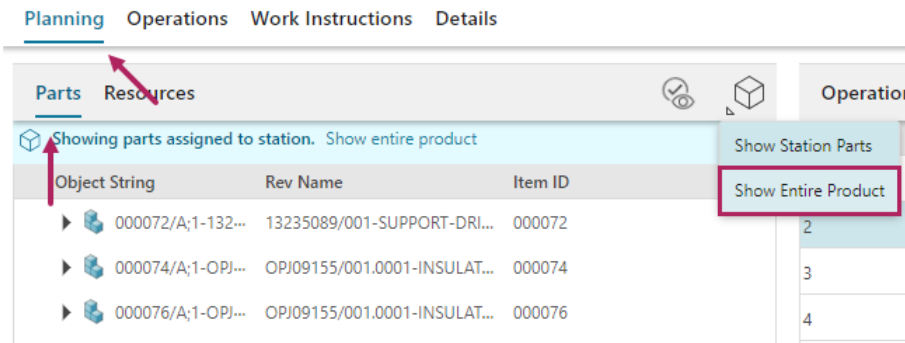
Teamcenter Easy Plan opens the **Process Planning** or **Work Instructions Authoring** page for the object.

Assign a part or assembly from the scope of the entire MBOM

You can assign a part or an assembly from the scope of the entire manufacturing bill of materials (MBOM) to an operation in the plant bill of process (BOP).

Procedure

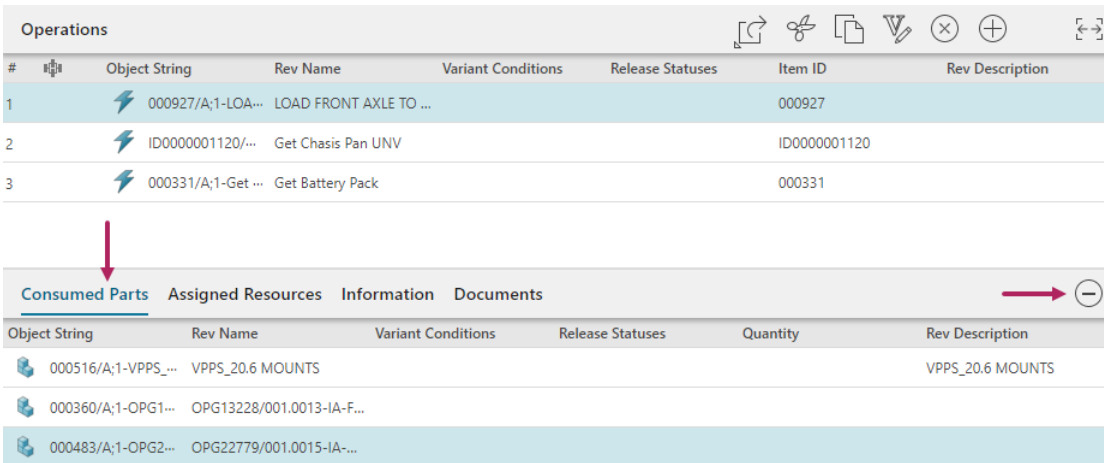
- 1. Navigate to a process area or process line that contains process stations.
- 2. Open a process station.
- 3. On the **Planning** tab, under the **Parts** subtab, select **Show entire product**.



- 4. Expand the parts and assemblies in the MBOM tree.
- 5. In the **Operations** table, select an operation to which you want to assign parts and assemblies.

Note

Parts and assemblies already assigned to the operation are listed in the **Consumed Parts** tab, under the **Operations** table.



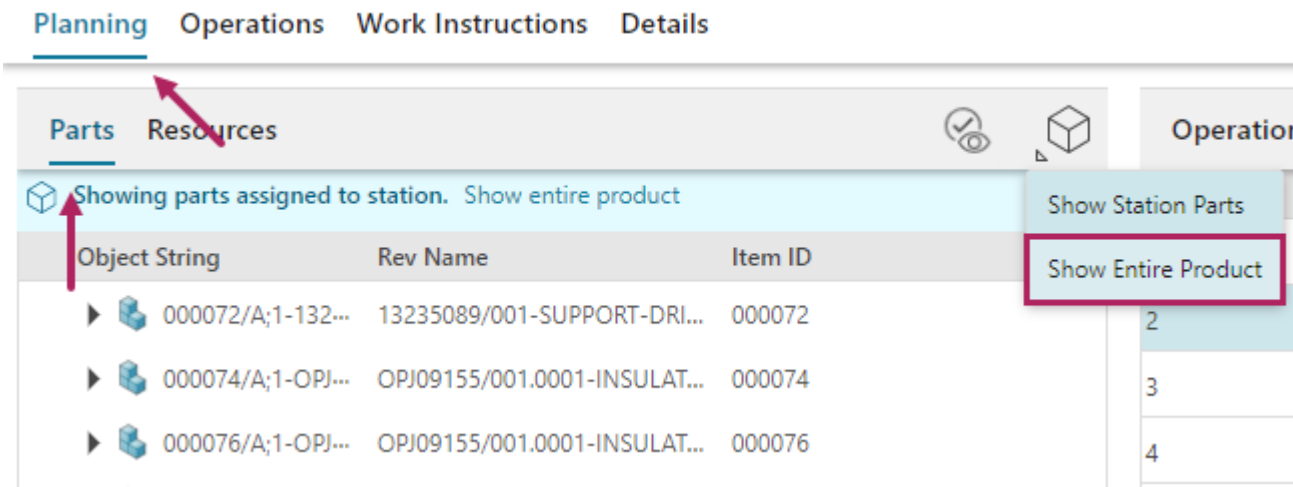
- 6. Drag parts and assemblies from the **Parts** subtab to the **Consumed Parts** tab to assign them to the operation.
- 7. (Optional) To remove a part or assembly from an operation, select the part in the **Consumed Parts** tab, and click **Unassign**.

Determine part and assembly consumption from the MBOM

Use this procedure to determine whether parts and assemblies are consumed from the manufacturing bill of materials (MBOM) to an operation in the plant bill of process (BOP).

Procedure

- 1. Navigate to a process area or process line that contains process stations.
- 2. Open a process station.
- 3. On the **Planning** tab, under the **Parts** subtab, select **Show entire product**.



- 4. Expand the parts and assemblies in the MBOM tree.
 - 5. Click **Show Consumption Indication** .
- The **Parts** tab displays consumption icons next to parts and assemblies that are consumed.

Planning Operations Details		
Parts Resources		  
Showing entire product. Show parts assigned to station		
Object String	Rev Name	
▼  000358/A;1-20_CHASSIS	20_CHASSIS	
✓ ▼  000359/A;1-VPPS_20.2 SUSPENS...	VPPS_20.2 SUSPENSION	
✓ ▶  000360/A;1-OPG13228/001.00...	OPG13228/001.0013-IA-FRONT-SUSPENSIO...	
✓ ▶  000483/A;1-OPG22779/001.00...	OPG22779/001.0015-IA-REAR SHOCK ABSOR...	
▶  000507/A;1-VPPS_20.5 CHASSIS S...	VPPS_20.5 CHASSIS STRUCTURE	
✓ ▶  000516/A;1-VPPS_20.6 MOUNTS	VPPS_20.6 MOUNTS	
▶  000654/A;1-VPPS_20.4 BRAKES	VPPS_20.4 BRAKES	
⌵  000904/A;1-brembo rotor	brembo rotor	
⌵  000905/A;1-lock nutX6	lock nutX6	

- ✓ indicates the item is consumed under the selected station.
- ⌵ indicates the item is consumed under a different station.
- ⌵ indicates the item is consumed multiple times under the selected station, or under multiple stations.
- ⌵ indicates the item is consumed multiple times under different stations.

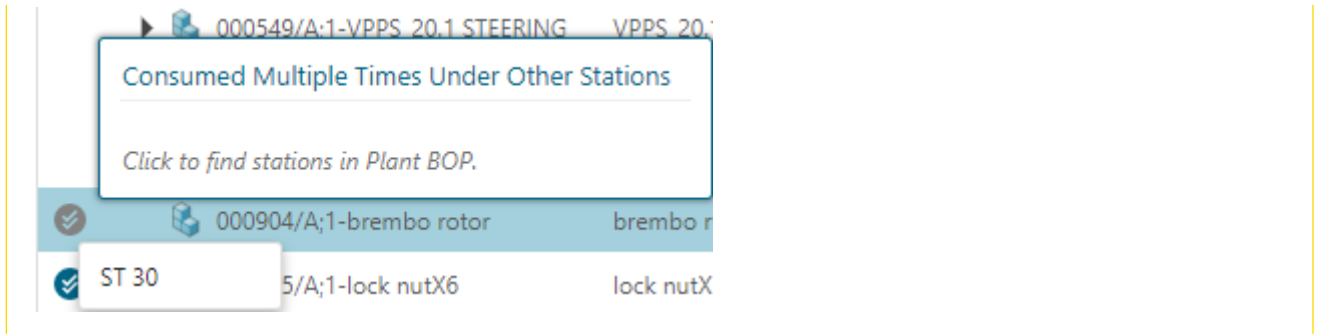
Note

If you keep **Show Consumption Indication**  active, the icon indicators automatically refresh when you consume and remove parts or assemblies during planning.

6. (Optional) Hover over any consumption icon to review the definition of the consumption indication.
7. (Optional) Click on any consumption icon to view details.

Example

If you hover over the icon for part **00904/A;1-brembo rotor**, you learn that it is consumed multiple times under other stations. When you click the icon, you learn that it is consumed under Station 30.



Compare mismatches between a plant BOP master and a plant BOP alternative

You can compare mismatches between a plant bill of process (BOP) master and an alternative BOP, using a standard accountability check. You can then propagate changes to the target plant BOP.

Prerequisites

To use this feature, you must make sure that the work package contains a plant BOP, and you must define the relevant preference. Key preferences include the following.

EP_ShowTileCountforToolbarChips

Lets you switch between selecting orange chips in tiles and in the **Change Summary** panel.

MEAccountabilityCheckSettings.PlantBOP.PlantBOP

Lists accountability check datasets saved via Teamcenter Manufacturing Process Planner.

EP_PlantBopPlantBopAlternativesAccountabilityCheckDataset, EPPlantBOPPlantBOPAlternativesACFavoriteDataset.xml

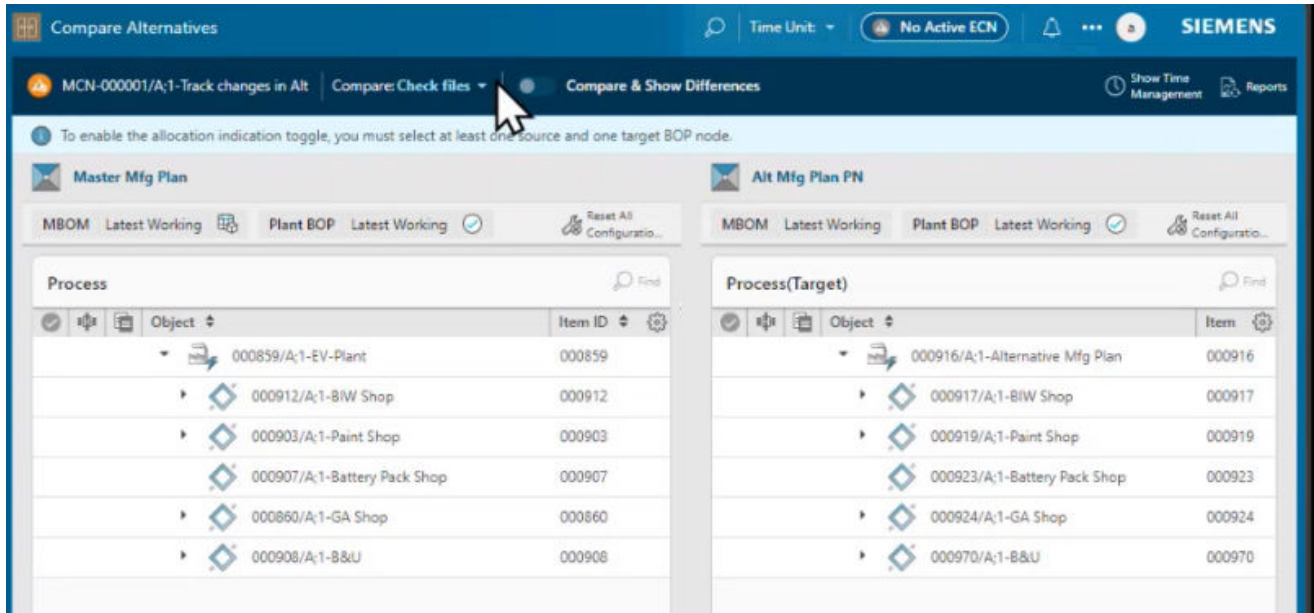
If **MEAccountabilityCheckSettings.PlantBOP.PlantBOP** is not defined, then the default dataset xml document is used. You can modify this dataset definition.

Procedure

1. On the **Manage Work Package** page, click **Compare Alternatives** , and in the **Select Alternative** dialog box, select a master or alternative work package to compare to the master work package.
By default, the opened work package is considered the source and must contain a plant BOP.
2. (Optional) To switch the source and target, click the **Set selected Work Package as "Source"** ☐ check box.
3. Click **Compare**.

4. If the target work package is associated with an active manufacturing change notice (MCN) relevant to you, in the **Track Your Work** dialog box, do one of the following.
 - To track changes to the target BOP structure, from the **Select Tracking Change** list, select the MCN, and then click **Proceed**.
 - To proceed without selecting a tracking change notice, click **Cancel**.

The **Compare Alternatives** task page is displayed, with the source plant BOP structure and target plant BOP structure visible. Any configuration applied to the work packages when you initiated the comparison is applied to the structures.

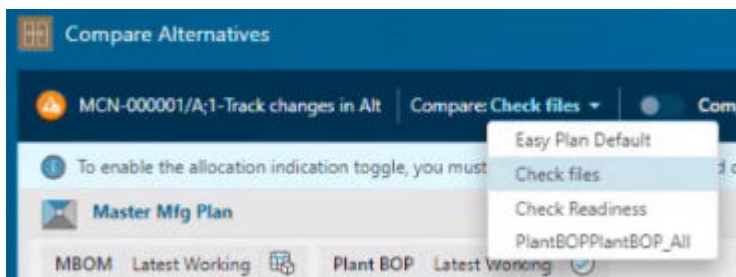


Note

You cannot change either structure configuration directly from the **Compare Alternatives** task page. You must **configure the structures** from the source or target work package.

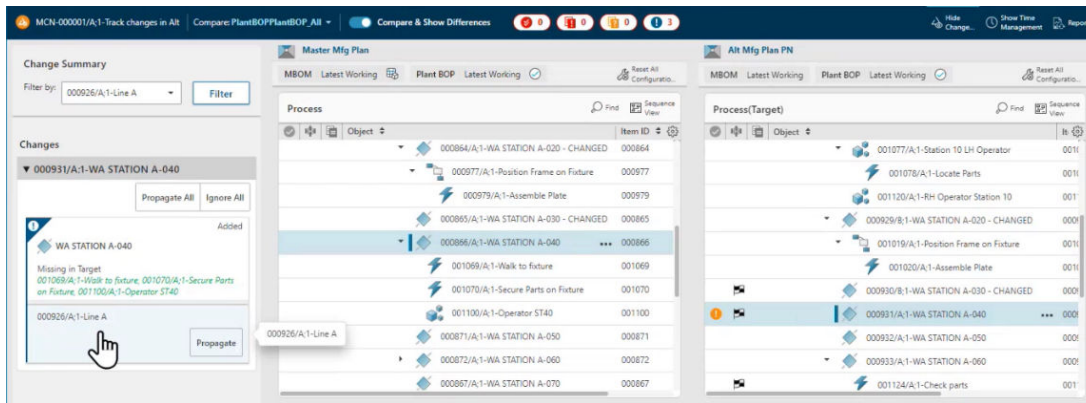
5. Press Ctrl and select one or more nodes from the source and the target BOP structures.

Above the two structure panels, the **Compare** list is populated with saved accountability check settings.



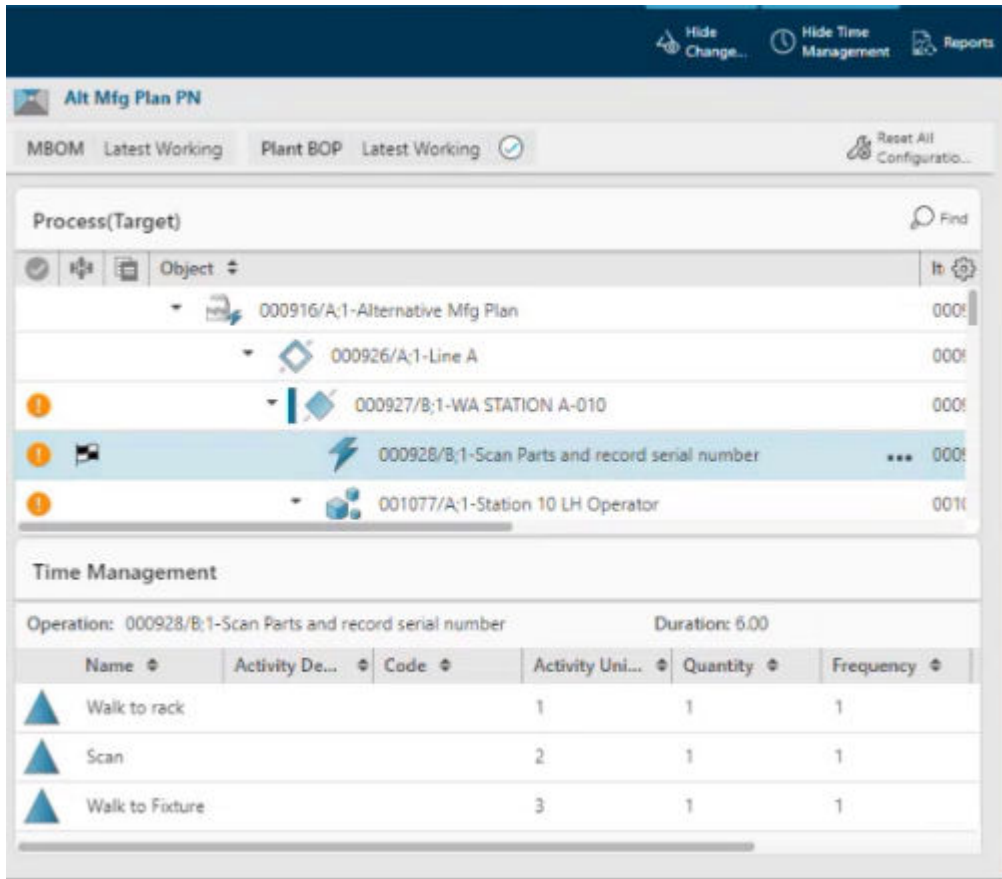
6. From the **Compare** list, select a setting or accept the default, and then enable the **Compare & Show Differences** **assignment comparison control**.

Comparison results are displayed in the **Change Summary** panel. The scope of object hierarchies that are being compared is indicated by blue symbols on the selected rows of the master and alternative structures. Orange symbols in the target structure signify objects with mismatches.



7. (Optional) In the **Change Summary** panel, do any of the following.
 - From the **Filter by** list, reduce the summary results displayed by selecting a specific parent object. Only mismatched child objects of that parent object are displayed.
 - Expand tile groups in the **Change Summary** panel to review the types of mismatches and to review details of each. Click in the lower sections of tiles to sync to relevant objects in the source structure and the target structure, depending on the mismatch type.
 - To compare time management capabilities of plant BOP activities, click **Show Time Management** ⌚ in the master or alternative toolbar.

The **time management panel** in the **Compare Alternatives** task page functions just as it does on the **Process Planning** task page.



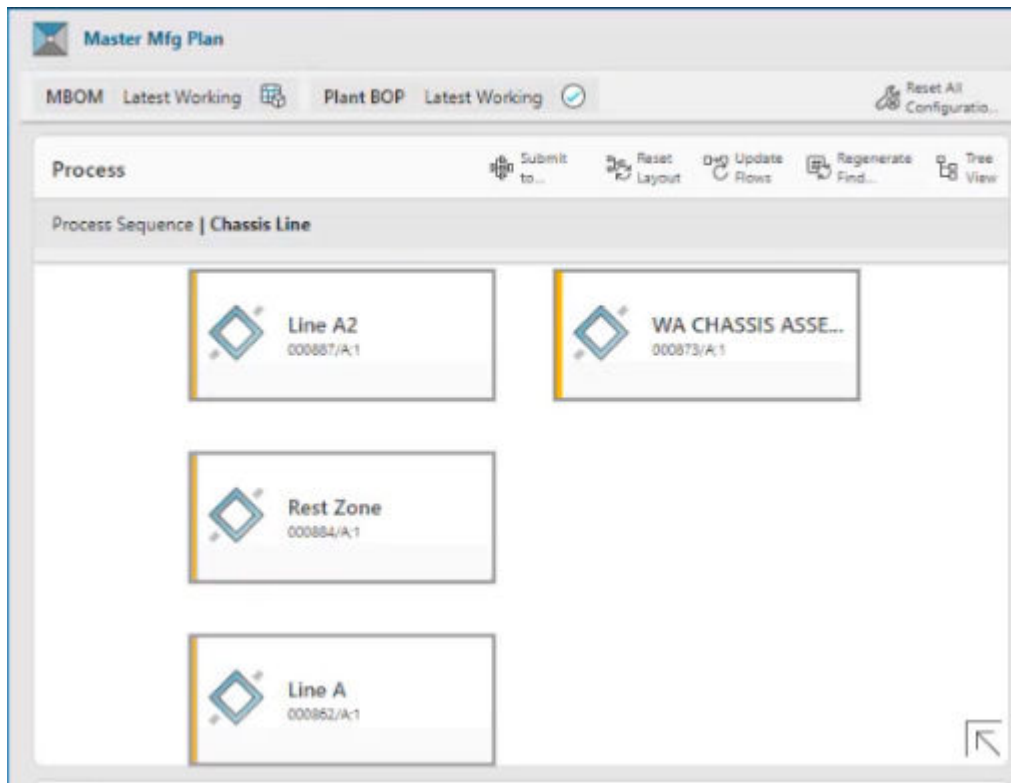
The screenshot shows the 'Alt Mfg Plan PN' interface. At the top, there are tabs for 'MBOM Latest Working' and 'Plant BOP Latest Working'. Below the tabs, there is a 'Process(Target)' section with a search bar and a list of objects. The objects are listed in a table with columns for 'Object' and 'It'. The objects are:

- 000916/A;1-Alternative Mfg Plan
- 000926/A;1-Line A
- 000927/B;1-WA STATION A-010
- 000928/B;1-Scan Parts and record serial number
- 001077/A;1-Station 10 LH Operator

Below the objects list, there is a 'Time Management' section. It shows the operation '000928/B;1-Scan Parts and record serial number' with a duration of 5.00. Below this, there is a table with columns: 'Name', 'Activity De...', 'Code', 'Activity Uni...', 'Quantity', and 'Frequency'.

Name	Activity De...	Code	Activity Uni...	Quantity	Frequency
Walk to rack			1	1	1
Scan			2	1	1
Walk to Fixture			3	1	1

- To view a structure in sequential order, click **Sequence View**  in the master or alternative toolbar.



8. To propagate one or more mismatches to the target BOP, click **Propagate** or **Propagate All**.

Orange impact indications are cleared when you have propagated all mismatches successfully. If you opened the page with a change notice applied to the target BOP structure, you can also click **Ignore All** to clear the orange impact indications without propagating the mismatches.

Define the scope of an assembly to a level in the plant BOP

You can associate assemblies and subassemblies in a manufacturing bill of materials (MBOM) to a specific level in the plant bill of product (BOP) during process planning.

Note

You must be running Teamcenter 12.4.0.2 or later to use this feature.

1. Open a work package that contains processes and parts.
2. Navigate the plant BOP to a process area or process line that contains process stations.

Note

While the plant BOP loads, the associated MBOM also loads in tree view.

3. In the MBOM tree, select and drag a subassembly onto an object, such as an area or a line, in the **Process Sequence** panel.

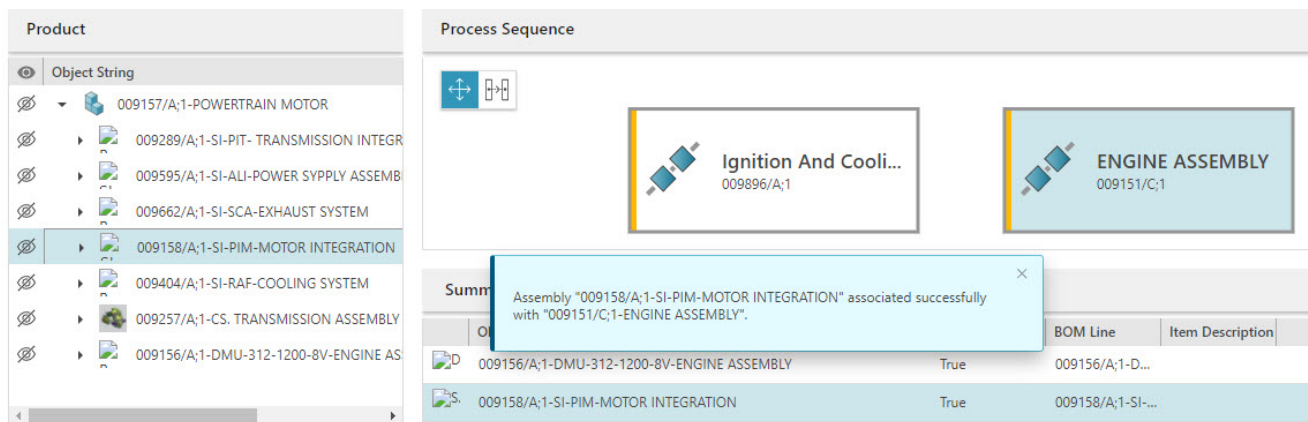
Note

You cannot create a scope to the operation level of a plant BOP.

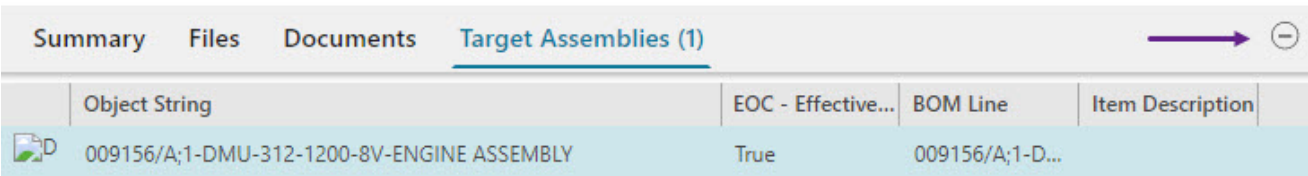
The application creates a scope of the subassembly to the plant BOP at the selected level. The **Target Assemblies** tab lists the new association.

Caution

There is a known issue in Teamcenter 12.4.0.2. If you load more than one work package during a single logon session, the **Target Assemblies** tab displays incorrect data. To resolve this issue, log off Teamcenter, and then log back on again.



4. (Optional) To remove a scope, select the subassembly in the **Target Assemblies** tab and click **Remove** .



5. (Optional) To continue process planning, you can drill down in the plant BOP structure.

Example

If you are working on a process line, you can open a process station.

View and analyze a scoped MBOM assembly

You can view and analyze a scoped manufacturing bill of materials (MBOM) assembly within a plant bill of process (BOP).

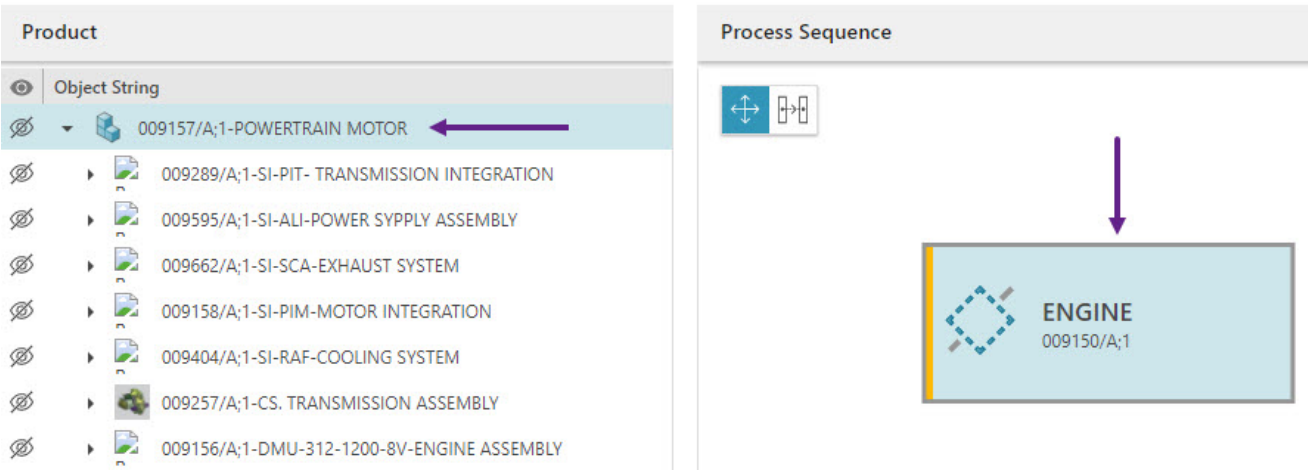
Note

Process Planning for BTO/BTS/CTO displays target assemblies based upon scoped parts.

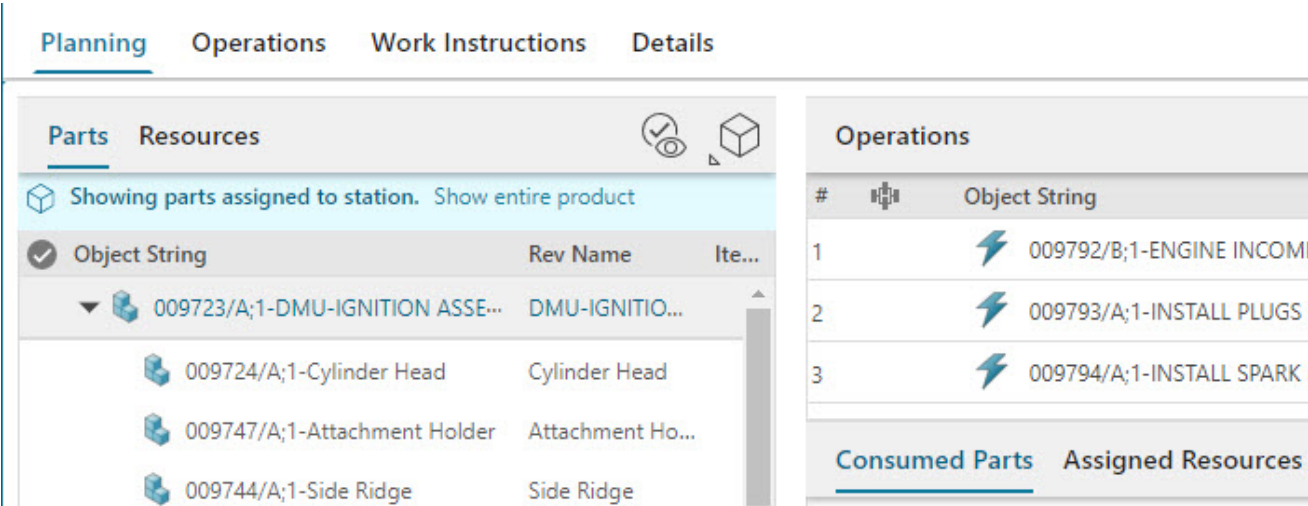
- If a station has assigned assemblies or subassemblies, the application displays the target assembly for that station. You see either a partial manufacturing bill of materials (MBOM), or the children assigned to the station.
- If a station does not have assigned assemblies or subassemblies, the application displays the target assembly for the parent as the scope of work for the station.

1. Open a work package that contains processes and parts.
2. Open a process area with an assembly or subassemblies assigned to it and expand the MBOM structure.

The **Product** panel shows the expanded MBOM. The **Process Sequence** panel shows the process area.



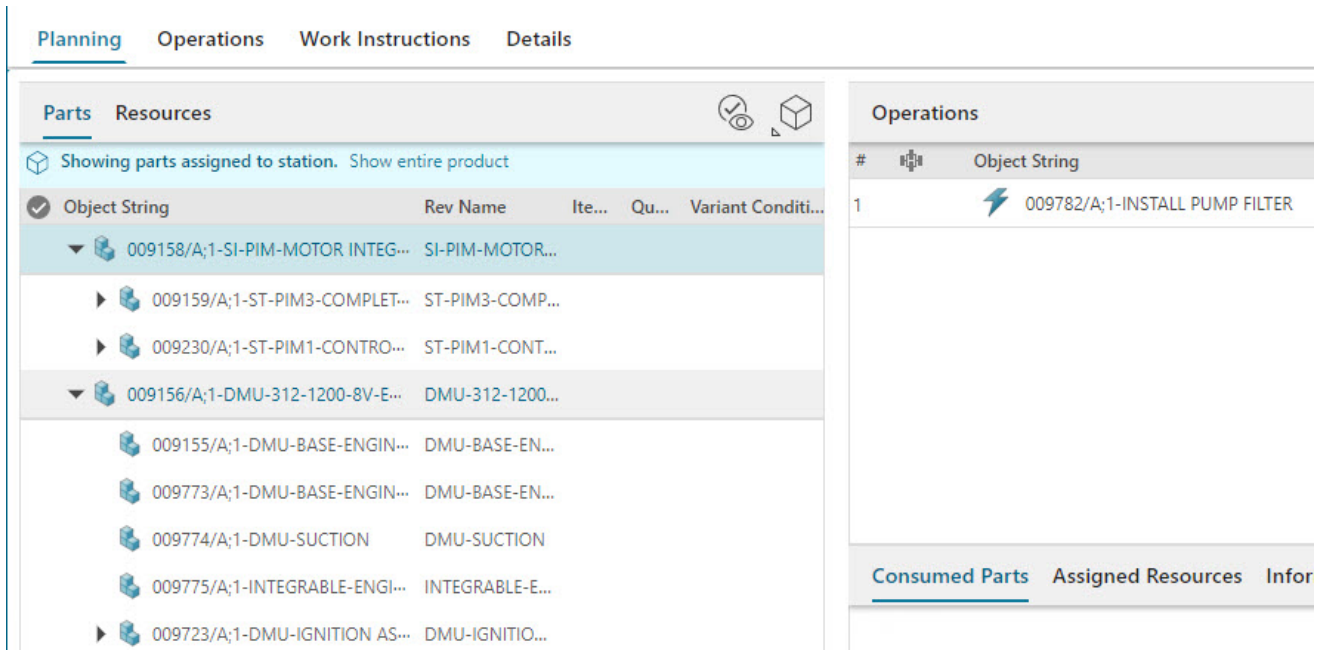
3. Drill into the plant structure and open a process station with a target assembly assigned to it.



Note

The **Parts** tab shows a partially loaded MBOM in tree view. The MBOM is the target assembly as the scope of work for the Ignition station.

- (Optional) Open a station without an assembly or subassemblies assigned to it.



Note

The station does not have a target assembly assigned to it. The **Parts** tab is showing the MBOM for the process line, which is the parent object of the station.

Display the MBOM as a graphic structure during process planning

You can use this feature to display a graphical view of the manufacturing bill of materials (MBOM) tree structure while you work in a process area.

- Open a work package that contains processes and parts.
- Navigate the plant BOP to a process area or process line that contains process stations.

As the plant BOP loads, the associated MBOM also loads in tree view.

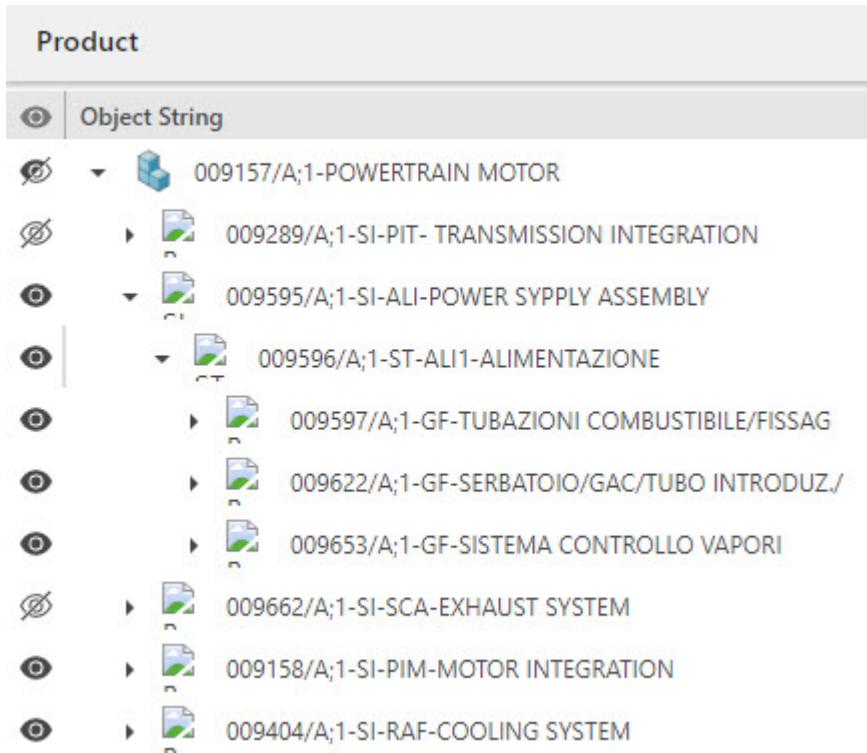
- In the MBOM tree, select parts to display or hide in the **Graphics** panel.



displays a part or subassembly,



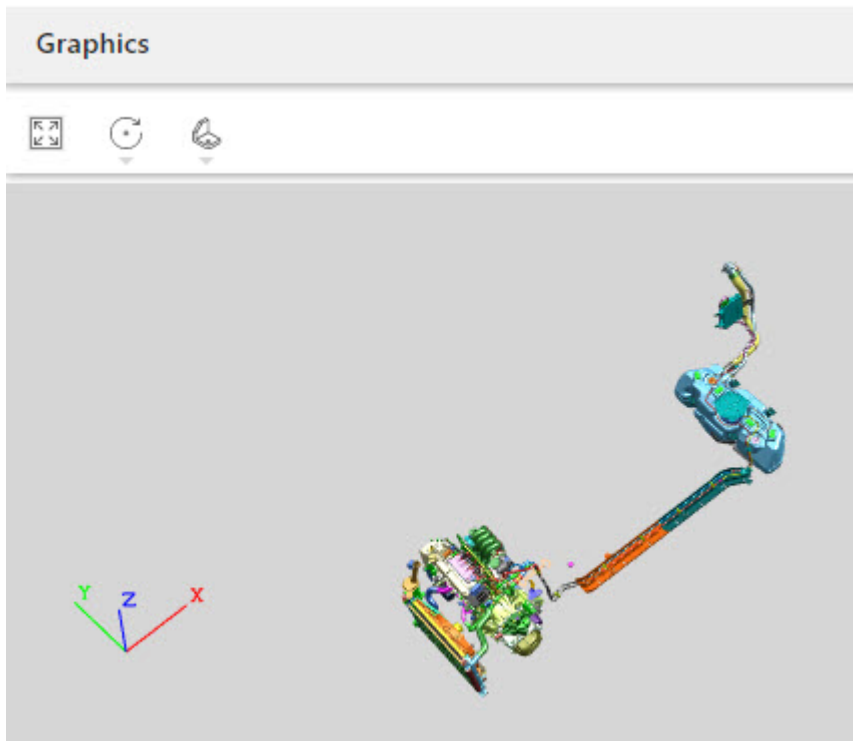
hides a part or subassembly.

**Tip**

Select an item at the root of a subassembly to select all items below it.

4. (Optional) In the **Process Sequence** panel, open an object with an assembly or subassemblies assigned to it. For example, open a line.

The subassembly assigned to the selected level of the plant bill of process (BOP) is displayed in the **Graphics** panel.



Tip

Work with images in the **Graphics** viewer.

- Drag the 3D model to rotate and inspect an image.
- Use the mouse wheel to zoom an image.
- Press the middle and right mouse buttons to pan the image. If you do not have a middle mouse button, press your scroll button and right button to pan.

Show or hide multiple assembly, part, or process lines in the Viewer panel

You can show or hide multiple assembly, part, or process lines in the 3D **Viewer** panel.

Procedure

1. If you have not done so already, **search for and open** an existing work package that contains processes and parts and then **navigate** to the **Process Planning** or **Work Instructions Authoring** page.
2. If you are working in the **Assembly**, **Process**, or **Parts** tab or panel of the **Work Instructions Authoring** page, do one of the following to select the lines that you want to show or hide in the **Viewer** panel.
 - To select all lines consecutively, hold your Shift key and select the first and last lines.
 - To select nonconsecutive lines, hold your Ctrl key and select each of the lines.

Note

You can select lines that are currently displayed or hidden in the **Viewer** panel. When you show them, displayed items remain displayed, and hidden items become displayed. When you hide them, hidden items remain hidden, and displayed items become hidden.

3. If you are working on the **Process Planning** page, in the **Process** tab, do one of the following to select the lines that you want to show or hide in the **Viewer** panel.
 - To select all lines consecutively, hold your Shift key and select the first and last lines.
 - To select nonconsecutive lines, hold your Ctrl key and select each of the lines.
4. In the panel toolbar, click **Show Selected**  or **Hide Selected** .

Open a plant BOP in a standalone viewer

Manufacturing engineers can open a plant bill of process (BOP) in a standalone viewer to validate the plant BOP after process planning is complete. If a product development engineer (PDE) needs to change out a part, the PDE can open the plant BOP to determine whether the part is consumed within the plant BOP.

Note

Your Teamcenter administrator must install TCM Visualization in your environment before you can perform this task. Contact the Teamcenter administrator if you are unable to complete this task.

User information about the standalone viewer is in the *How do I?* section of the Teamcenter Lifecycle Visualization documentation, which is available on the Siemens Digital Industries Software Support Center.

1. Open a work package that contains processes and parts.
2. Navigate the plant BOP to a process area or process line.
3. Select an object with an assembly or subassemblies associated to it, and then click **Open in Teamcenter Visualization** .

Teamcenter Visualization opens in a separate window, and loads the plant BOP at the station level.

4. In the **Project Workspace** panel, expand the station and MBOM structure.

Note

The standalone viewer displays graphics for all assigned parts. Scoped parts do not display in the viewer.

5. Select check boxes to view and hide parts in the **Graphics** view panels.

Perform process area planning in PERT view

Manage process PERT flows

Use a Program Evaluation and Review Technique (PERT) view to work with processes and operations in process structures.

This capability allows you to define the flow of materials and assemblies by viewing the sequence in which your process plan is defined. You can also flows using standard commands in the default bill of process (BOP) panel tree view. If your administrator has enabled line balancing, you can also **view operations that include process resources** in process resource interaction (PRI) view.

Procedure

1. If you have not done so already, **search for and open** an existing work package that contains processes and parts and **navigate** to the **Process Planning, High Level Planning, or Work Instructions Authoring** page.
When you work with operations in the PERT view, you switch between the default tree view and the PERT view, and access all the commands at the operations level. By default, the BOP panel displays the process tree view consisting of process, folder, and operation objects.
2. In the **BOP** panel, select an object for which you want to create or manage PERT flows, and then click **Sequence View** .
The sequence view displays a pictorial PERT representation of the processes.
3. Click **Move Mode**  to move objects in the PERT chart.
To reset the order of moved objects in the chart, click **Reset Layout**.
4. Click **Flow Creation Mode** , and drag an object to another object to create a flow sequence.
5. Do any of the following.
 - To reorder the process view, click **Reset Layout** .
 - To delete an object from both the PERT and tree views, select the object and click **Delete** .
 - To change the order of an object in the process flow, right-click the object and select **Set as Successor** or **Set as Predecessor**.
 - **Regenerate object find numbers** using a specific place value schema.
 - **Submit objects to a workflow**.
6. (Optional) Click **Tree View**  to return to the tree view.

Create and manage operations in PERT view

Use PERT and tree commands to work with operations in the **Process Planning** or **High Level Planning** pages.

Procedure

1. If you have not done so already, **search for and open** an existing work package and **navigate** to the preferred page.
When you work with operations in the PERT view in **Process Planning**, you can switch between the tree view and the PERT view to access all the commands at the operations level.
2. (Optional) From the top right corner of the **Process** tab, click **Sequence View** .
The PERT view, or sequence view, displays a pictorial representation of the processes.

Note

The **Sequence View** button is visible when operations or process resources exist under a station. If no process resources exist, the button opens a PERT view. If process resources exist, the button opens a **PRI view**.

3. (Optional) Click **Tree View**  to display the tree view.
The **Tree View** lists processes in hierarchical order.
4. Click **Move Mode**  to move the PERT chart.
5. Select the required process, then click **Flow Creation Mode**  and drag to another process to create a flow sequence.
6. Select the process you want to delete, then click **Delete**  to delete the process.

Results

Note

Commands such as **Set as Successor**, **Set as Predecessor**, **Clone**, **Submit to Workflow**, and **Create** remain available in operations.

Create and manage process nodes in PERT view

You can create and manage process nodes while working in a Program Evaluation and Review Technique (PERT) view.

There are two modes in the **Process Sequence** view  that is available from **Process** panels and tabs available from application pages such as **Process Planning** and **High Level Planning**.

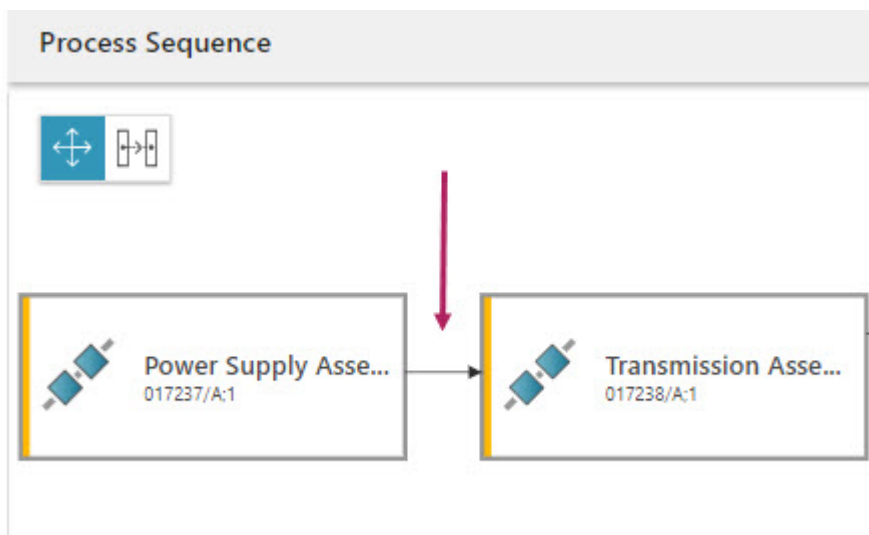
- **Move Mode**—use this mode to move objects in the **Process Sequence** panel during process planning.
- **Flow Creation Mode**—use this mode to create new flow sequences during process planning.

Note

Teamcenter Easy Plan automatically saves changes when you create a new flow sequence between process objects or move a process object to a different location within the plan.

1. Navigate to a plant bill of process (BOP) that has parts and tools assigned to processes.
2. Select an object in the **Process Sequence** panel.
3. (Optional) Click **Flow Creation Mode** , and then drag the selected process object to another process object.

Teamcenter Easy Plan creates a sequenced relationship between the process objects, and draws a flow line between the objects in the **Process Sequence** panel.



4. Select an object in the **Process Sequence** panel.
5. (Optional) Click **Move Mode** , and drag the selected the process object to a different location within the plan.
Select and drag other process objects and flow lines as needed to move them and revise the process plan.
6. (Optional) Click **Reset Layout**  to reset the entire layout to its original flow.

Tip

You can use the **Reset Layout**  feature after you:

- Zoom in or out on process objects.

- Focus on a specific node while you are in PERT view.
- Move PERT nodes while you are in PERT diagram view.

7. (Optional) Select a line in a process flow and click **Delete** .

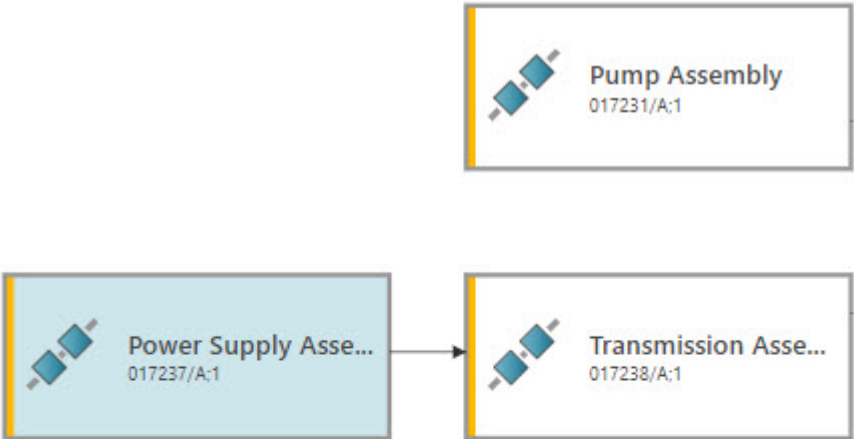
Teamcenter Easy Plan displays a confirmation message to verify that you want to delete the object. Click **Cancel** or **Delete**.

View and edit process area properties

You can view and edit process area properties during process planning.

1. Navigate to a plant bill of process (BOP) that has parts and tools assigned to processes.
2. Select an object in the **Process Sequence** panel.

Properties information for the process area displays in the **Summary** tab.



Summary	
Rev Name:	Power Supply Assembly
Rev Description:	Power Supply Assy
Item Type:	Process Line
Item Revision Owning User:	Soni, Ganesh (ganesh)
Line Type:	
Takt Time:	0.00

3. Click **Start Edit** .

Properties that you can edit are surrounded by a gray border.

4. Click inside the property you want to edit, and type in your changes.

Tip

When you place your cursor inside a property field, the border changes to a teal color to indicate that you are editing that property.

5. Click **Save Edits**  or **Cancel Edits**  when you complete the property changes.

Manage process area file attachments

You can attach and manage files for process areas while working in a Program Evaluation and Review Technique (PERT) view.

1. Navigate to a plant bill of process (BOP) that has parts and tools assigned to processes.
2. Select an object in the **Process Sequence** panel.
3. Click the **Files** tab.

Files attached to the process area are displayed in the **Files** tab.

4. Click **Attach File** to attach a file.
5. Click **Choose File** and then navigate to the file you want to attach and click **Open**.
6. Type a **Name** and then select a **Type** and a **Relation** and click **Done**.

Process Planning for BTO/BTS/CTO uploads and attaches the file to the selected object.

View and manage process area file attachments

You can view and manage files that are attached to a process area in the **Files** tab.

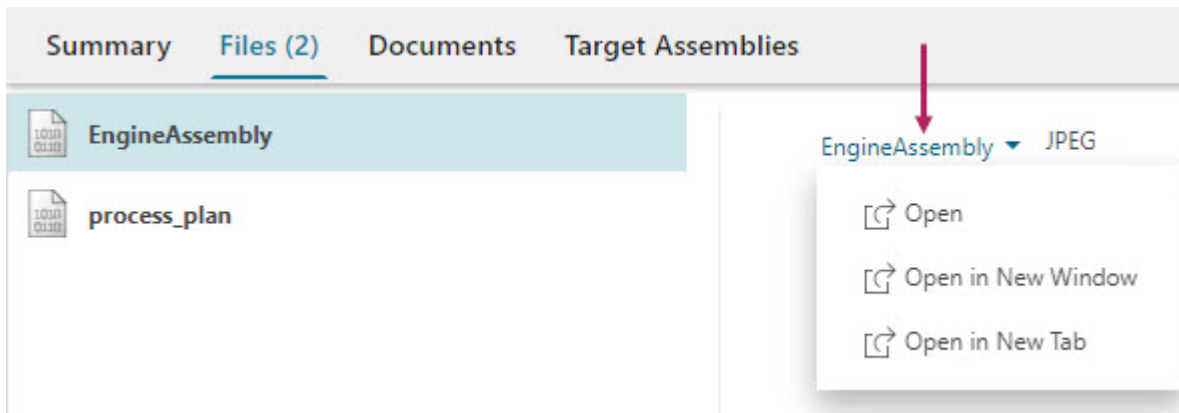
1. Navigate to a plant bill of process (BOP) that has parts and tools assigned to processes.
2. Select an object in the **Process Sequence** panel.
3. Click the **Files** tab.

Files attached to the process area are displayed in the **Files** tab.

4. Select a file within the tab.

Process Planning for BTO/BTS/CTO displays a preview of the selected file.

5. (Optional) In the display preview window select the file attachment menu, and then select one of the following options.



- **Open**—opens the file in the current window.
 - **Open in new window**—opens a separate window and displays the file.
 - **Open in new tab**—opens a new tab in the current window and displays the file.
6. (Optional) Select a file and click **Download**  to save a copy of the file.
 7. (Optional) Select a file and click **Delete**  to remove the attachment from the process area node.

Submit process area objects to a workflow

You can submit process area objects to a workflow process.

1. Navigate to a plant bill of process (BOP) that has parts and tools assigned to processes.
2. Select an object in the **Process Sequence** panel.
3. Click **Submit to workflow** .
4. Select a **Workflow Template**.
5. (Optional) Type a **Workflow Name** and **Description**.
6. Click **Submit**.

Process Planning for BTO/BTS/CTO submits the object to the workflow.

Enable line balancing for operations

You can define the sequence of flows between the operations and use all the PERT commands on stations and operations in the Teamcenter rich client.

Note

If your administrator has enabled line balancing using the preference **EP_EnableLineBalancing**, you can only **view operations that include process resources** in process resource interaction (PRI) view. Line balancing and sequencing of operations are not allowed at the same time.

- PERT for operations is unavailable if line balancing is enabled.
- **Create process** and **Compound operation** are unavailable if line balancing is disabled.

Procedure

1. Log on with the administrator credentials to set up the preference to show or hide line balancing.
2. On the **Home** page, click **Preference**.
3. Search for **EP_EnableLineBalancing** in the search bar.
4. Select **EP_EnableLineBalancing**.
5. Set the value for the preference.
 - If the value is set to **False**, PERT for operations is enabled.
 - If the value is set to **True**, PERT for operations is disabled and PERT commands are inaccessible.

View operations that include process resources in PRI view

On the **Process Planning** page, you can view stations that have associated process resources with assigned operations in a process resource interaction (PRI) sequence.

The PRI view is useful when you are authoring a manufacturing plan while transitioning from early planning to more detailed planning. The view offers a snapshot similar to the time management panel in the **Line Balancing** page, but with more detailed process plan information, rather than line balancing.

Note

- To use the PRI view, your administrator must **enable PERT for operations or line balancing**.
- Process resources are only available in plant bills of processes (BOPs). Classic BOPs are not supported.

Procedure

1. If you have not already done so, **navigate** to the **Process Planning** page.
2. In the **Process** panel, in a plant BOP, select a station that has assigned process resources.

In this example, the station contains two resources (operators), each of which are assigned operations.

		000251/A;1-STATION1	20
		000277/A;1-operator1	10
		000280/A;1-op4	30
		000399/A;1-op8	60
		000278/A;1-operator2	20
		000281/A;1-op5	40

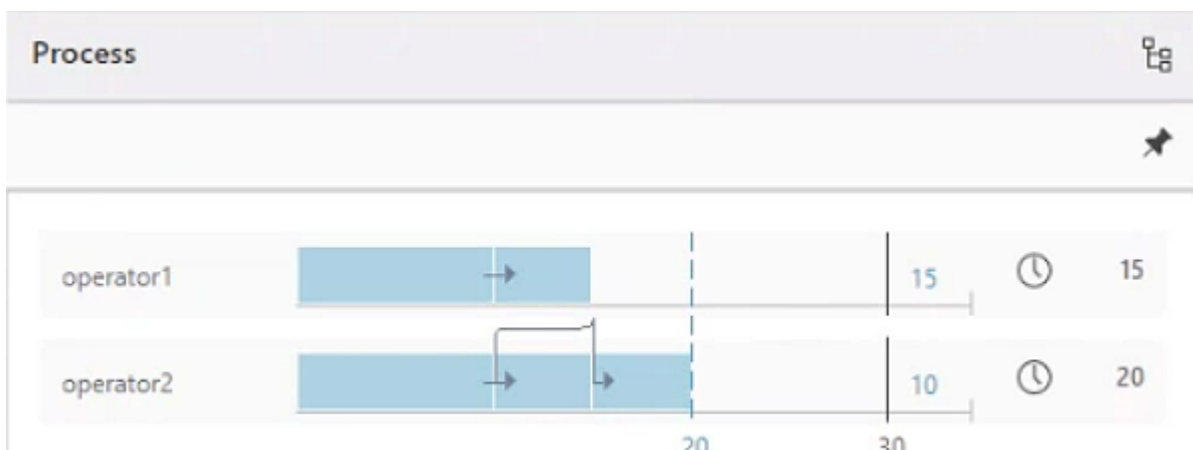
When the preference **EP_EnableLineBalancing** = **true**, the **Sequence View** button is displayed if:

Note

- Process resources exist under a selected station. If nothing exists under the station, **Sequence View** opens a blank **PERT view**. If process resources exist, **Sequence View** opens a PRI view.
- If the PRI view is not displayed when you click **Sequence View**, your administrator has not **enabled PERT for operations or line balancing**.

3. Click **Sequence View** .

The resulting PRI view displays a view of line balancing data that is based on the process resources within the station.



Regenerate object find number values

Use the **Regenerate Find Numbers** command to reorder find numbers using a specific place value schema in both process trees and PERT sequences—for example, 5, 10, 15, 20—to save time and avoid errors.

Find numbers in Teamcenter Easy Plan are sequential identifiers assigned to each line in the process structure to keep elements in a specific order.

Note

- The **Regenerate Find Numbers** command is based on the value of the preference **EP_AllowAutoRegenerateFindNumbers** (default value = *true*).
- Typically, you assign widely spaced place find number values to process or operation objects in a standard process structure, or to area, line, station, and operation objects in a plant process structure. Compound operations and execution steps are also supported.

Example

When you add a new object, you might give it a find number value of 25 so that it lies between other similar object types with the broadly spaced default find numbers of 20 and 30.

- When you cut an object and then paste it before or after another object in the **Process Planning** page, the sequence is maintained in:
 - Both the **Process** and the **Editor** tabs in ETO.
 - The process and PERT views in the **Process** panel in BTO.

For example, if you paste an object between objects of the same type with find number values of 15 and 20, the pasted object will have a value of 17.5.

Procedure

1. If you have not done so already, **search for and open** an existing work package that contains processes and parts and **navigate** to the **Process Planning** or **Work Instructions Authoring** page.
2. In the **Process** tab or panel, select the object for which you want to generate new find numbers and click **Regenerate Find Numbers** .

Tip

You can regenerate line numbers at a specific level in the tree by clicking an object at the top level (for example, an area at the top of a plant process tree to regenerate find numbers for that area and all areas below it at the same level). You can also select an object containing child objects and regenerate find numbers for that object and all of its descendants (for example, an area at the top of the tree to regenerate find numbers for that area and all areas below it, as well as all their station and operation descendants).

3. In the **Regenerate Find Numbers** dialog box, in the **Start Number** text box, type the number that you want to assign to the first selected object type.
4. In the **Increment** text box, type the numeric value that you want to add to each subsequent object.

Example

If start number = 5 and increment = 10, find numbers for objects from the selected line down are 5, 15, 25, 35, and so on.

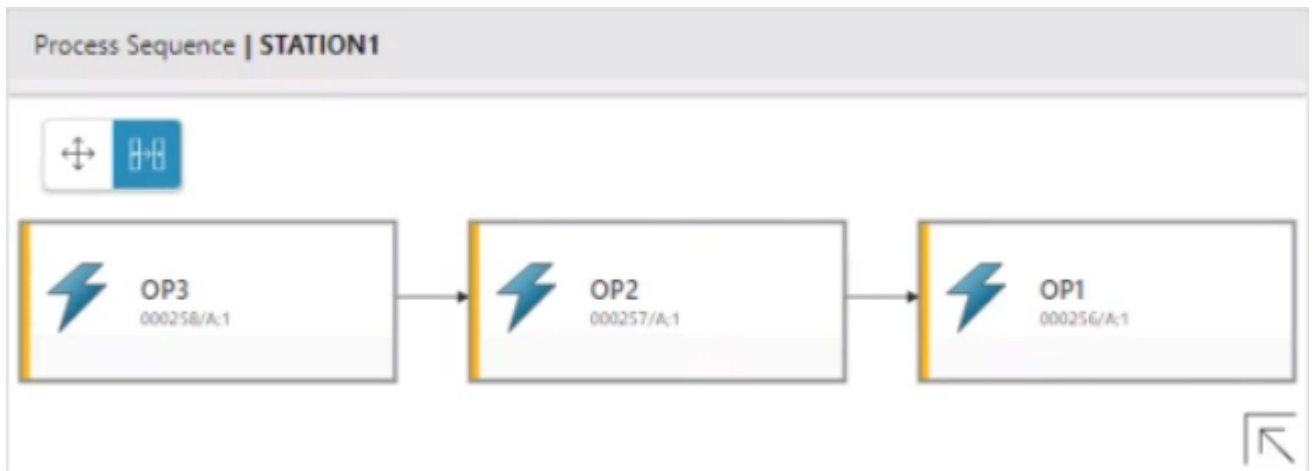
5. To consider process PERT flows between processes and operations in BTO, select the **Consider flows** ☒ check box.

This option synchronizes find numbers and flows to support data transfers to downstream applications. When you **create and manage process PERT flows** in BTO, you can use the **Consider flows** option to update find numbers in the process tree based on that flow's changes. You can also **update find numbers using flows in a PERT sequence view**.

In the example below, a plant process tree contains a station with three operations (**OP1**, **OP2**, and **OP3**). No existing flows are created between them, and their find numbers, by default, start with a value of 5, and then increment by values of 10 (**OP1** = 5, **OP2** = 15, and **OP3** = 25).

Object String	Fin...
 000233/A;1-AREA1	10
 000235/A;1-LINE1	5
 000241/A;1-STATION1	5
 000256/A;1-OP1	5
 000257/A;1-OP2	15
 000258/A;1-OP3	25

With **STATION1** selected and **Sequence View**  enabled, you can use the PERT view to define a flow between the operations. In the example below, this is **OP3** → **OP2** → **OP1**.



When you click **Tree View**  to return to standard process tree view, and regenerate the find numbers with **Start Number** = 10, **Increment** = 10, and the **Consider flows** ☒ check box selected, the operations are regenerated in the PERT flow order (**OP3** = 10, **OP2** = 20, **OP3** = 30).

Object String	Fin...
 000233/A;1-AREA1	10
 000235/A;1-LINE1	5
 000241/A;1-STATION1	5
 000258/A;1-OP3	10
 000257/A;1-OP2	20
 000256/A;1-OP1	30

6. To regenerate find numbers for all descendants of a selected object, select the **Include descendants** ☒ check box.

In the example below, the **AREA1** object in a plant bill of process (BOP) in BTO is regenerated to include descendants using a **Start Number** value of 5 and **Increment** value of 10. The first child object of **AREA1** (**LINE1**) is regenerated with a start value of 5, and the second (**LINE2**) is incremented by 10 for a value of 15.

Similarly, the first child of **LINE1** (**STATION1**) is regenerated with a start value of 5, and the second and third (**STATION2** and **STATION3**) are incremented by 10 for values of 15 and 25, respectively.

Finally, the child objects of each station (for example, **OP1**, **OP2**, and **OP3** for **STATION1**) are regenerated so that the first child object has a start value of 5 (**OP1** = 5) and the remaining child objects are incremented by 10 (**OP2** = 15, **OP2** = 25).

Object String	Fin...
000233/A;1-AREA1	10
000235/A;1-LINE1	10
000241/A;1-STATION1	10
000256/A;1-OP1	10
000257/A;1-OP2	20
000258/A;1-OP3	30
000242/A;1-STATION2	20
000259/A;1-OP4	10
000260/A;1-OP5	20
000261/A;1-OP6	30
000243/A;1-STATION3	30
000236/A;1-LINE2	20

Before regeneration

Object String	Fin...
000233/A;1-AREA1	10
000235/A;1-LINE1	5
000241/A;1-STATION1	5
000256/A;1-OP1	5
000257/A;1-OP2	15
000258/A;1-OP3	25
000242/A;1-STATION2	15
000259/A;1-OP4	5
000260/A;1-OP5	15
000261/A;1-OP6	25
000243/A;1-STATION3	25
000236/A;1-LINE2	15

After regeneration

7. Click **Confirm**.

The find numbers for the selected objects and if applicable, PERT views and descendants, are regenerated. They can be viewed in the **Find No.** column of the **Process** tab or panel. If multiple objects originally had identical or parallel find numbers, those objects now share the same regenerated find number, as in the standard process example below.

	Object String	Find No.
	001137/A;3-Activities1	45
	001295/A;2-Root2	2
	001300/A;2-opAct1	4
	001301/A;2-op2	6
	001396/A;2-OpAct2	8
	001398/A;2-opAct3	10
	001397/A;2-opAct4	12
	001399/A;2-opAct5	14
	001400/A;2-opAct6	14

Update PERT process flows using object find numbers

Update the PERT process flow sequence of objects in a plant bill of process (BOP) using the find numbers of the objects.

You can create a PERT sequence for all child objects contained in a single selected process tree object—for example, all operations in a selected station—or you can update the PERT sequence of all descendants of a selected process tree object. You can also generate a parallel PERT sequence for objects with identical find numbers, or you can **regenerate find number values** from the process tree.

Procedure

1. If you have not done so already, **search for and open** an existing work package that contains a BOP structure, and **navigate** to a preferred planning task in **High Level Planning** or **Process Planning**.
If your administrator has enabled line balancing using the **EP_EnableLineBalancing** preference, you can also navigate to the **Line Balancing** page.
2. In the **Process** panel, in the default tree view, select an object that contains descendants for which you want to generate a PERT process flow based on object find numbers.

Note

The **Update Flows** command lets you update parallel flows in a PERT sequence. Incremental find numbers in the **Process** panel usually indicate a linear flow, while identical find numbers indicate a parallel flow.

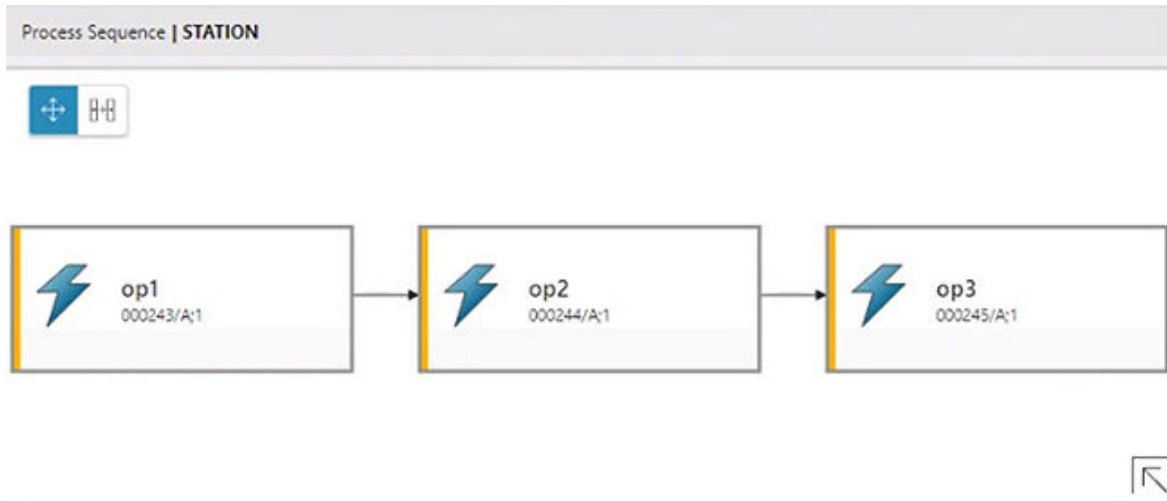
Object String	Fin...	Object String	Fin...
000237/A;1-AREA1	10	000237/A;1-AREA1	10
000239/A;1-LINE1	10	000239/A;1-LINE1	10
000241/A;1-STATION	10	000240/A;1-LINE2	20
000243/A;1-op1	10	000242/A;1-STATION	10
000244/A;1-op2	20	000246/A;1-op4	10
000245/A;1-op3	30	000247/A;1-op5	20
		000248/A;1-op6	30
		000249/A;1-op7	30

Linear flows
(op1 = 10, op2 = 20, op3 = 30)

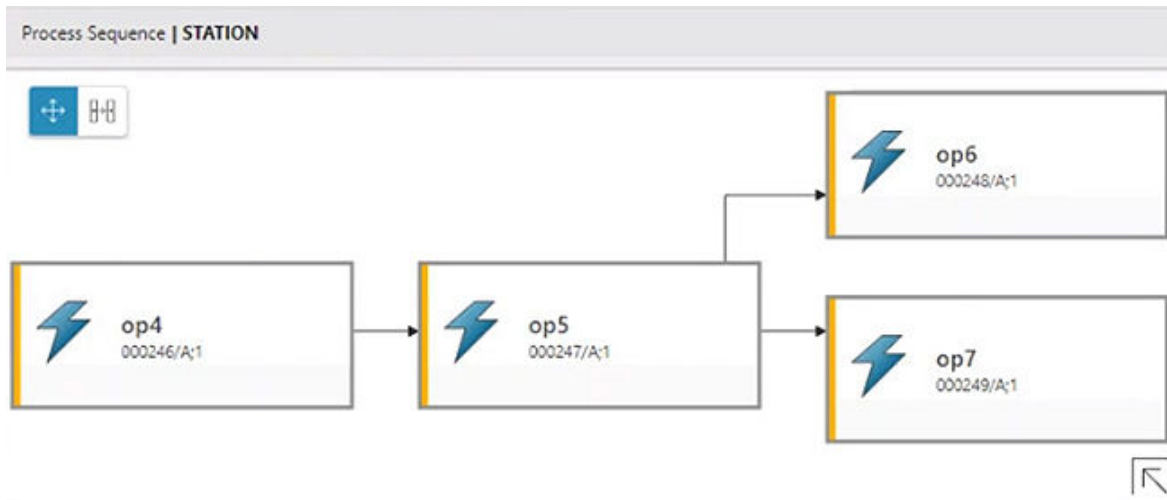
*Parallel flows (op6 and op7 = 30),
after linear flows*
(op4 = 10, op5 = 20)

- If you are working on the **Process Planning** page, in the **Process** toolbar, click **Sequence View** . If you are working on the **Line Balancing** page, select the process resource interaction (PRI) view.
- In the PERT sequence view, click **Update Flows** .
- In the **Update Flows** dialog box, select the levels for which you want to update find numbers under the object you selected in step 2.
 - To update only those objects visible in the current sequence view, accept the default option, **Visible level only**.
 - To update objects visible in the current sequence view as well as all objects below that level, select **All sub-levels**.
- If the child objects contain parallel flows and you want to avoid having to manually create them later, select the **Consider Parallel Flows** ☒ check box.

Depending on the sequence of flows within parallel flows, redundant flows might sometimes be created. You can delete these based on your requirements.
- Click **Update**.
Linear find number sequences are reflected in the flow (op1 = 10, op2 = 20, op3 = 30).



Parallel find number sequences are reflected in the flow (linear **op4** = 10, **op5** = 20, parallel **op6** and **op7** = 30).



Create external PERT flows for operations

You can create external PERT flows whenever there is dependency between operations from different stations. This allows you to define the sequence of flows between the operations of those stations.

Procedure

1. If you have not done so already, **search for and open** an existing work package and **navigate** to the preferred page—for example, the **Process Planning** or **High Level Planning** page.
2. In the tree view, click **Expand** ▼ to see the contents of the required station. The list of operations is displayed.
3. Select the operation, click **More** ⋮, and set the operation as **Predecessors**.

4. Select the operation from the second station.
5. Click **More**  and set the operation as **Successor**.
Easy Plan recognizes that the **Predecessor** and **Successor** are from different stations and generates an **external flow** tab below the **process tab**.

A green arrow signifies that the flow has a predecessor, and a red arrow signifies that the flow has external successor.
6. Select the external flow you want to remove, and then click **Remove** .

Viewing and analyzing consumption status data

View and analyze consumption status data

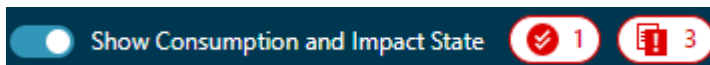
When you assign operations from many Teamcenter Easy Plan process pages—such as from the **Process** panel to the **Editor** panel in **Work Instructions Authoring**, or from a manufacturing bill of materials (MBOM) to a product bill of process (BOP) in the **Product BOP Authoring** page—the application displays icons to indicate the assignment status of assembly items.

Note

Consumption indications are based on the line balancing scope. For example, if you are viewing a zone with 10 stations, the line balancing scope is the zone.

Procedure

1. If you have not done so already, **search for and open** an existing work package that contains processes and parts and **navigate** to the **Process Planning** or **Work Instructions Authoring** page.
2. Click **Show Consumption and Impact State** .
Assignment indication icons for consumed parts are displayed in the **Parts** tab in the information panel. The **Show Consumption and Impact State** dashboard provides quick information about assignment statuses. The icons in the dashboard indicate how many parts are over consumed, and how many parts are missing in the engineering bill of materials (EBOM) source.



If parts are missing in source, the **Process** tab or panel displays a red icon. The missing parts are displayed in the **Missing in Source** panel.

Assembly

Process

Selection synced with Editor. Switch

Object String

001135/A;1-MFG COSTCENTER 10

002726/A;1-MFG POSITION 10

002739/A;1-MFG POSITION 20

002742/A;1-MFG POSITION 30

004197/A;1-R_proc1

Missing In Source

002732/A;1-WINGEND BASE BOLTS x 12

002735/A;1-WINGEND INBOARD BASE RIB

002736/A;1-WINGLET AFT SKIN

Tip

As you assign and remove objects in the structure, Teamcenter Easy Plan automatically updates consumption indication icons.

3. In the **Missing in Source** panel, select a part to view relevant parts in the information panel.

Missing In Source

002732/A;1-WINGEND BASE BOLT...

002735/A;1-WINGEND INBOARD ...

002736/A;1-WINGLET AFT SKIN

Parts (3)

Resources (2)

Work Area (1)

Object String

Occurrence Typ

002732/A;1-WINGEND BASE BOLT...

MEConsumed

002735/A;1-WINGEND INBOARD ...

MEConsumed

002736/A;1-WINGLET AFT SKIN

MEConsumed

4. (Optional) Select an icon to review the assignment details.
5. Resolve issues within the structure.

6. (Optional) Click **Show Consumption and Impact State**  to deactivate consumption indications for the structure.

View and analyze net effectivity cases for parts

You can compare effectivity between an assembly and its consumed parts to identify and correct any net effectivity mismatches between the bill of materials (BOM) and the bill of process (BOP).

Prerequisites

You must set the **MEAccountabilityCheckEnableNetEffectivity** preference value to **true** and the **MEDelegatedOccurrenceProperties** preference value to **bl_occ_effectivity**. In addition, you must add the **MEAccountabilityCheckEnableNetEffectivity** preference and the **MEDelegatedOccurrenceProperties** preference to the **AWC_Startup_preference** in the Teamcenter rich client.

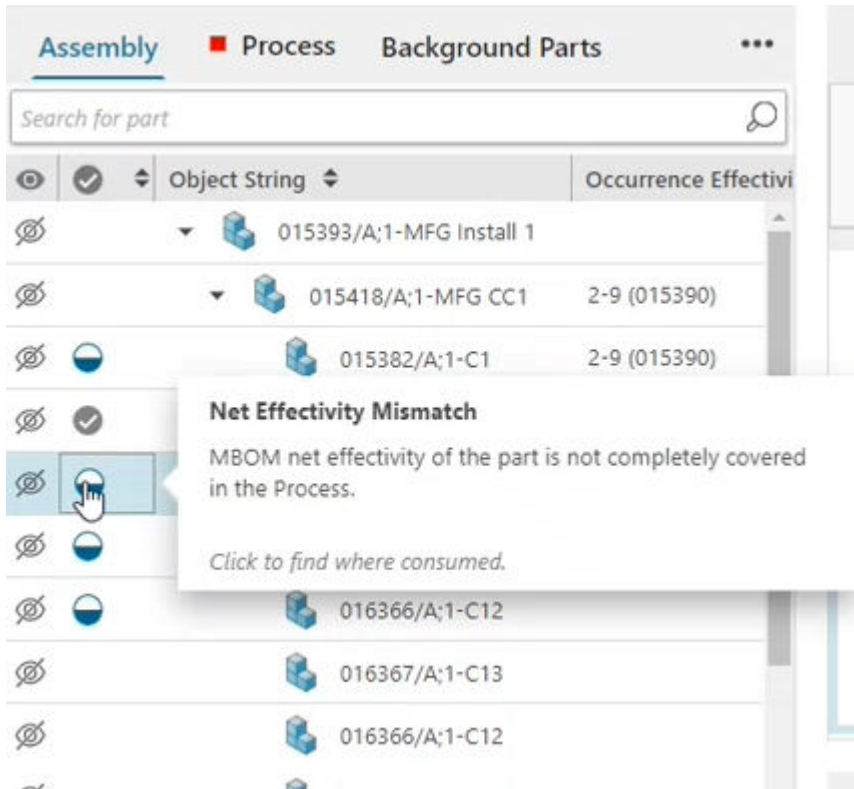
See the *Preferences* section in the *Active Workspace Administration* documentation for a description of preferences and how to set them.

Procedure

1. If you have not done so already, **search for and open** an existing work package that contains processes and parts and **navigate** to the **Process Planning** or **Work Instructions Authoring** page.
2. Click **Show Consumption and Impact State** .
Assignment indication icons for consumed parts are displayed next to items in the **Assembly** panel.

Note

Teamcenter Easy Plan displays assignment indication icons for consumed parts and their effectivities. As you assign and remove objects in the structure, Teamcenter Easy Plan automatically updates the indication icons.



3. (Optional) Hover over an icon to display net effectivity details for the part.
 - —Between the BOM and the BOP, net effectivity matches.
 - —Inside the scope of the current assembly, net effectivity does not match.
 - —Between the BOM and the BOP outside the scope of the current assembly, net effectivity matches.
 - —Outside the scope of the current assembly, net effectivity does not match.
4. (Optional) Click on an icon to find information about where the part is consumed.
5. (Optional) Resolve issues within the structure.
6. (Optional) Click **Show Consumption and Impact State** to deactivate consumption indications for the structure.

Line balancing assignment status icons

On the **Line Balancing** page, assignment indications are based on the bill of process (BOP) line balancing scope. For example, if you are viewing a zone with 10 stations, the line balancing scope is the zone.

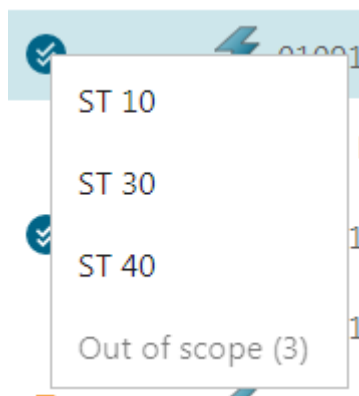
(Blank) The operation is unassigned to any process area.

- ✓ The operation is assigned to a process area in the current line balancing scope. Click the icon to jump to the process area in the current scope and highlight the operation in the **Operations** list.
- ✓ The operation is consumed under other processes that are not in the current line balancing scope.

Click the icon to jump to the process area where this operation is consumed.

- ✓ The operation is assigned to multiple process areas, including areas in the current line balancing scope and possibly in another line balancing scope.

Click the icon to see a list of the process areas where the operation is assigned. In the example below, the operation is located in three process areas in the current scope and three in a different scope.



- ✓ The operation is assigned to multiple process areas. However, none of them are in the current line balancing scope.

Click the icon to see a list of process areas where this operation is consumed.

- ⚠ The operation has properties that were changed in the current scope of the plant BOP or the product BOP after allocation. This is a in-scope partial match warning.
- ⚠ The operation has properties that were changed in another scope of the plant BOP or the product BOP after allocation. This is a out-of-scope partial match warning.
- ❗ The operation was deleted from the product BOP after it was allocated to the plant BOP. This is a missing in source error.

Find a consumed part that is within the current scope

You can use consumption indication icons to locate parts that are consumed within the current scope.

Procedure

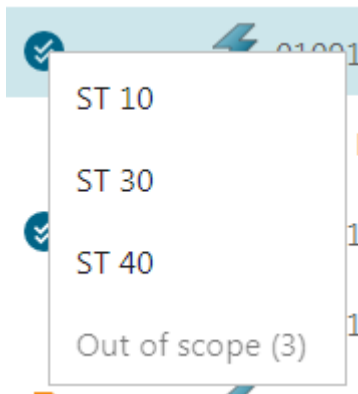
1. If you have not done so already, **search for and open** an existing work package that contains processes and parts and **navigate** to the **Process Planning, Work Instructions Authoring**, or **Product BOP Authoring** page.
2. In the **Process** tab or panel, select a process with assigned parts and click **Show Consumption and Impact State** . **Assignment indication icons** for consumed parts are displayed in the **Parts** tab in the information panel.

Tip

As you assign and remove resources in the structure, consumption indication icons are automatically updated.

3. Search the **Parts** tab for these icons.
 - —The operation is assigned to a process area in the current line balancing scope.
 - —The operation is assigned to multiple process areas, including areas in the current line balancing scope and possibly in another line balancing scope.
4. (Optional) Mouse over an icon to get details about where the part is assigned.
5. (Optional) Click the  to icon jump to the process area in the current scope and highlight the operation in the **Operations** list.
6. (Optional) Click the  icon to see a list of the process areas where the operation is assigned.

In the example below, the operation is located in three process areas in the current scope and three in a different scope.



7. (Optional) Click **Show Consumption and Impact State**  to deactivate consumption indications for the structure.

Find a consumed part that is out of scope

You can use consumption indication icons to locate parts that are consumed out-of-scope.

Note

See *Assignment status icons* for detailed information about each consumption icon.

Procedure

1. If you have not done so already, **search for and open** an existing work package that contains processes and parts and **navigate** to the **Process Planning** or **Work Instructions Authoring** page.
2. In the **Process** tab or panel, select a process with assigned parts and click **Show Consumption and Impact State** . **Assignment indication icons** for consumed parts are displayed in the **Parts** tab in the information panel.

Tip

As you assign and remove resources in the structure, consumption indication icons are automatically updated.

3. Search the **Parts** tab for these icons.
 - —The operation is consumed under other processes that are not in the current line balancing scope.
 - —The operation is assigned to multiple process areas. However, none of them are in the current line balancing scope.
 - —The operation has properties that were changed in another scope of the plant BOP or the product BOP after allocation. This is a out-of-scope partial match warning.
4. (Optional) Mouse over an icon to get details about where the part is assigned.
5. (Optional) Click the icon to review the assignment.
6. Resolve out-of-scope issues within the structure.
7. (Optional) Click **Show Consumption and Impact State**  again to deactivate consumption indications for the structure.

Find consumed operations from an assembly

You can use assignment indication icons in an assembly to locate consumed operations within the process scope.

Note

By default, assignment indicators do not display for custom object types. You must **edit a closure rule** to display assignment indicators for custom object types.

Procedure

1. If you have not done so already, **search for and open** an existing work package that contains processes and parts and **navigate** to the **Process Planning, Work Instructions Authoring**, or **Product BOP Authoring** page.
2. Click **Show Consumption and Impact State** . **Assignment indication icons** are displayed.

Tip

As you assign and remove objects in the structure, consumption indication icons are automatically updated.

3. Review the icons.
 -  indicates the item is consumed under the hierarchy of loaded processes.
 -  indicates the item is consumed under a hierarchy of different processes.
 -  indicates the item is consumed multiple times under the hierarchy of loaded processes, or under multiple hierarchies of loaded processes.
 -  indicates the item is consumed multiple times under a hierarchy of different processes.
4. (Optional) Hover over any consumption icon to review the definition of the consumption indication.
5. Click a consumption icon to view details, and in the **Process** tab or panel, select an operation from the list.
Process Planning for ETO syncs to the operation you selected, and the **Parts** tab displays the consumed part that you selected for your search.
6. (Optional) Resolve any issues within the structure, or continue with process planning.
7. (Optional) Click **Show Consumption and Impact State**  to deactivate consumption indications for the structure.

Show assignment indications for custom objects

By default, assignment indications do not display for custom object types. You must edit a closure rule to display assignment indications for custom object types. You can also edit the closure rule to exclude specific custom object types and ensure that assignment indications do not display for the excluded object types.

See the *PLM XML/TC XML Export Import Administration* documentation for detailed task instructions.

Note

You must log into the Teamcenter Rich Client with a database administrator (DBA) user account to perform this task.

If you do not have Teamcenter DBA permissions, contact your Teamcenter administrator.

Procedure

1. Close Teamcenter Easy Plan.
2. Open the Teamcenter Rich Client and log in as a DBA user.
3. Open the **PLM XML/TC XML Export Import Administration** application.
4. Locate the **AccountabilityAll** closure rule.

Note

By default, Process Planning for ETO uses the **AccountabilityAll** closure rule to manage assignment indications for objects. The **AccountabilityAll** closure rule manages assignment indications for source data and for product structures.

If you work with target data or process structures, use the **AccountabilityProcessConsumption** to manage assignment indications in your environment.

Contact your Teamcenter administrator if you are not sure which closure rule to use.

5. Take action as needed to configure assignment indications:
 - To include custom object types and display assignment indications, double-click the **Conditional Clause** field to add custom object types in the format `SECONDARY.bl_line_object_class=="<custom operation name>Revision"`.

Example

If the custom operations in your environment are named **Ng5_customProcRevision** and **Ng5CustOp1Revision**, edit the **Conditional Clause** field as follows:

```
PRIMARY.bl_me_appgroup=="0" && SECONDARY.bl_has_children=="true"
&& (SECONDARY.bl_line_object_class=="MEProcessRevision"
|| SECONDARY.bl_line_object_class=="MEOPRevision" ||
SECONDARY.bl_line_object_class=="Ng5_customProcRevision" ||
SECONDARY.bl_line_object_class=="Ng5CustOp1Revision" ) &&
SECONDARY.bl_load_state=="0"
```

ClosureRule

Traversal Rule Name: AccountabilityProcessConsumption

Description: Get only assigned nodes under a process or operation that are of type MEConsumed. Associated structures need not be loaded.

Scope of Traversal: ☒ Export ☐ Import

Output Schema Format: TCXML

Prim...	Primary Object	Seco...	Second...	Relation ...	Related Property Or ...	Action Ty...	Conditional Clause
CLASS	AppGroupBOPLine	CLASS	BOMLine	PROPERTY	bl occarp visible lines	TRAVERSE	SECONDARY.bl has children=="true"
CLASS	BOMLine	CLASS	BOMLine	PROPERTY	bl all child lines	TRAVERSE	(SECONDARY.bl line object class=="Mfg0MEProcAre
CLASS	BOMLine	CLASS	BOMLine	PROPERTY	bl all child lines	TRAVERSE	PRIMARY.bl me appgroup=="0"&& SECONDARY.bl

- To exclude custom object types and conceal assignment indications, double-click the **Conditional Clause** field to add custom object types in the format `SECONDARY.bl_line_object_class !=<custom operation name>Revision`".
6. Click **Modify** to save the changes, and close the Teamcenter Rich Client.
 7. View and analyze consumption status data.

Create or update a DIPA in a work package

You can create and update a dynamic in-process assembly (DIPA) for a process structure in Easy Plan.

Prerequisites

Your work package must contain a plant bill of process (BOP) to use this feature. Teamcenter Easy Plan does not support DIPA with classic BOP data.

You must create a sequence flow between the process stations that you use in a DIPA node. Another way to think of it is that every process station except the last one in a DIPA node must have a predecessor.

Note

Teamcenter Easy Plan supports external sequence flows for DIPA.

You must set the following preferences to use this feature:

- **MEDynamicIPAOccurrenceTypes**—Determines which part occurrence types are collected into a DIPA node. The default value is **MEConsumed**. If you use other occurrence types, such as custom occurrence types, your administrator must add these occurrence types to the preference. Otherwise the DIPA does not contain parts assigned to the process structure with those occurrence types.
- **MEDynamicIPARemoveOccTypes**—Determines which occurrence types to consider for removal from aggregated parts of the predecessors in the given process structure to generate the DIPA. Set the value to valid Teamcenter occurrence type in your structure.

- **MEDynamicIPADisplayName**—Determines the property of the predecessor in the given process structure to be considered when generating the name of the In-Process Assembly (IPA). A valid value is one of the following plant BOP line properties: **bl_item_object_name** or **bl_rev_object_name**.
- **MEDynamicIPARecursiveCreateProcessTypes**—Determines which object types are used to recursively generate DIPAs in the process sub-hierarchies. Default values include **Mfg0MEProcStatnRevision** and **MEProcessRevision**.
- **MEDynamicIPARootItemTypes**—Determines the types of root item allowed by the product or manufacturing bill of material (MBOM) structures that are part of a DIPA. The default value is **Item**.

Note

If you create a custom item type that is subclassed instead of subtyped, or vice versa, you must edit the value of **MEDynamicIPARootItemTypes** and add your custom type.

- **MEDynamicIPATraversalClosureRule**—Determines the closure rule to be used for traversal of the process structure to calculate the DIPA. The default value is **DynamicIPAProcessOnlyWithPA**.

Note

If you customize your process and add your own closure rule type derived from the item type, you must edit the transfer mode value of **MEDynamicIPATraversalClosureRule**.

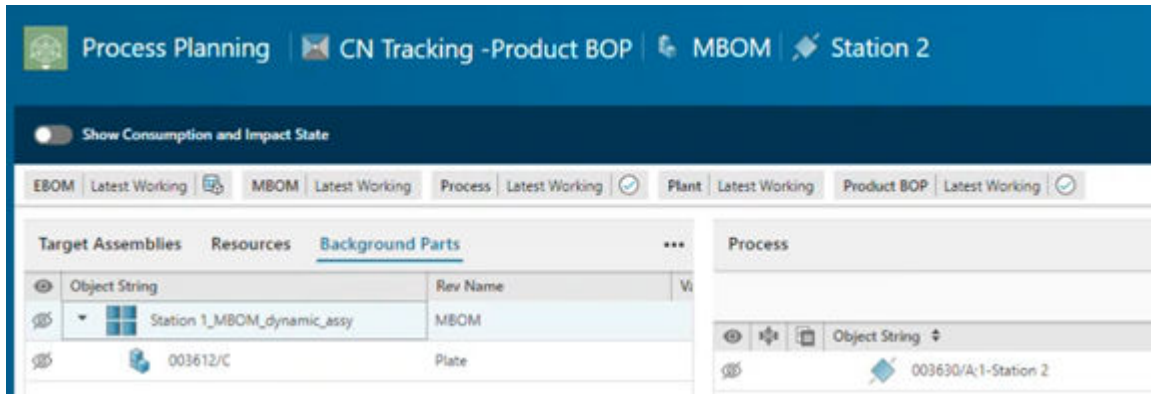
- **MEDynamicIPADisableRepopulateForPS**—Determines the closure rule to use to traverse the process structure to calculate the DIPA. The default value is **DynamicIPAProcessOnlyWithPA**.

In addition, you must add these preferences to the **AWC_Startup_preference** in the Teamcenter rich client.

See the *Preferences* section in the *Active Workspace Administration* documentation for a description of preferences and how to set them.

Procedure

1. If you have not done so already, **search for and open** an existing work package that contains processes and operations, and **navigate** to the **Work Instructions Authoring** or **Process Planning** page.
2. In the **Process** panel, expand the assembly and select a station.
In this example, Station 2 is selected.
3. Click the **Background Parts** tab, then click **More***** and select **Create DIPA**.
Teamcenter Easy Plan creates the DIPA node, and includes all the parts that were consumed in the process before the station you selected.



4. (Optional) In the **Process** panel, select an operation and then drag the DIPA node to the **Resources** tab.
Teamcenter Easy Plan assigns the DIPA node to the operation.
5. (Optional) In the upper-left panel, in the **Background Parts** tab, select  next to each object you want to display in the **Viewer**.
6. (Optional)

Click the **Background Parts** tab, then click **More***** and select **Update DIPA**.

Teamcenter Easy Plan updates all consumed parts within the DIPA node and all predecessor relationships.

If you assigned the DIPA node to an operation, Easy Plan updates the same information that is assigned to the operation. You do not need to manually refresh it there.

Tip

After you apply a different configuration to a structure, update the DIPA node. You might have configured out part of the DIPA node.

7. (Optional) To remove a DIPA node, you must manually remove any predecessor relationships within the node.
In addition you must manually remove any assignments to operations, if you assigned a DIPA node to an operation.

Open a full or partial BOP in Teamcenter Visualization

You can open a full or partial BOP in Teamcenter Visualization Desktop.

The **Open in Teamcenter Visualization**  command is available from the **High Level Planning** and **Compare Alternatives** pages, when applicable and available.

Prerequisites

Use the preference **EP_EnableOpeninTCVisforBOP** to enable the command.

Procedure

1. **Navigate** to the **High Level Planning** task page, or **open** the **Compare Alternatives** task page.
2. If you selected:
 - The **High Level Planning** task page, in the **BOP** panel, open the action menu for the BOP root node to open the full BOP, or for a line or station to open a partial BOP.
 - The **Compare Alternatives** task page, in the source or target panel, open the action menu for the BOP root node to open the full BOP, or for a line or station to open a partial BOP.
3. Click **Open in Teamcenter Visualization** .
4. If your browser requires it, open the resulting downloaded file to initiate the launch of Teamcenter Visualization Desktop.

Results

When Teamcenter Visualization opens, the relevant BOP structure is visible and you can activate model graphics to conduct further analysis.

9. Line balancing and detailed timing

Open the Line Balancing page and confirm the variant rule

When you open the **Line Balancing** page, Easy Plan prompts you to use either the variant rule that is set for the plant bill of process (BOP) or the **Product Variant** list on the **Line Balancing** page.

Procedure

1. Open an existing work package, or create a new one.
2. From any page in Easy Plan, click the tile at the top of the page and select the **Line Balancing** tile. Easy Plan displays a dialog box to warn you that an active variant configuration is applied to the structure.
3. Choose one of the following options:
 - **Clear**—resets the structure configuration from the variant rule, allowing you to select a configuration from the **Product Variant** list and use that variant to balance the line.
 - **Cancel**—configures the structure based on the plant BOP. You use the variant rule for the plant BOP to balance the line, and the **Product Variant** list is not available for you to use.

Note

We recommend that you use the variant rule set for the plant BOP.

4. Use Easy Plan to balance the line.

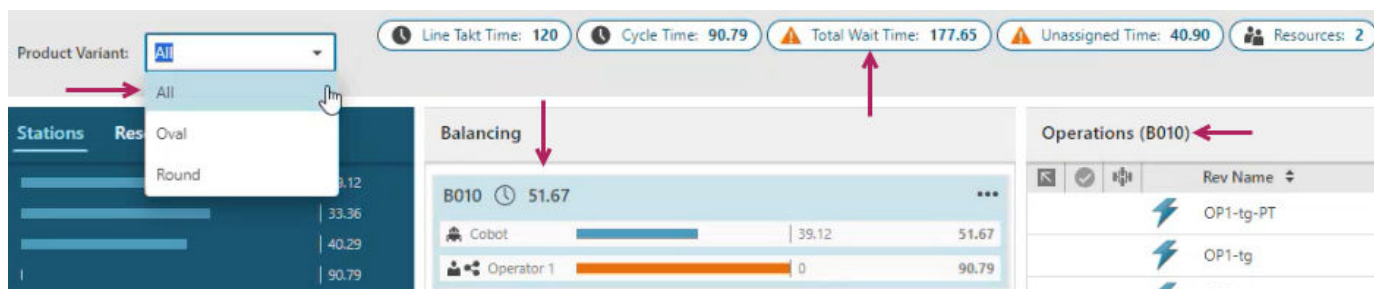
Monitor KPIs in the Line Balancing dashboard

You can monitor key performance indicators (KPIs) in the **Line Balancing** dashboard, and then use that information to increase efficiency on the line.

After you **navigate to the Line Balancing page**, you can use the information in this topic to help you balance the line.

Note

Your dashboard may not contain all of the items listed in this topic because your Teamcenter administrator configures the dashboard for your environment.



Dashboard item	Additional information
Product Variant	Lists only the saved variant rules (SVRs) for the line. Note Your Product Variant list may not contain the Weighted or Maximum variants. Those product variants must be enabled by your Teamcenter administrator.
Line Takt Time	Displays the takt time for the line.
Cycle Time	Displays the average time it takes to finish one unit of production. Note If the line takt time is not available (NA), the Cycle Time chip icon is orange. In previous releases when the line takt time was NA, this icon was gray. 
Total Wait Time	Displays the amount of time an item waits for processing or inspection, or to move to the next operation on the line.
Unassigned Time	Displays the amount of time a process resource is unassigned.
Resources	Displays the number of human resources working in the selected process station.
Human BTI	Displays the number of human resources and the balance time index (BTI) for human resources.
Cobots	Displays the number of cobot resources in the selected process station.
Cobots BTI	Displays the number of human resources and the balance time index (BTI) for human resources.

View working and waiting times for process stations and process resources

On the **Balancing** panel, you can click the **Station** or **Resource** tab to display the working and waiting tabs for the selected station or resources.

Prerequisites

You must add a value for each process resource type used in your environment to the **EP_LineBalancingProcessResourcesTypesForOverview** preference. Valid values for this preference are **cobot**, **human**, and **machine**. In addition, you must add **EP_LineBalancingProcessResourcesTypesForOverview** to the **AWC_Startup_preference** in the Teamcenter rich client.

See the *Preferences* section in the *Active Workspace Administration* documentation for a description of preferences and how to set them.

Procedure

1. If you have not done so already, **search for and open a work package**, and then **navigate** to the **Line Balancing** page.
2. (Optional) Click the **Stations** tab to view working and waiting times for process stations.



Easy Plan displays all the process stations in the line.

3. (Optional) Click the **Resources** tab to view working and waiting times for process resources.



Easy Plan displays all the cobot and human process resources in the line.

- (Optional) Hover on a shared operator, then click the resource to view details about the stations to which it is assigned.



Easy Plan displays the list of stations to which a process resource is assigned.

- (Optional) In the **Operations Sequence** panel, create flows to change the sequence in which work is performed in the process station.
Easy Plan updates the **Cycle Time** for the line and updates the **Resources** or **Stations** tab.

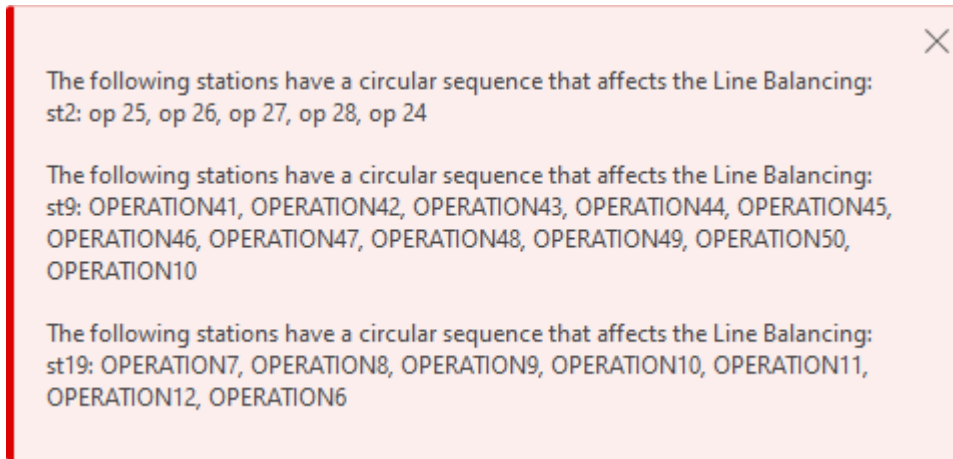
Resolve cycle checks in the Line Balancing page

The Easy Plan **Line Balancing** page notifies you when data contains a cycle in the operation flow, which stations contain a cyclic flow, and what operations are involved in the cycle. You can then use that information to resolve cyclic flow issues.

Sometimes plant bill of process (BOP) data is worked on in other applications, such as Process Simulate or Manufacturing Process Planning, and cyclic flows are introduced in those applications. Previously if you tried to view data with a cyclic flow, Easy Plan would not load it into the **Line Balancing** page.

Procedure

- If you have not done so already, **search for and open a work package**, and then **navigate** to the **Line Balancing** page.



Easy Plan opens the **Line Balancing** page and displays a warning message when the data contains a cyclic flow. The message lists the stations that have a circular sequence, and each operation within the station that is involved in the cycle.

2. Select a process station that has a circular sequence and in the **Operations Sequence** panel, resolve flow issues with operations in that station.
3. Select each process station that has a circular sequence and resolve flow issues with operations within that station, until all stations listed in the warning message are resolved.

Create process resources

Process resources and operators

Change the Process Planning page to a station view

You can change the **Process Planning** page view from a process resource scope to a station scope during planning.

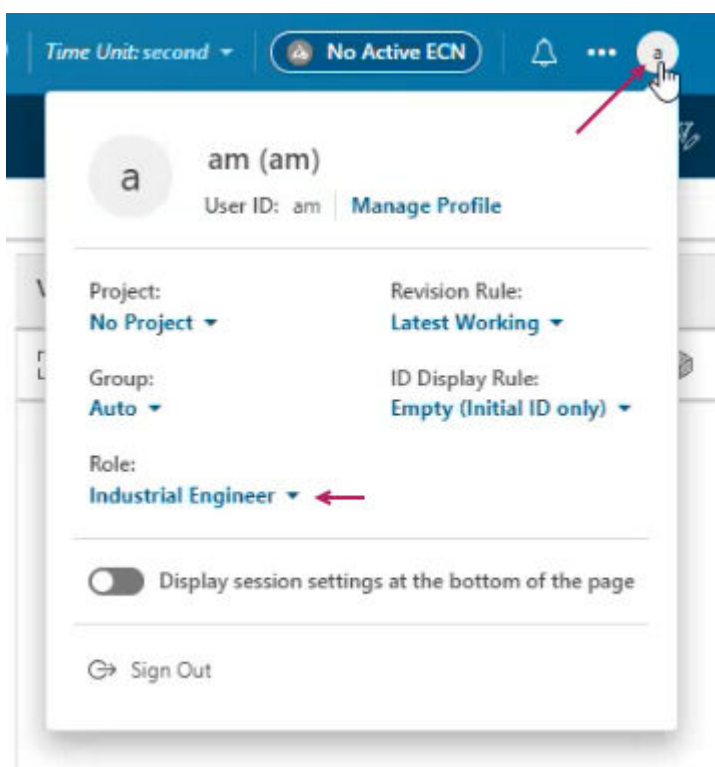
Procedure

1. If you have not done so already, **search for and open** an existing work package and **navigate** to the **Process Planning** page.

By default, the **Process Planning** page opens and is configured for industrial engineers. Each process station displays its process resources, and the operations assigned to each resource.

Object ▾	Rev Name ▾	Find No. ▾	Allocated Time By P... ▾
000380/A;2-Production Line	Production Line	10	
000381/A;2-B010	B010	10	
000389/A;2-Cobot ←	Cobot	80	
000386/A;2-OP1-PT ←	OP1-PT	50	11.67
000387/A;2-OP2-PT	OP2-PT	60	20
000388/A;2-OP3-PT	OP3-PT	70	20
000390/A;2-Operator 1 ←	Operator 1	90	
000382/A;2-OP1-tg-PT ←	OP1-tg-PT	10	2.48

- Click your profile icon, then click **Role** and change it to **Manufacturing Engineer**.



- Perform process planning tasks in the manufacturing engineer role on the **Process Planning** page.
Easy Plan displays operations directly under each process station, and lists the operations in Find No. order. In the manufacturing engineer configuration, Easy Plan does not display process resources in the assembly.

Object	Rev Name	Find No.	Allocated Time By P...
000380/A;2-Production Line	Production Line	10	
000381/A;2-B010	B010	10	
000382/A;2-OP1-tg-PT	OP1-tg-PT	10	2.48
000383/A;2-OP1-tg	OP1-tg	20	10
000384/A;2-OP2-tg	OP2-tg	30	10
000385/A;2-OP3-tg	OP3-tg	40	8.33
000386/A;2-OP1-PT	OP1-PT	50	11.67
000387/A;2-OP2-PT	OP2-PT	60	20

Create process resources

You can create cobot, human, or machine process resources and then assign operations to those process resources to balance the line.

Prerequisites

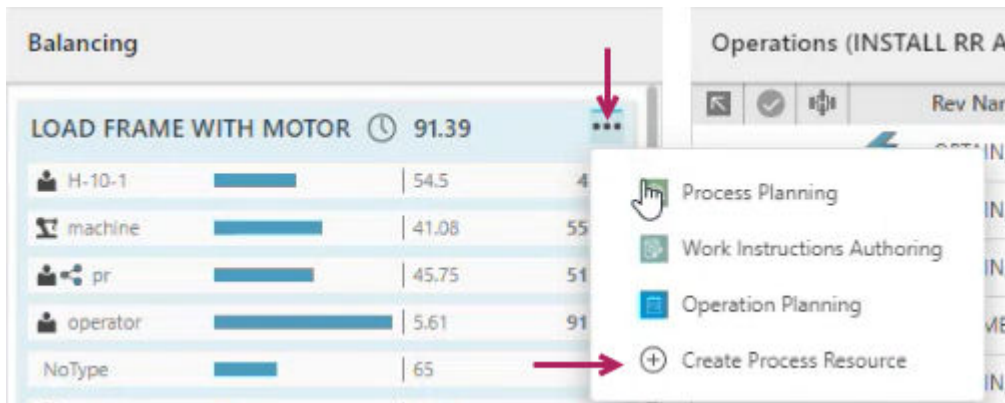
You must add **cobot** to the list of valid values for the **EP_LineBalancingProcessResourcesTypesForUtilization** and **EP_LineBalancingProcessResourceTypesForTotalWaitTime** preferences.

In addition, you must add **EP_LineBalancingProcessResourcesTypesForUtilization** and **EP_LineBalancingProcessResourceTypesForTotalWaitTime** preferences to the **AWC_Startup_preference** in the Teamcenter rich client.

See the *Preferences* section in the *Active Workspace Administration* documentation for a description of preferences and how to set them.

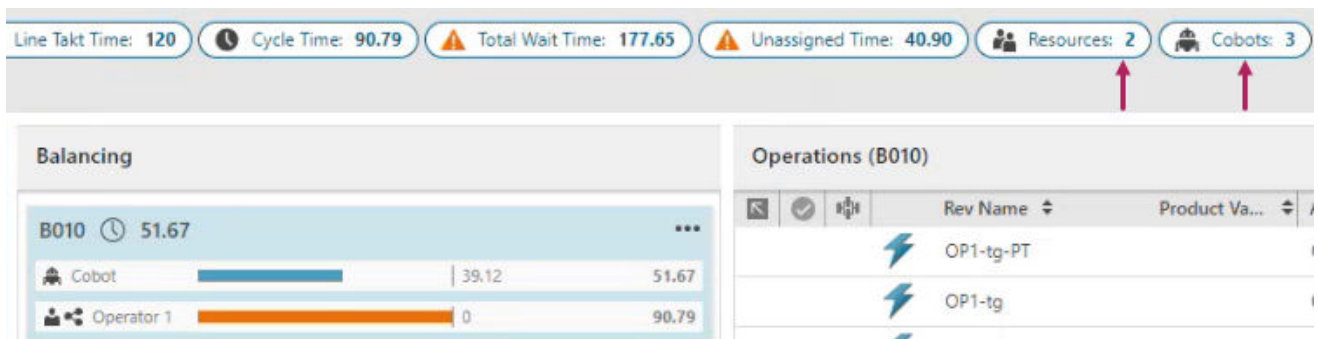
Procedure

1. If you have not done so already, **search for and open a work package**, and then **navigate** to the **Line Balancing** page.
2. Select a process station and click **More**, then select **Create Process Resource**.



3. In the **Create Process Resource** dialog box click **Type** and select the process resource you want to create:
 - **Cobot**
 - **Machine**
 - **Operator**
4. Type in a **Name** and do one of the following:
 - To create additional process resources, click **Create & Add More**.
 - To create a single process resource, click **Create**—Click this button to create one process resource and close the dialog box.

Easy Plan creates the process resource, adds it to the process station, and then updates the process resource tile in the **Line Balancing** dashboard.



5. (Optional) **Assign operations** to the new process resource in the station.

Create a process resource in the plant BOP tree

You can create a process resource in the plant bill of process (plant BOP) tree and then assign operations to it. The process resource can be an operator or a machine.

Prerequisites

You must set the **TCAAllowedChildTypes** value to **Mfg0ProcResourceRevision**. In addition, you must add **TCAAllowedChildTypes** to the **AWC_Startup_preference** in the Teamcenter rich client.

See the *Preferences* section in the *Active Workspace Administration* documentation for a description of preferences and how to set them.

Procedure

1. **Search for and open an existing work package** and then **navigate to the Process Planning page**.
2. Expand the assembly, select a station, and then click **Create Process Resource** ⊕.

Note

You must create the process resource from a process station. You cannot create the process resource from other objects within the product BOP.

3. In the **Create Process Resource** dialog box select the process resource type, then type a **Name** and click **Create**.
Teamcenter Easy Plan creates the process resource as a child of the station.
4. (Optional) In the assembly, select the process resource you created and click **Create Operation** ⊕.
Teamcenter Easy Plan creates the operation as a child of the process resource, and assigns that operation to the process resource.

Manage process resource interactions

During line balancing, you must ensure that stations and process resources (PRs) do not exceed their defined takt time. You can define and evaluate dependencies between operations that PRs perform, because one operation may not be able to start until another operation is completed.

Example

A machine can begin working only after materials are loaded into it. Or during an operation, material can be unloaded from a machine only after all operations are complete.

Interoperational dependencies may cause gaps in work executed by a PR. That gap is *wait time*, because the PR is idle. Process Planning for BTO/BTS/CTO helps you to identify wait time for each PR and to increase utilization by assigning one PR to multiple operations, when possible.

Note

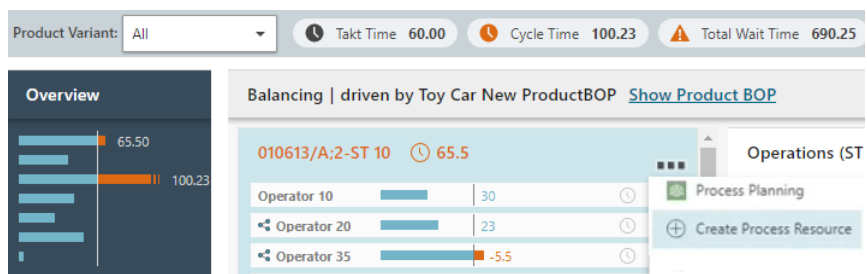
In a process station, process resources may be humans or machines. Humans are often called operators, and machines are often called process resources.

Process Planning for BTO/BTS/CTO supports:

- **Filtering data by product variant**—you can analyze and manage balancing for one product variant without affecting balancing for other product variants.
- **Shared PRs**—if an operator in one station is also assigned to operations in another station, that is a shared operator.
 -  to the left of an operator indicates a shared operator is assigned to operations in the station
 -  to the left of an operation indicates the operation is assigned to a shared PR at another station

Tip

Hover on the  symbol to view information about the shared operator.



View process resource utilization as a percentage of takt time

You can view process resource utilization as a percentage of takt time to see how close resource allocation is to 100%. You can also define thresholds for process resources to ensure that they are used efficiently.

Note

First, you set resource utilization for the process line. After you set utilization for the process line, if desired, you can also set it at the process station level.

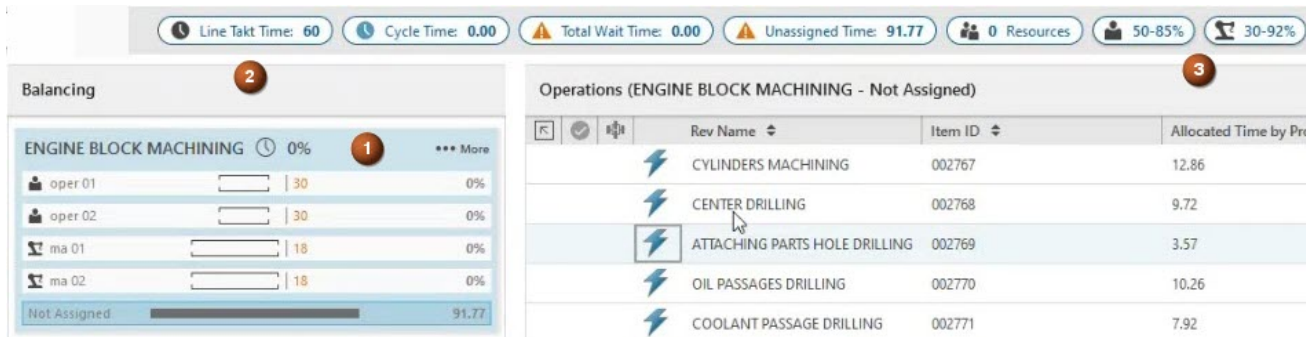
Prerequisites

You must set the **EP_LineBalancingProcessResourceUtilization** value to **true** to display process resource utilization as a percentage of takt time for a process line. In addition, you must add **EP_LineBalancingProcessResourceUtilization** to the **AWC_Startup_preference** in the Teamcenter rich client.

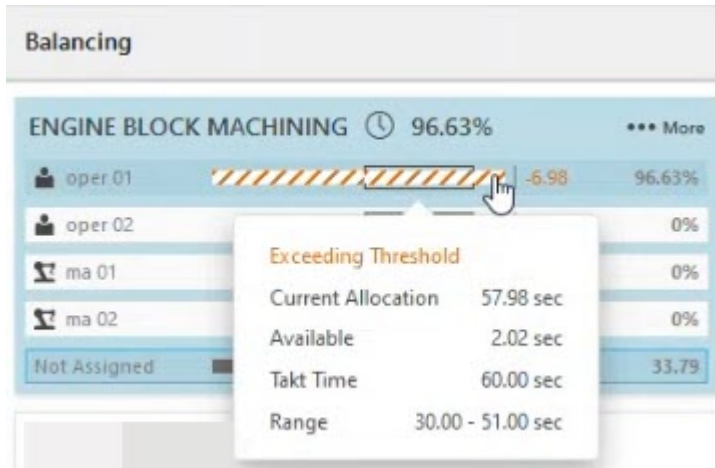
See the *Preferences* section in the *Active Workspace Administration* documentation for a description of preferences and how to set them.

Procedure

1. If you have not done so already, **search for and open** an existing work package, and navigate to the **Line Balancing** page.
2. Click **Manage Utilization** to define the process resource utilization thresholds for the process line.



- (1)
 - The process station lists the name, its total utilization, and its assigned process resources.
 - If you create a new process station, Teamcenter Easy Plan assigns the utilization for the process line to the station.
 - When you select a process station, Easy Plan highlights that station and it turns blue.
 - As you assign operations to process resources, Easy Plan updates utilization statistics for the process station.
- (2) **Line Takt Time** displays the total takt time allocated for the process line. The value is displayed in nominal time.
- (3) **Manage Utilization** displays process resource utilization for the human and machine resources for the process line.
Click a **Manage Utilization** button to set thresholds for process resources on the line.
3. In the **Human Utilization (%)** and **Machine Utilization (%)** sections, type in values for the **Lower Threshold** and **Upper Threshold** and then click **Save**.
4. (Optional) Assign operations to operators to balance the line as needed. Teamcenter Easy Plan updates the utilization resource statistics for the process station.
5. (Optional) In a process station, hover on a process resource to review its utilization statistics.



Analyze operator capacity

Some operators are not assigned 100% of the time to a line during every cycle. Part-time operators often have other tasks to complete in parallel with work on the line.

Example

For example, an operator may only be available to work 50% of the time at the balanced line. The rest of the time, the operator may work on a mirrored line in the next station.

When you perform balancing, account for any part-time operators assigned to the line, so the line does not exceed defined takt time.

Note

An operator with a capacity of less than 100% may not be shared, meaning that the operator is not available to do work in other stations. If an operator is already shared, the person cannot have a capacity less than 100%.

Process Planning for BTO/BTS/CTO treats operators as process resources (PRs) during calculations. Process Planning for BTO/BTS/CTO uses this formula to calculate available takt time for a part-time PR:

Line takt time * capacity of PR.

Example

Takt = 60

Operator is assigned to station 50% of their time

Calculated takt time for the part-time operator is 30

Allocated work = 25

Available time = 5

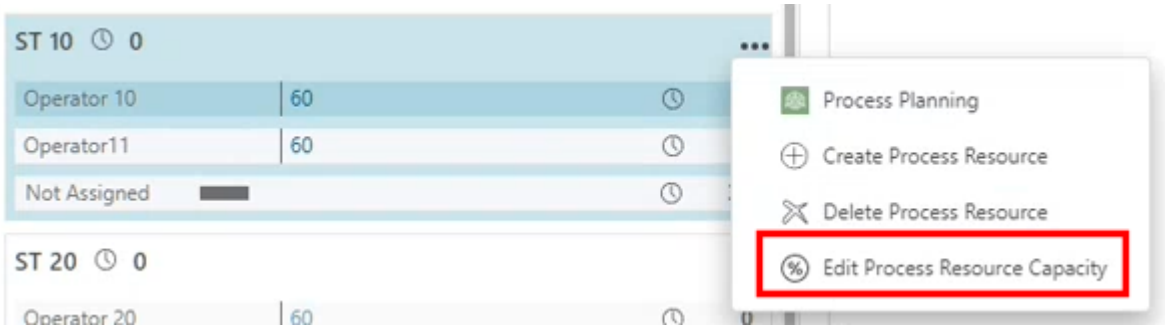
Define capacity for part-time operators

You set operator capacity to help analyze your plan, and determine how many operators the plan is using.

Note
Process Planning for BTO/BTS/CTO counts each part-time operator as a single person.

Perform the following steps to define capacity for part-time operators.

- 1. In the plant BOP, navigate to a process line or process area and click the **Balancing** tab.
- 2. Select a process station.
- 3. Select an operator (PR) in the station.
- 4. Click the **More** icon.
- 5. Select **Edit Process Resource Capacity**.



- 6. Click **Capacity**, select the operator's availability as a percentage, and click **Done**.

Process Resource Capacity

This process resource is available partially for this plan.
Please define how much it is available.

Capacity

100

50

100

Cancel

Done

Note

Process Planning for BTO/BTS/CTO uses a percentage of the available time to calculate operator capacity, then lists capacity for part-time operators next to those resources in the station tile.

Process resource capacity is set with a predefined list. Your Teamcenter administrator may create custom values that are not listed in this example by adding values to the site specific preference **EP_ProcessResourceCapacityValues**.

7. View, analyze, and adjust the line to ensure that takt time is not exceeded.

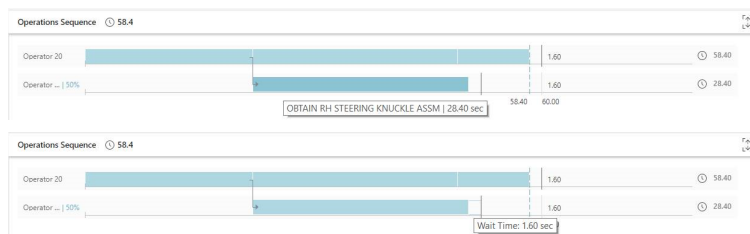
Wait times for part-time operators

If a part-time operator works in a station, work time is calculated from when the operator starts working until relative takt time is completed for that operator. For an operator allocated 50% of the time, relative takt time is 50% of total station takt time.

Example

In the **Operations Sequence**, total station takt time is 60 seconds. The second operator is allocated at 50%, so that operator's relative takt time is 30 seconds.

The second operator does not start work until Operator 20 (the first operator) completes the first operation, and the second operator must complete the next operation in 30 seconds. That operation takes 28.40 seconds, so the second operator's wait time is calculated as 1.6 seconds.



Assign operations from Product BOP to stations

Operations

Define dependencies between operations

Use this procedure to define dependencies between operations.

1. Open or navigate to a process area or process line that contains process stations.

- Click the **Balancing** tab.
- Select a station.

Operations (ST 45) (2 missing time allocations)

#	Rev Name	Variant Formula	Allocated T...	Estimated ...	Associated Process Resource
1	⚡ INSTALL TORSION BAR TO FRAME		0.00	0	Operator 47
2	⚡ PLUG (RH) CABLE ABS TO HARNESS AS...		0.00	0	Operator 46
3	⚡ CONNECT (LH) CABLE CDC VALVE TO ...		15.60	0	Operator 47
4	⚡ CONNECT (LH) CABLE CDC VALVE TO ...		7.90	0	Operator 46
5	⚡ FIXTURE(RH) CLIP TO CABLE ABS AND ...		19.00	0	Operator 47

Operations Sequence ⌚ 68.6

When you select a **Station** tile, the **Operations** table updates to list all operations in that station. The **Operations** table provides the following information:

- The **Station** tiles list all operators (PRs) assigned to each station.
- The table header states how many operations are missing a time allocation. Any operations without a time allocation are highlighted in orange text.
- The table lists operations (REV NAME), Allocated and Estimated times for each operation, and the associated Process Resource (Operator) for each operation.

Below the **Operations** table, the **Operations Sequence** table lists operators assigned to the station, and the sequence of tasks performed at the station.

Note

You can **resequence or move operations** during line balancing if needed.

- In the **Operations Sequence** table, hover at the end of an operation until you see the diamond symbol.
- Drag the diamond symbol to draw the required sequence (flow) from the first operation to the next required operation in the sequence.

Process Planning for BTO/BTS/CTO updates the **Operations Sequence** table with the dependencies you just defined and updates related calculations.

Operations Sequence ⌚ 64.9

Operator 50		51.20	⌚ 28.80
Operator 46		37.10	⌚ 42.90

Delete a dependency in a plan

To delete a dependency, select the dependency line and click **Delete** ✂.

Process Planning for BTO/BTS/CTO prompts you to verify the deletion. Next, Process Planning for BTO/BTS/CTO verifies that the deletion does not cause errors within or between other dependencies, and updates calculations for the station.

Resequence operations assigned to a process resource in the Line Balancing page

On the **Line Balancing** page, you can either resequence operations assigned to a process resource or assign operations to a different process resource. You can also sort operations data by columns in the **Operations** table.

Note

In Easy Plan, the ability to drag files or objects to other objects works the same way as it does in other applications. For more details on dragging or copying elements, see [Rules for dragging elements from BOM to BOP](#) or [Rules for copying elements from BOM to BOP](#). For more details on resequencing and moving elements, see [Rules for cloning, moving, and resequencing objects in the BOM or the BOP](#).

Prerequisites

You must have write access to the process resources and the operations you want to move.

Procedure

1. If you have not done so already, search for and open an existing work package that contains process resources and operations, and navigate to the **Line Balancing** page.
2. (Optional) To sequence operations assigned to the same process resource, in the **Operations** table, select one or more operations and do one of the following.
 - To move operations before another operation, drag the operations to the upper half of the operation.
A blue line appears above the operation, indicating that you are moving operations before the operation in the table.
 - To move operations after another operation, drag the operations to the lower half of the operation.
A blue line appears below the operation, indicating that you are moving operations after the operation in the table.

Caution

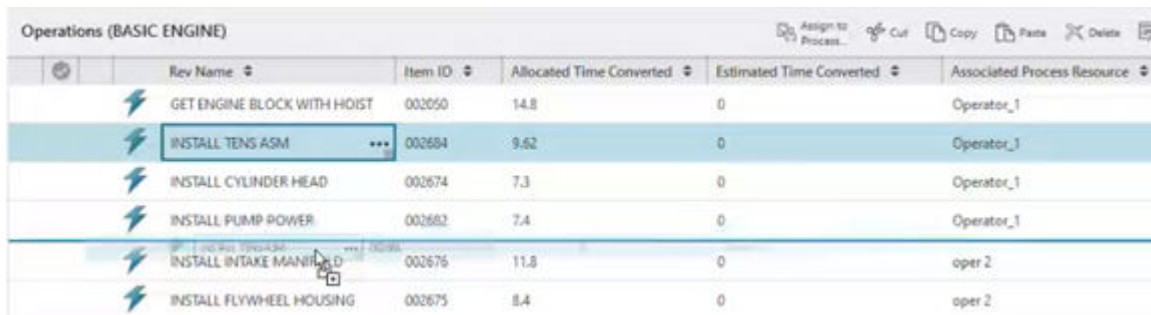
If you select and move multiple operations, all operations you select must have the same direct parent. For example, if you select multiple operations to resequence, all operations must belong to the same process station.

3. (Optional) To move operations to a different process resource in the **Operations** table, select one or more operations and do one of the following.

Note

The drag and drop feature works when the **Operations** table contains content for a process station and a process resource.

- To move operations before an operation assigned to another process resource, drag the operations to the upper half of the operation.
- To move operations after an operation assigned to another process resource, drag the operations to the lower half of the operation. In the image, the operation is moved to assign it as the first operation performed by the process resource that is named **oper 2**.



	Rev Name	Item ID	Allocated Time Converted	Estimated Time Converted	Associated Process Resource
	GET ENGINE BLOCK WITH HOIST	002050	14.8	0	Operator_1
	INSTALL TENS ASM	002684	9.62	0	Operator_1
	INSTALL CYLINDER HEAD	002674	7.3	0	Operator_1
	INSTALL PUMP POWER	002682	7.4	0	Operator_1
	INSTALL INTAKE MANIFOLD	002676	11.8	0	oper 2
	INSTALL FLYWHEEL HOUSING	002675	8.4	0	oper 2

Note

When you sort data in the **Operations** table, the sort temporarily overrides any resequencing you applied to operations in the table. When you remove the sort for data in the table, all operations are properly sorted once more.

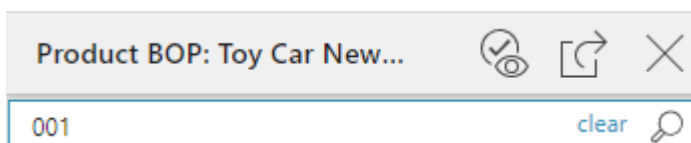
Search for operations from the line balancing page

You can search on the line balancing page to find specific operations.

Note

You can search for operations by item ID or revision name. Process Planning for BTO/BTS/CTO returns results based on full or partial search criteria.

1. Navigate to a process area or process line that contains process stations.
2. Click the **Balancing** tab.
3. Click **Show Product BOP**.
4. Type a full or partial item ID or revision name, and click **Search**.



Product BOP: Toy Car New...

 clear

- 5. (Optional) Select and open a search result to continue authoring the operation.

Group the operations in a process for use in line balancing

Group operations in a process, so you can use the process as a container for the total allocated time values of the operations in line balancing.

Procedure

- 1. If you have not done so already, **search for and open** an existing work package that contains processes and operations, and **navigate** to the **Product BOP Authoring** page.
- 2. In the **Product BOP** panel, press Ctrl and then click every operation you want to attach to the target process.
- 3. In the **Product BOP** panel toolbar, select **Cut** .
- 4. Select the target process, and in the toolbar, select **Paste**  → **Paste Into**. The operations are now moved into the process.

Product BOP				
Show Selected Hide Selected Set Effectivity Excel Roun... Regenerate Find... Create Cut Copy Delete				
Object		Item ID	Allocated Time Converted	
002751/A;1-PRODUCT BOP - POWERTRAIN		002751		
002761/A;1-COOLING		002761		
004226/A;1-Process	...	004226		
002762/A;1-INSTALL UPPER HOSE		002762	7.38	
002763/A;1-INSTALL WATER PUMP		002763	12.62	
002764/A;1-INSTALL LOWER HOSE		002764	8.88	
002765/A;1-INSTALL CADD5 HSG		002765	8	

Results

On the **Line Balancing** page, in the **Operations** panel, the **Allocated Time by Product Variant** column displays the sum of the allocated time values of all operations. Only the process is visible.

Balancing

station1 ⌚ 2

⋮ More

mac1

48

⌚ 2

Not Assigned

36.88

⌚ 36.88

Operations (station1)

⌕ Maximize

⌕ Vertically

✓		Rev Name ▾	Item ID ▾	Allocated Time by Product Va... ▾
	⚡	op2	003669	1
	⚡	op3	003670	1
	🖨️	Process	004228	36.88

Assign or reassign operations to a process resource to equalize allocated time

You can assign operations to a process resource that were previously unassigned or assigned to another process resource of the station. You may do this to equalize the time allocated to two resources in a station.

Note

You can also drag and drop operations to assign them to a process resource in the station.

Procedure

1. If you have not done so already, **search for and open a work package**, and then **navigate** to the **Line Balancing** page.
2. Select a process station, and then select one or more objects in the **Operations** table and click **Assign to Process Resource** .

Assign to Process Resource PR1 PR2 Unassign Assign to Another Process Resource...	

At least one process resource must exist to see the **Assign to Process Resource**  command.

3. Select a process resource from the list.

You can select **Unassign** to return an operation to the **Not Assigned** list for this station.

Note

You cannot assigned process resources with the type of Machine or No Type as shared process resources.

You can assign Process resources with the type of Cobot or Resource (Human) as shared process resources.

What to do next

An operation can be assigned to a single process resource at once. Assigning an operation to a process resource either unassigns it from another process resource or removes it from the **Not Assigned** list. The roll up times are updated on the station tile.

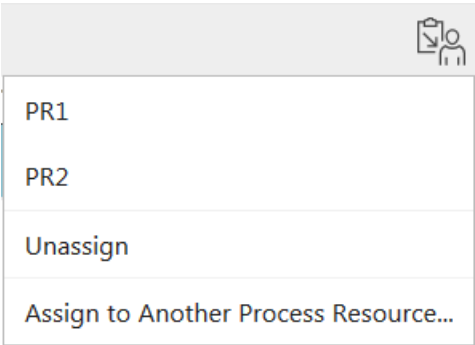
Assign operations to a process resource in a different station

You can assign the operations to a process resource in another station without moving them to the other station. This shares the process resource between the two stations. You may do this if a worker in a nearby station is under utilized and operations in a station that exceeds the takt time cannot be moved to his station.

Note

You can also drag and drop operations to assign them to a process resource in a different station.

- 1. Open or navigate to a process area or process line that contains process stations.
- 2. Click the **Balancing** tab.
- 3. Select operations and click **Assign to Process Resource** .

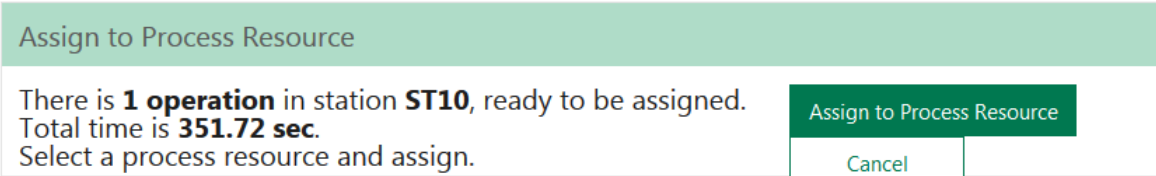


At least one process resource must exist to see the **Assign to Process Resource**  command.

- 4. Click **Assign to Another Process Resource**.

The **Assign to Process Resource** panel is displayed.

The number of operations and total time shown in the **Assign to Process Resource** panel increases.

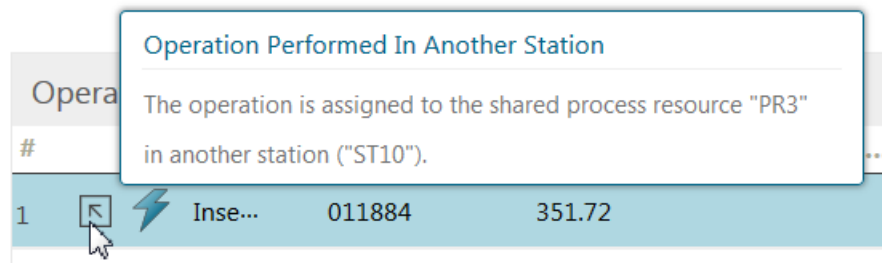


- 5. Select a process resource in another station.

6. In the **Assign to Process Resource** panel, click **Assign to Process Resource**.

The process resource is added to the source station as a shared resource. Operations assigned to the process resource remain in the original station, and the total time of the process resource in both stations is updated with a new total time that includes its previously assigned operations and newly assigned operations.

After the operation is assigned to a shared process resource, an  icon is shown next to it in the target station.



If you unassign all operations a shared process resource is performing in one station, it is removed from the station into which it was shared.

Move operations to a process resource in a different station

You can move an operation to a process resource in another station. You may want to do this if one station exceeds the takt time, and another station is under utilized.

Note

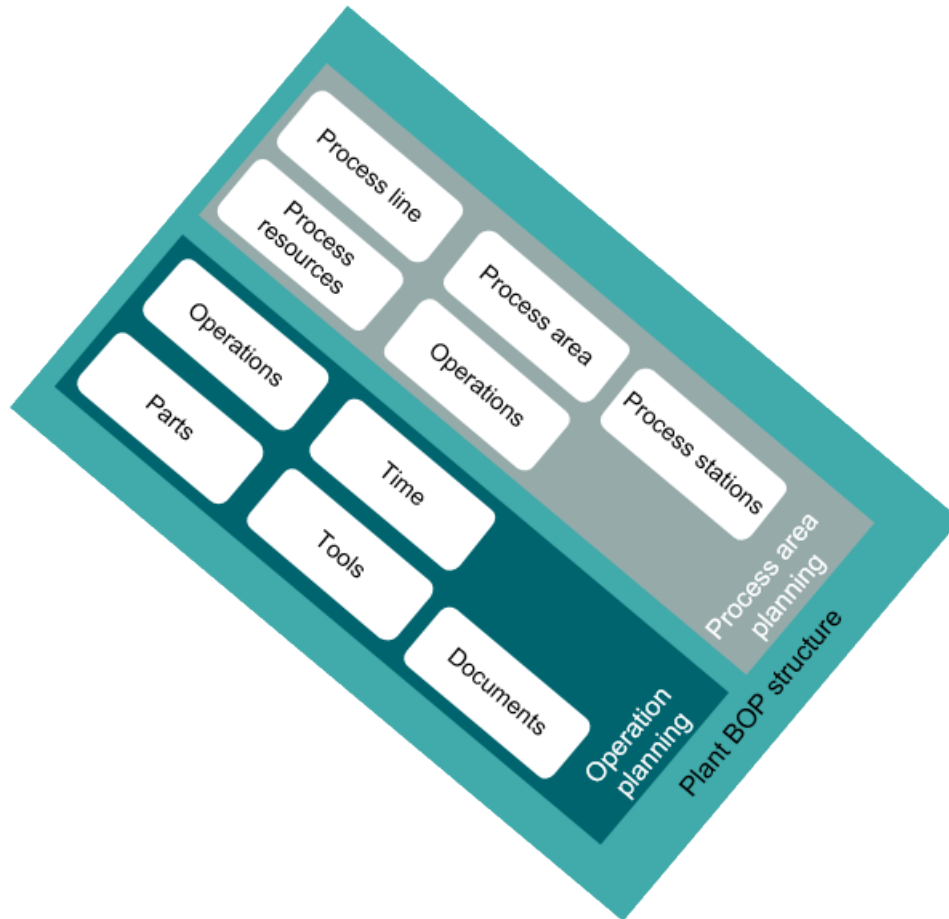
You can also drag and drop operations to move them to a process resource in a different station.

1. Open or navigate to a process area or process line that contains process stations.
2. Click the **Balancing** tab.
3. Select one or multiple operations and click **Cut** .
4. Select a process resource of a station from the list and click **Paste** .

Plan plant BOP operations

View operation planning

In the plant BOP, operation planning is performed on the operation page. This includes the activities, parts, and tools that are needed to perform the operation.



- **Operation**

Each process station object contains operations that describe the high-level tasks to be performed. Operations can be sequenced. For example, the **Station 10** process station could contain this operation: **Add Instrument Panel**.

- **Time**

Each operation contains time objects that describe the more detailed tasks to be performed in the operation and can be sequenced. For example, you could create these activities to describe how to insert an instrument panel into a car: **Maneuver Lift Assist Holding Instrument Panel through Car Door**, **Secure Instrument Panel to Car**, and **Remove Empty Lift Assist from Car**.

- **Parts**

These are the parts associated to the operation.

- **Tools**

These are the tool associated to the operation.

- **Documents**

Reference documents can be added to operations and activities.

Create operations

You can either create operations directly in the plant BOP or you can **add operations from a functional plan (product BOP) to the plant BOP**.

To create operations directly in the plant BOP, perform these steps:

Procedure

1. Search and open or navigate to a process station.
The process station page is displayed.
2. Click the **Planning** tab.
3. Click **Create Operation** .
4. In the **Create Operation** dialog box, select an operation type.
5. Type a name in the **Name** box.
6. (Optional) Type additional information in the **Description** box.
7. Click **Create**.
8. (Optional) You can create station reports.

Add content to an operation

Add an activity

Procedure

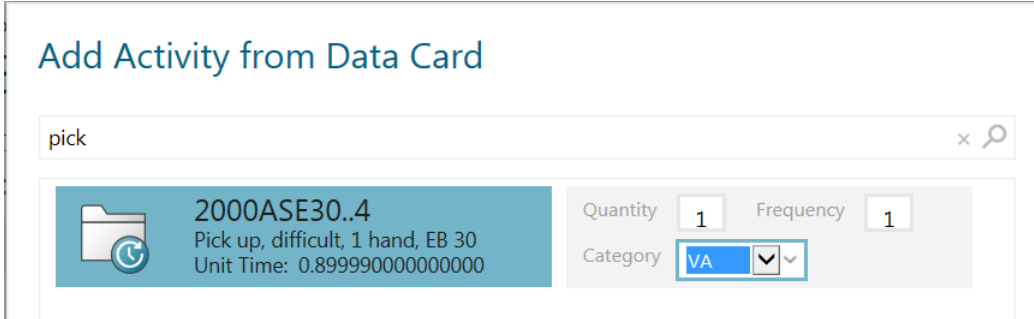
1. Search and open or navigate to an operation.
2. Click the **Time** tab.
3. Determine where to create the new activity step using one of these techniques:

Note

Activities are performed in an operation from top down.

- If you select an activity, a new activity is added after the selected activity.
 - If no activity is selected, a new activity is added as the last for the operation.
4. Click **Add Activity from Data Card** .

5. Type a string in the **Search by code** box to locate the time code from the data card and click **Search** .
6. Select the time code, and then type the **Quantity** and **Frequency**.
7. Select a time **Category** from the list.



8. Click **Create** to add the activity, or click **Create & Add More** to add more activities.
9. (Optional) Double-click the **Name** and **Activity Description** for an activity to edit the fields and provide details specific to your environment.
10. Click **Close** when you have added all activities to the operation.
11. (Optional) Click **Back to Balancing**  to return to the **Balancing** page.

Create activities and define roll-up time on operations

Time management

Time analysis

Use time analysis to assign approximate time values to operational activities that workers must perform to manufacture products on a line. Time analysis uses standard time elements from a time system. A *standard time element* is the historical, measured time used as a baseline that is required by an average skilled operator, working at a normal pace, to perform a specified task using a prescribed method.

Time Management (3 of 4 activities)								⊗ Delete	⛶ Add Activity	⊕ Search Activity
Operation: 002888/A;1-Op1				Duration: 15.84 sec						
Name	Activity De...	Code	Unit Time	Quan...	Freque...	Categ...	Work Time			
Treat, suppl...	Treat, suppl...	50M-BZH...25	5.76	2	1		11.52			
Body movemen...	Body movemen...	50A-KFA...46	4.32	1	0.5		2.16			
Response time ...	Response time ...	5MOS-AZ-A..O	1.08	2	1		2.16			

You use standard time elements to ensure that time calculations are accurately defined per your company standards. Process Planning for BTO/BTS/CTO supports the following time systems.

- TiCon integration
- Methods – Time – Measurement (MTM) Association

Access the Time Management panel

Use the **Time Management** panel to create or modify activities that workers must perform for specific operations to manufacture products on a line.

Procedure

1. Search for and open an existing work package, or **create** one and open it.
2. **Navigate** to work package planning tasks, and then **navigate** to the **Process Planning** page.
3. In the **Process** tab or panel, select an operation, and in the page toolbar, click **Show Time Management** .

The **Time Management** panel replaces the **Viewer** panel and displays a list of activities associated with the selected operation.

Time Management (3 of 4 activities)								⊗ Delete	⛶ Add Activity	⊕ Search Activity
Operation: 002888/A;1-Op1				Duration: 15.84 sec						
Name	Activity De...	Code	Unit Time	Quan...	Freque...	Categ...	Work Time			
Treat, suppl...	Treat, suppl...	50M-BZH...25	5.76	2	1		11.52			
Body movemen...	Body movemen...	50A-KFA...46	4.32	1	0.5		2.16			
Response time ...	Response time ...	5MOS-AZ-A..O	1.08	2	1		2.16			

- 1 The name of the operation selected in the **Process** panel. Below the operation name are the names and descriptions of all activities that are currently displayed in the **Time Management** panel.
- 2 **Duration** displays the sum of all currently displayed activity work time values in the selected operation, $11.52 + 2.16 + 2.16 = 15.84$. **Time units of measure**, in this case seconds, are displayed in the page header.
- 3 The activity code and **unit time values** for each activity.
- 4 The quantity and frequency, as well as the **time category** of activities to be completed. These values are editable and changes to them impact work time and duration.

Example

Changing the quantity of the **Response time** activity from a value of 2 to 4 doubles that activity's total work time to 4.32. The additional work time is added to the duration sum, $15.84 + 2.16 = 18.0$.

- 5 The **Work Time** column displays the total time necessary to complete the activity. Work time - unit time * (quantity * frequency).
4. (Optional) Create a time activity **from another activity** or **from an MTM**.
 5. To close the **Time Management** panel and return to the **Viewer** panel, click **Show Time Management** .

Create a time activity from another activity

Create an operational activity for use in time analysis by searching for a copy of a similar activity and reusing or modifying specific properties of that copy.

Note

Time activities require that your administrator sets the value of the preference **EP_TimeAnalysisMode = ACTIVITIES**.

Procedure

1. Access the **Time Management** panel.
2. In the **Time Management** toolbar, click **Search Activity** .
3. In the **Search Activity** dialog box, type a full or partial activity name and click **Search** .
4. Select the activity to be copied and edit any of the following to reflect the requirements of your new activity.
 - In the **Quantity** text box, type a different quantity for the number of activities to be completed.

- In the **Frequency** text box, type a different number to represent how frequently the activity must be completed.
 - From the **Category** list, select a different **time category**.
5. Do one of the following.
- To create the activity and define another activity, click **Create & Add More**.
 - To create a single activity and close the **Search Activity** dialog box, click **Create**.

The new activity or activities are created in the **Time Management** panel as new instances of the activity you selected in step 4, with the properties you modified.

Create a time activity from an MTM

You can create an operational activity for use in time analysis by accessing a Methods-Time Measurement (MTM) data card, if MTM data is configured by your administrator.

Note

Time activities require that your administrator sets the value of the preference **EP_TimeAnalysisMode = ACTIVITIES**.

Procedure

1. Access the **Time Management panel**.
2. In the **Time Management** toolbar, click **Add Activity** .
3. In the **Add Activity** dialog box, from the left tree panel, select a preferred data card.
4. In the selected data card, hover your mouse over cells in time-measurement unit (TMU) columns to read their descriptions.
5. To create a new activity as an instance of a TMU cell's properties, click the cell.
The new activity is created in the **Time Management** panel with the properties of the selected MTM.

Time categories

You assign one or more time categories to each activity type. These time categories are supported for time analysis:

- **NA** – A time category is not assigned. The **Category** box for the activity is gray.
- **VA** – Value-added activities are shown with a green **Category** box.
- **NVA** – Non-value added activities are shown with a red **Category** box.
- **NVABR** – Non-value added but required activities are shown with an orange **Category** box.

You assign time categories according to business practices. Time categorization affects how time is calculated and shown in reports.

You separate activities into categories so you can determine where time can be minimized for efficiency. For example, you may want to reduce how much time you spend doing non-value added activities such as walking. Below are several examples of value-added and non-value added activities.

Value added	Non-value added
Get and dispose part or tool	Walk
Position or apply	Enter or exit vehicle
Secure	Inspect
Assemble or subassemble	Track sheet
Route, connect, or clip	Scanning

Default units of time

During planning, you can view and change units of measure for time. A selection of default time units is provided for you, including those shown here.

Time unit	Multiplier to seconds
1/1000th min	0.06
1/100th min	0.6
1/10th min	6
FAC	0.18
MOD	0.129
TMU	0.036
day	86400
hour	3600
minute	60
second	1

Set time units of measure

You can set time units of measure for your project. Process Planning for BTO/BTS/CTO saves those units of measure for the project until you change them. In this example, time is measured in seconds.

In Process Planning for BTO/BTS/CTO 2.8, this feature is not supported on Internet Explorer. Use a different browser to set time units of measure.

Procedure

1. In the header, beside **Time Unit**, click the unit of measure.



2. Select a time unit from the **Time** drop-down list.

Time units of measure are updated for your project. Those units of measurement are saved for the project until you change them.

Tip

Hover over an object on the page (for example, a station, operation, or process resource) to display time-related data in a tool tip for that object.

Allocated time and weighted time

In the process station page, the **Operations** tab contains an **Operations** section. You must configure the product variants displayed on this tab.

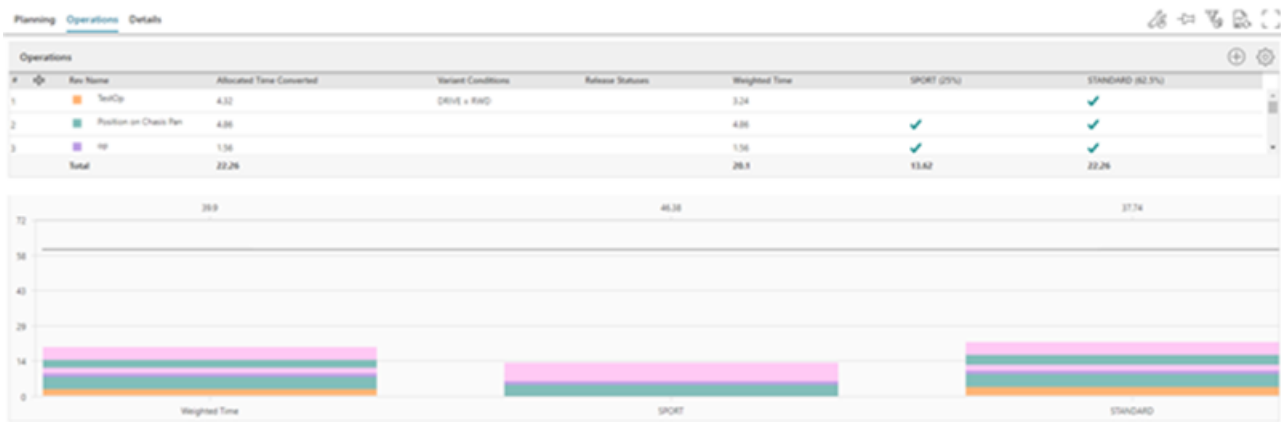
You can add, delete, and edit operations, depending on your user access rights. Editing an operation in the list changes its properties.

Allocated time is the sum of the time assigned to activities within the operation. It includes the time taken to perform the operation, including value-added, non-value added, and non-value added but required time. Because its value is rolled up, you must make changes to allocated time on the activities within the operation, rather than on the process station page. Allocated time is determined using the activity's time analysis, but if an activity has an assigned time system code, the assigned time is used instead of the allocated time.

Weighted time is automatically calculated using the following equation: (weighted time) = (allocated time) x (the assigned probability from the production program). You cannot edit weighted time directly in this chart.

Warning

Before you perform line balancing, verify that each operation's allocated time and variant probability are greater than zero. If either the allocated time or the variant probability for an operation is zero (or less), Process Planning for BTO/BTS/CTO ignores the operation during balancing.



Calculating station work content and remaining time

When you use a production program, operations may or may not have variants assigned to them. Process Planning for BTO/BTS/CTO calculates station work content and remaining time differently, depending on whether variants are assigned to an operation.

With variants

For an operation with variants, the active mode for calculating work content determines the operation time that displays in line balancing.

Process Planning for BTO/BTS/CTO uses two methods to calculate work content and time with variants:

- *Average work content mode* (default)—uses probability to weight the operation time, which then weights the station work content.
- *Minimum and maximum work content mode*—uses only the worst and best case variants of a particular station to calculate the work content.

Note

Probability is used only in conjunction with variants. See the *Teamcenter Manufacturing Process Planner* documentation for a description of variants and their effect on line balancing.

Without variants

Allocated time is how long it takes to complete a specific operation assigned to a process.

Station work content is the sum of allocated time for all operations assigned to a station.

Operation name	Allocated time
Obtain seat	17

Install seat	15
Secure seat	10
Station work content (total time)	42

Takt time is the time allocated to the station. It represents how long the product being manufactured remains within the station. On a moving line, the takt time is controlled by the speed of the line, the length of the station, and the distance between products being manufactured on the line (also known as the pitch).

The *station remaining time* represents the total time a station is idle of work, and is calculated using this equation:

Station remaining time = (station takt time) - (station work content)

Note

After operations are allocated, you can compare the workload of each station to balance the load between them. Your aim is to create a balanced line where the remaining time value for each station equals zero, meaning each station is occupied 100% of the time.

Calculating variant probability

Process Planning for BTO/BTS/CTO uses allocated time to calculate process and station work content. It can also calculate for variant probability, which is a percentage that describes how often the mix of products on a line includes a given variant.

If there are variants:

(station work content) = (time of assigned operations) x (operation's variant probability)

For example, consider the interior color variant in a certain plant: 40% of the time the interior is brown, 45% of the time the interior is red, and 15% of the time the interior is black. If the insert seat operation time is 20 seconds:

Operation name	Product program (variant)	Product program (variant) probability	Allocated time	Weighted time
Install seat	Brown interior	0.40	20	8
Install seat	Red interior	0.45	20	9
Install seat	Black interior	0.15	20	3

If all three operations are allocated to the same process area:

Operation name	Product program (variant)	Line balancing operation time
Install seat	Brown interior	8
Install seat	Red interior	9
Install seat	Black interior	3
Station work content		20

Balance the line

Edit operation frequency

You can edit operation frequency to produce a more accurate operation time.

Note

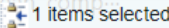
In the **Operation Frequency** field, the left number in the fraction is the **Repeats** value and the right number is the **Per Cycle** value. To calculate the total operation time, you multiply this fraction by the sum of the activities. For example, if the sum of the activities is 2, and the frequency is 1 repeat per 2 cycles (1/2), the operation total time is $2 * (1/2) = 1$.

1. **Search for and open or navigate to an operation.**
2. Click the **Time** tab.
3. In the summary row at the bottom of the table, click **Edit Operation Frequency** .
4. Type in new values for the operation frequency.

Reorder the activities

Procedure

1. Search and open or navigate to an operation.
The operation page is displayed.
2. Click the **Time** tab.
3. Drag an activity to the line in between two activities where it should take place.

Activities		
#	NAME	ACTIVITY DE...
1	Pick up, difficult, 1...	Pick up, difficu...
2	Treat, c... 	Treat, clean, c...
3	Put on and take o...	Put on and ta...

The order of activities is changed.

4. (Optional) Click **Back to Balancing**  to return to the **Balancing** page.

Edit or delete activities

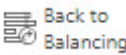
Edit activities

Procedure

1. Search and open or navigate to an operation.
2. From an operation page, select the **Time** tab.
3. Double-click the **Name**, **Activity Description**, **Quantity**, **Frequency**, or **Category** for an activity to type something different.

Activities  									
#	NAME	ACTIVITY DESCRIPTION	CODE	UNIT TIME	QUANTITY	FREQUENCY	CATEGORY	WORK TIME	
1	Pick up, difficult, 1 hand, EB 30	Pick up, difficult, 1 hand, E...	2000ASE30..4	0.89	2	1		0.89	
2	Treat, clean, compressed air/bn...	Treat, clean, compressed a...	50M-RAD...25	2.88	1	2		2.88	

The time code is used to add a new activity to the operation. A default **Name** and **Activity Description** is shown.

4. (Optional) Click **Back to Balancing**  to return to the **Balancing** page.

Delete activities

Procedure

1. Search and open or navigate to an operation.

The operation page is displayed.

2. From an operation page, click the **Time** tab.
3. Select the activities you want to delete.
4. Click **Delete** .
5. At the prompt, click **Delete** to permanently delete the object.
6. (Optional) Click **Back to Balancing**  to return to the **Balancing** page.

View production program information

If the manufacturing line you are planning contains either a mixture of products or products with options, you can display information about the production program, or variants.

Procedure

1. Navigate to your plant BOP.
2. Click **Show Production Program**  on the one-step commands.

What to do next

The **Production Program** dialog box appears. It shows information about the plant's assigned variants, production rate, and variant probabilities. You use this information during line balancing.

Production Program		
Rev Name	Production Rate	Probability
 BASE	40.00	40
 LUXURY	35.00	35
 SPORT	25.00	25
Total	100	100

Tip

You can create or edit this information using either the **Manage Work Package** page in Process Planning for BTO/BTS/CTO, or the Teamcenter rich client.

[View object details](#)

The **Details** tab displays properties according to the type of object you are viewing. The Teamcenter administrator can configure which properties display for objects in your environment.

Procedure

1. Search for and open or navigate to an object.
2. Click the **Details** tab.

You can view properties information for a plant BOP, process line, process area, process station, or operation.

This example shows the **Details** tab for a plant BOP object.

Planning		Details	
ID:	001367	Owner:	Pat (pat)
Revision:	A	Group ID:	Planner.Engineering
Item Type:	Plant BOP	Creation Date:	21-Mar-2019 16:23
Rev Name:	Toy_Car_PLBOP	Last Modified User:	Pat (pat)
Rev Description:		Last Modified Date:	21-Mar-2019 10:35
performance Rating Factor 100.00 (%)			
Time Allowance (%): 0.00			

View operation details

You can open an operation to review related time, parts, tools, and activities information.

1. Search for and open or navigate to an operation.

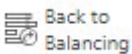
Note

Activities in the **Time** tab are measured in seconds. This time is rolled up to the **Activities Time** for the parent operation. The **Activities Time** should be equal to or less than the allocated **Operation Total Time**.

2. Click the **Time** tab.
3. Review data related to the operation.

The summary row at the bottom of the **Activities** table displays:

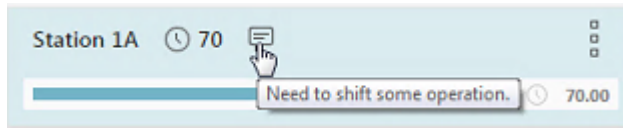
- **Activities Time (seconds)** – The sum of all activity times, without consideration of the frequency.
- **Operation Frequency** – The frequency of the operation. You can view and edit the operation frequency to produce a more accurate operation time.
- **Operation Total Time** – The allocated time of the operation, which is the total activity time multiplied by the frequency.

4. (Optional) Click **Back to Balancing**  to return to the **Balancing** page.

Manage station comments during line balancing

During line balancing, you can use the comments feature to add notes about changes you make. This helps you track planning changes and avoid confusion when multiple planners work within the same structure.

If a station contains comments, the station displays a comment bubble. Hover over the comment bubble to review the comments.

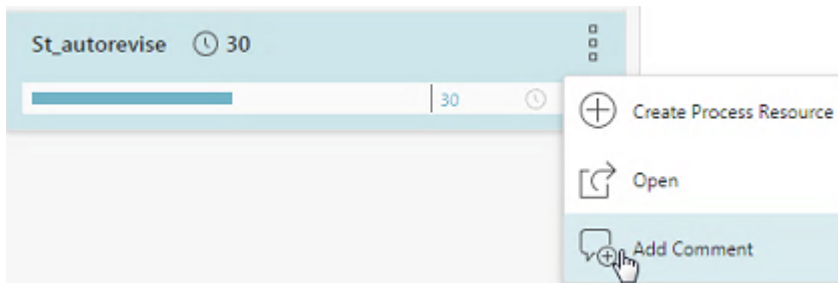


Add or edit a comment

Use these steps to add or edit comments to a station.

Procedure

1. In the plant bill of process (BOP), navigate to a process area or process line and click the **Balancing** tab.
2. Select a station tile, click **More** , and select **Add Comment**.



3. Type text in the **Add Comment** dialog box, and click **Done**.

Note

If a station is released, a message displays stating that the object must be revised to complete the action. If you add, edit, or delete a comment, that is considered a revision to the station.

Click **Yes, Revise**.

Delete a comment

Use these steps to delete an existing comment from a station.

Procedure

1. In the plant BOP, navigate to a process area or process line and click the **Balancing** tab.
2. Select a station tile, click **More** , and select **Edit Comment**.
3. Click **Delete comment for this station**.

The comment permanently disappears from the station.

Note

If a station is released, a message displays stating that the object must be revised to complete the action. If you add, edit, or delete a comment, that is considered a revision to the station.

Click **Yes, Revise**.

Author production program and evaluate balancing by variants

Product configurations

Analyzing product configurations

If you work with product configurations (variants) during line balancing, you can **filter data by product variant to identify production bottlenecks**. You can use this information to determine which variants use the minimum and maximum amounts of time, and reassign resources and operations as needed.

Production Process Planning supports both classic variants and Product Configurator variants; however, you cannot use a mixture of classic and Product Configurator variants in the same structure.

Note

Your Teamcenter administrator must configure and enable Product Configurator in your environment before you can filter and view data that uses the Product Configurator variant functionality.

If you use Product Configurator variants, **verify that your environment meets prerequisites**.

You perform the following tasks to analyze product configurations:

- **Analyze existing variant formulas on operations.**
- **Define the variant formula.**
- **Filter by product variant.**
- **Review variant time distribution** to balance the line.

Optimize product configuration on the balancing page

During line balancing, you can optimize the balancing of each variant by operation.

Note
With classic variants, you work with the variant condition, and with Product Configurator variants, you work with the variant formula. You use this same procedure to refine the variant condition or formula in your environment.

Procedure

- 1. In the plant bill of process (BOP), **open or navigate to a process area or process line** and click the **Balancing** tab.
- 2. Select a station, and select an operation or multiple operations.

Operations (ST 30)

Assign to...

Cut

Copy

Delete

Open Details

Open Variant...

Maximize

Vertically

Rev Name	Allocated Time Converted	Associated Process Resource
OBTAIN AND INSTALL BREMBO ...	17.00	
OBTAIN AND INSTALL ROTOR T...	21.00	Operator 30
SECURE ROTOR WITH LOCK NUT	19.50	Operator 35
SECURE ROTOR WITH LOCK NUT	9.00	Operator 30

- 3. Click **Open Variant Formula**  .
The **Variant Formula** dialog box opens.

Show Families

Initial Validation

Start Edit

Filter	001188/A...	001189/A...	001190/A...	001191/A...	
[Teamcenter]doors					
4	✓			⊘	
5		✓			
[Teamcenter]engine					
1.6	⊘				
2.0					

Within the **Variant Formula** dialog box:

- Each operation that you selected is a table column.

- Table cells indicate the status of variant formulas for each operation. A check mark in a table cell indicates that a formula is defined for that operation.
 - The variant families or options are listed as table rows.
 - The caret in each column heading opens a drop-down menu with additional options for that operation.
4. Click **Show Families** to expand the **Filter** column.
5. Click **Start Edit**  .
6. Click inside a table cell to add a variant formula to an operation.
A check mark is displayed in the table cell.
7. (Optional) Click inside a table cell to remove a variant formula from an operation.
8. Click **Save Edits**  , and click **X**.
Process Planning for BTO/BTS/CTO returns to the **Balancing** tab. The **Variant Formula** column displays defined variant formulas for each operation within the station.

Operations (ST 30) (2 missing time allocations)

Rev Name	Variant Formula
 OBTAIN AND INSTALL BREMBO ...	[Teamcenter]doors = 4 AND [Teamcen...
 OBTAIN AND INSTALL ROTOR T...	[Teamcenter]doors = 5 AND [Teamcen...
 SECURE ROTOR WITH LOCK NUT	[Teamcenter]doors = 5 AND [Teamcen...
 SECURE ROTOR WITH LOCK NUT	(([Teamcenter]doors = 5 AND [Teamce...

What to do next

Tip
In the **Overview** section click **Product Variant** and select a variant family or condition to filter data by the selected product variant. You can also select **Weighted** to see the weighted time for all product variants.

10. Layout planning

Overview of Teamcenter Manufacturing Access

Teamcenter Manufacturing Access prerequisites

Before you start working in Teamcenter Manufacturing Access, verify that your data meets these prerequisites:

- The structures you work with must be inside a collaboration context.
- The studies you created outside of Teamcenter Manufacturing Access tools must be attached to the collaboration context using a workflow.
- You must create all new studies using Teamcenter Manufacturing Access tools.

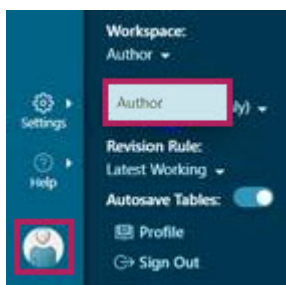
Run Teamcenter Manufacturing Access in the Author workspace

Change from the current workspace to the Author workspace.

You must run Teamcenter Manufacturing Access in the Author workspace mode to ensure that Study Manager works properly. If Study Manager does not load correctly in the Teamcenter rich client or in Process Simulate, you are not in the Author workspace.

Procedure

1. Open a standalone web browser.
2. Type **http://hostname:3000/#/showHome** in the address bar.
This is the Active Workspace URL.
The browser launches an Active Workspace session.
3. In the Active Workspace session, click **User** and change the workspace to **Author**.



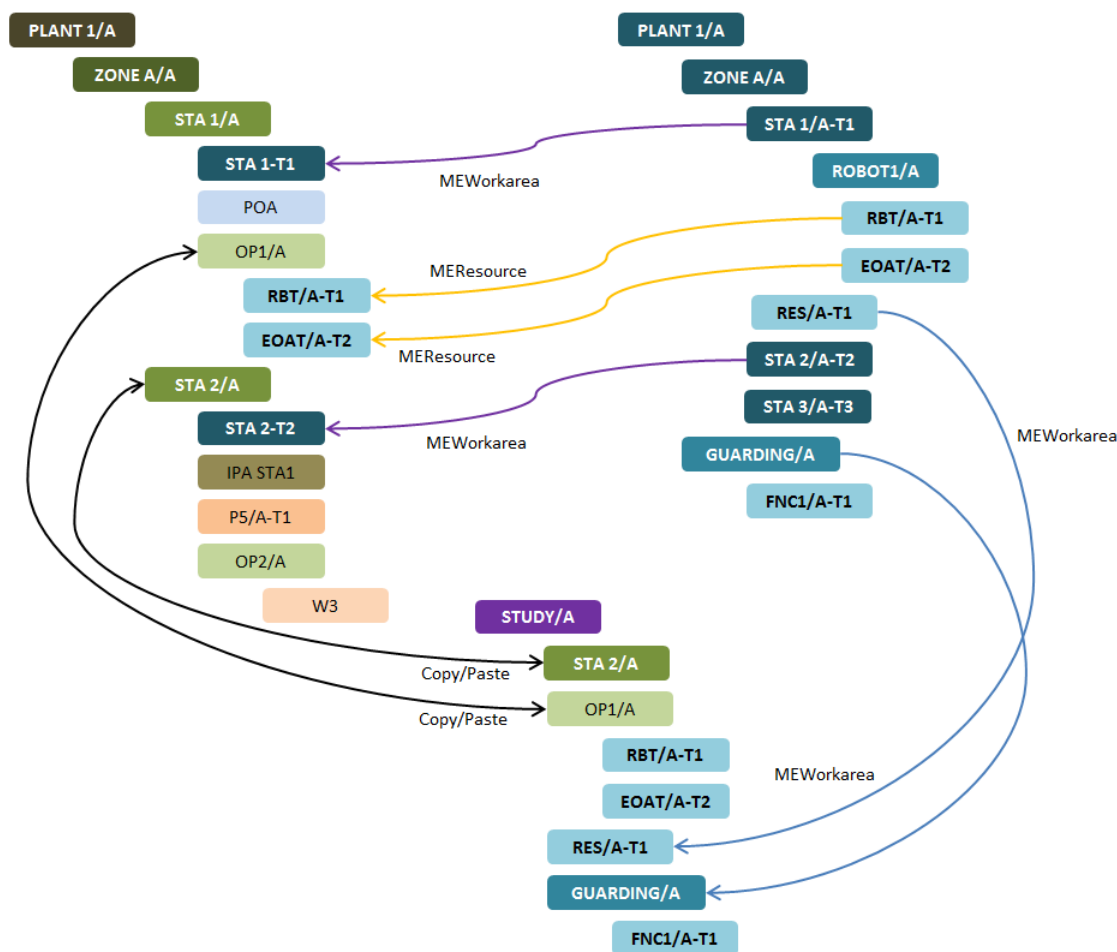
4. Clear the browser cache.
5. Open Study Manager in the Teamcenter rich client or in Process Simulate.
Now that you are in the Author workspace, Study Manager loads correctly.

Study overview

Study introduction

Studies (subscopes) can be used to define a scope of work. You can use studies to further refine the content of a station using Teamcenter, Process Simulate, or NX.

In order to properly validate and/or simulate information, it is often necessary to temporarily bring together information from different scopes into a single, common scope. This is accomplished by creating a study object that is specifically intended to manage these scopes. You add the station process and any related product and resources to the study. You then manually copy and paste any additional resources that are needed, but not related, such as conveyors or guarding, that are not part of the station resource.



Types of studies

There are two types of studies:

- Shared Study**  – The study can contain processes (with assigned product, features, and resources) and plant structure. Any changes made in a study are directly reflected in the source structures.
- Isolated Study**  – The study can contain processes (with assigned product, features, and resources) and plant structure. Any changes made in a study to plant structure are directly reflected in the source structures. However, changes made to the process structure are stored only in the study and are not reflected in the source process structure.

Business processes involving Teamcenter Manufacturing Access

Business process 1 – Process planning using Manufacturing Process Planner

When you **prepare to do process planning** using Manufacturing Process Planner, you need to use Teamcenter Manufacturing Access to create, search, and load studies.

Role	Task
Administrator	Administrators install and configure the environment and convert studies.
Process planner	Engineers in planning groups use the Teamcenter rich client to perform planning tasks. These tasks are performed in Teamcenter Manufacturing Process Planner. See the <i>Manufacturing Process Planner</i> documentation for details.

Business process 2 – Process plan validation using Process Simulate

When you **prepare to do process validation** using Process Simulate on Teamcenter, you need to use Teamcenter Manufacturing Access to create, search, and load studies. You also may need to insert additional resources or manufacturing features using Teamcenter Manufacturing Access.

Role	Task
Administrator	Administrators install and configure the environment and convert studies.
Simulation engineer	Engineers need to validate that the designed processes are doable. See the <i>Process Simulate on Teamcenter</i> documentation for details.

Business process 3 – Designing a fixture using NX Fixture Planner

When you **prepare to do fixture planning** using Manufacturing Process Planner, you need to use Teamcenter Manufacturing Access to create, search, and load studies.

Role	Task
Administrator	Administrators install and configure the environment and convert studies.
Fixture planner	Engineers need to use available information to design the fixtures used to manufacture the product. See the <i>NX Fixture Planner</i> documentation for details.

Create, load, revise, and release study

Sync and publish isolated studies from Study Manager

From within Study Manager, you can synchronize or publish an isolated study without using Manufacturing Process Planning (MPP) to refresh or publish the bill of process (BOP). This feature supports time-based and event-based modes.

Restrictions and limitations

You must be using Teamcenter Manufacturing Access version 6.3.3 or later to use this feature.

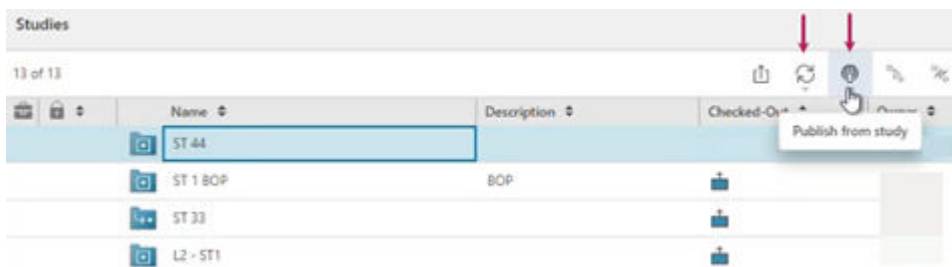
Prerequisites

The data in your study must meet the following requirements:

- You must have write access to all data within your study.
- If any objects within your study have a status of released, you cannot publish or sync the study.

Procedure

1. Open a study in **Study Manager**.
2. (Optional) To publish an isolated study, click **Publish from Study** and select one of the following options.
 - **Event based**—partially synchronizes or publishes an isolated study to incorporate changes since its last synchronization or publication.
 - **Time based**—fully synchronizes or publishes the entire study.



All changes that were made in the BOP during the study are updated in the original BOP, and a message indicates that the study is published.

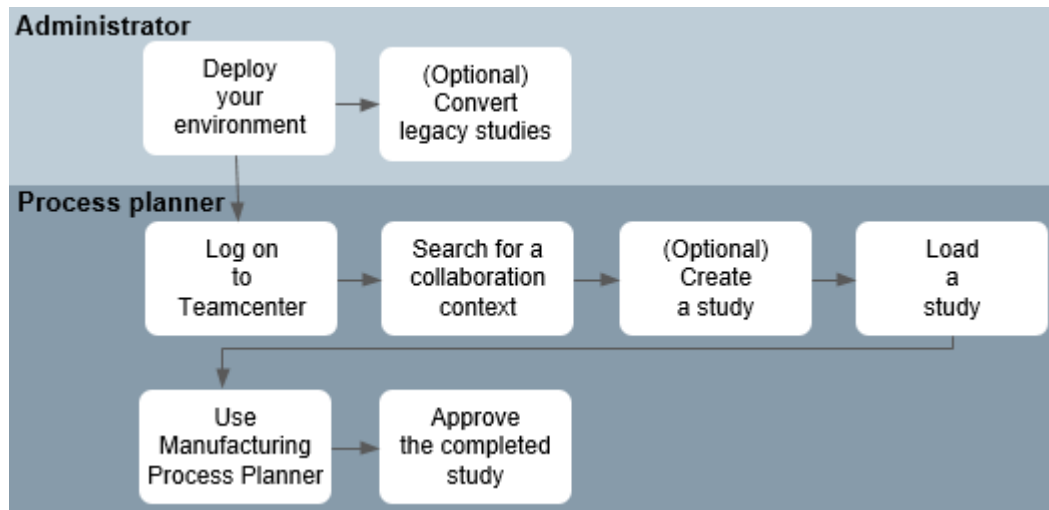
3. (Optional) Select **Sync Study** and select one of the following options.
 - **Event based**—partially synchronizes or publishes an isolated study to incorporate changes since its last synchronization or publication.
 - **Time based**—fully synchronizes or publishes the entire study.

All changes from the master BOP are synchronized into operations in the isolated study, and a message indicates that the study is synchronized.

Use Teamcenter tools to manage study

Use Teamcenter Manufacturing Access while planning a process

When you perform process planning using Teamcenter Manufacturing Process Planner, you create, search, and load studies.



Administrator

Your administrator completes the following data setup steps:

See the *Teamcenter Easy Plan* Deployment documentation.

1. Install and configure Teamcenter and Teamcenter Manufacturing Access.
2. **Convert studies** created before using Teamcenter Manufacturing Access with a workflow.

Process planner

The process planner completes the following steps in Manufacturing Process Planner:

1. Log on to the Teamcenter rich client and open the Manufacturing Process Planner application.
See the *Teamcenter Manufacturing Process Planner* documentation.
2. Search for a collaboration context using the Study Manager, and look at its studies.

Note

The **Study Manager** is available to Manufacturing Process Planner users with Teamcenter Manufacturing Access configured. If after searching, you cannot find a study for the desired purpose, **create a study** using the **Study Manager**.

3. **Load a study** using the **Study Manager**.
4. Use Manufacturing Process Planner to begin planning a process.
See the *Teamcenter Manufacturing Process Planner* documentation.
5. Approve the completed study by **setting the status** for briefcase export using the **Study Manager**.

Managing studies in Manufacturing Process Planner

Study basics

Working with studies

After you **open a study** from the **Study Manager** view, you see one of these study types:

- Shared study

In the **Study Manager**, a shared study uses this icon . In other **Manufacturing Process Planner** views, a shared study uses this icon .

- Isolated study

In the **Study Manager**, an isolated study uses this icon . In other **Manufacturing Process Planner** views, an isolated study uses this icon .

Sync and publish to studies

The sync and publish buttons are typically not needed for shared studies. They are frequently used with isolated studies. Isolated studies are normally used for event-based work in Process Simulate or as a way to set up alternative processes. When using isolated studies, the study contains alternate processes and operations, but has shared resources.

There are several commands related to isolated studies:

- **Synchronize to Study**  – Updates the processes and operations in the study.
- **Publish from Study**  – Updates the processes and operations in the process structure.

For more information, see the *Teamcenter Manufacturing Process Planner* documentation.

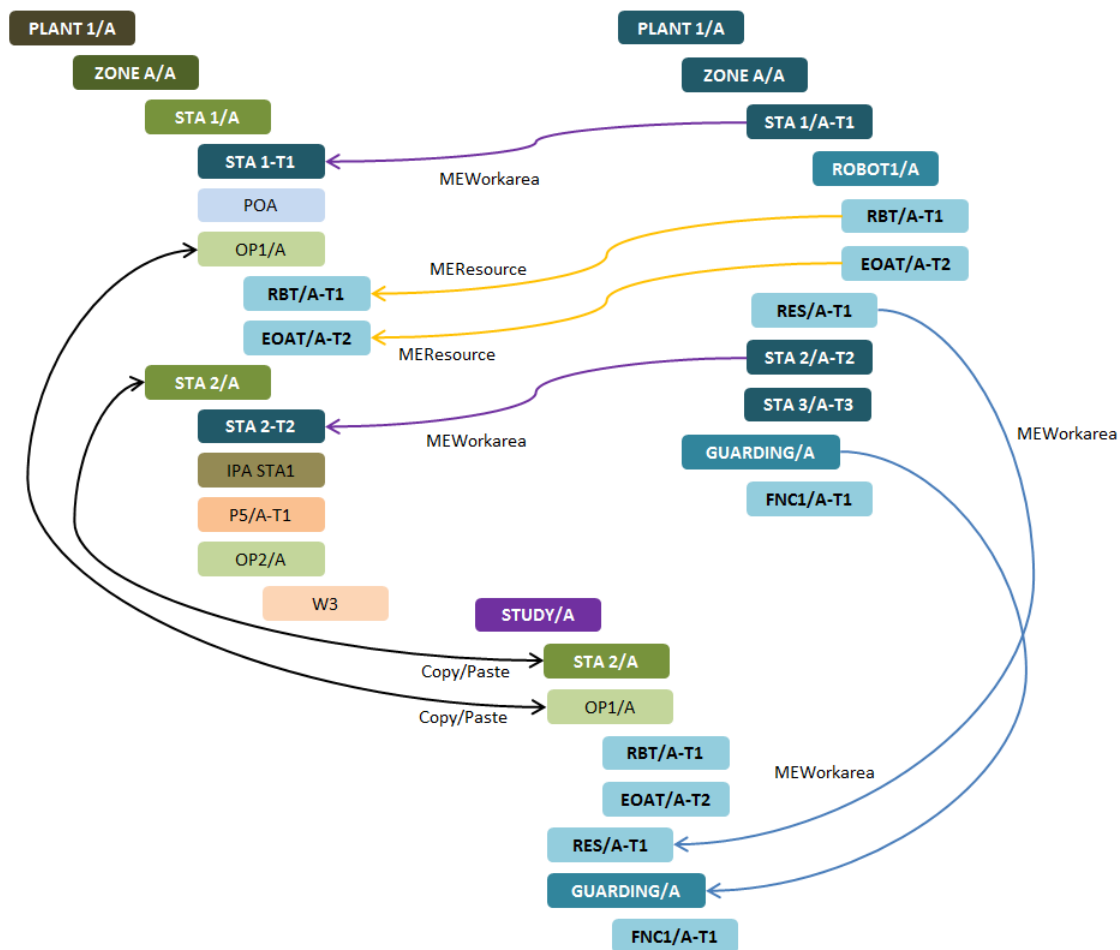
Adding operations to studies

To add operations from another station into a study, a copy and paste can be used. As data associated to these operations is shared, it is updated in all places. The user should take care to put only operations into

the study that they intend to update, for example, **OP1** in the diagram below. As this operation is linked to specific resources from **Sta1**, it is also included in this study.

Adding resources to studies

Additional resources that are not included as children to the linked station from the plant structure (BOE), can also be added to the study. These resources may be added to the study in order to evaluate adjacent clearances. If there is no intention to move a resource while performing the study analysis, then the resource should be added to the study by assigning as a **MEWorkarea** directly to the study process (**RES/A** in the diagram). However, if there is a requirement to reposition a resource and the user would like this information to be propagated back to the plant structure (BOE), then the immediate parent to the resource should be assigned as **MEWorkarea** instead. See **GUARDING/A** in the diagram below.



Study Manager

Note

Teamcenter Manufacturing Access must be installed and configured to use **Study Manager**.

You can use **Study Manager** to:

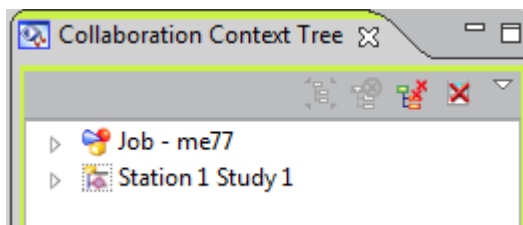
- View all studies in a collaboration context tree.
- View only those studies in a particular process or plant structure contained in that tree (the structure or zone itself, the stations within it, and operations inside those stations).
- View multiple process or plant structures in separate **Study Manager** views.
- Verify if an existing study might already meet your needs before creating a new study.
- Create a new study.
- Open a study.
- Load a study directly into Process Simulate and run a simulation.

Locate a study using Study Manager

View studies in the Study Manager

Procedure

1. In the Manufacturing Process Planner, open the **Collaboration Context Tree** view.



2. (Method 1) View all the studies of the collaboration context:
 - In the **Collaboration Context Tree** view, right-click a collaboration context and choose **Open with** → **Study Manager**  to open a new **Study Manager** view.
 - In the **Collaboration Context Tree** view, select a collaboration context and choose **Set input to recent selection**  to switch the active object in the **Study Manager**.

The **Study Manager** view displays all the studies of the collaboration context. This list may include several hundred studies.

3. (Method 2) View all the studies associated to the selected process object or its subprocesses:

- In the process structure, right-click a process object and choose **Open with → Study Manager**  to open a new **Study Manager** view.
- In the process structure, select a process object and choose

Set input to recent selection  to switch the active object in the **Study Manager**.

The **Study Manager** view displays all the studies associated to the selected object and its subprocesses. You can use this technique to narrow the list of studies shown in the **Study Manager**.

The study properties are displayed in columns, for example, **Name**, **Owner**, **Description**.

4. Select a study.

(Optional) View the study properties

Procedure

1. View studies in the **Study Manager**.

The studies are displayed in a table. Each column is a property of a study revision object. You can configure the columns that are displayed in this table. The columns are stored in the **TCMA_StudyMgrStudyGrid_Column** user preference.

2. In the **Study Manager** view, click **Table Columns**  and choose **Select Columns**.

The **Columns Selector** dialog box is shown.

3. By default, 17 properties of a study revision are shown in the **Available Fields** list.

You can enter part of the name of the column you wish to display in the **Filter** to find it easily.

The contents of the **Available Fields** list can be configured by your administrator. See the *Teamcenter Manufacturing Access Deployment* documentation for details.

4. (Optional) Select the properties to add from the list on the left and click **Add** .

For example you could add **Release Status** and **Is Approved**.

5. (Optional) Select the properties to add from the list on the right and click **Remove** .

6. (Optional) Drag the properties on the right to change the order of the columns.

7. Click **OK**.

The new properties are displayed in the table.

(Optional) Sort and organize table columns

Procedure

1. View studies in the **Study Manager**.
2. (Optional) To reorder the columns: In the **Study Manager** view, drag a column header and place it in between two others.
For example, drag the **Description** column to the left of the **Object** column.
3. (Optional) To sort the studies by a property: In the **Study Manager** view, click a column header.
For example, sort by the **Object** column.

(Optional) Filter the list of studies by name

Procedure

1. View studies in the **Study Manager**.
2. In the **Study Manager** view, type part or all of a study name in the **Search** box.
For example, type **sh**.

Note

You cannot use wildcards (*) in your search (for example, **Isolate***).

3. Press Enter or click **Search** .

A subset of studies are shown.

All studies with names that begin with **sh** are displayed and all other studies are hidden. The search string is highlighted in yellow in the study name and description.

(Optional) Filter the list of studies using a study property

Procedure

1. View studies in the **Study Manager**.
2. In the **Study Manager** view, click the down arrow  to the right of the **Search** box, and choose an object property.
For example, you could select **Owner**, then type either the user's name or ID in the parenthesis.
You can add additional properties to the search string, for example, **Name(me00), Description(Big)**.
You can also type the search string manually.

Note

Your administrator can customize the properties listed in this field.

3. Type in a value, and press **Enter**.

Create a study in Study Manager

If you want to use a study in **Study Manager** view or the **Load Study** dialog box, you must create the studies in **Study Manager**. Any studies created using the legacy **New Study** command must be **converted** before they can be used.

Procedure

1. In the Manufacturing Process Planner, right-click the collaboration context, an object in a process structure, or an object in the plant structure, and choose **Open with → Study Manager** .

The **Study Manager** view opens.

Tip

To switch the active object in the Study Manager, select a different object and choose **Set input to recent selection** .

To open a second **Study Manager** view, right-click a different object and choose **Open with → Study Manager** .

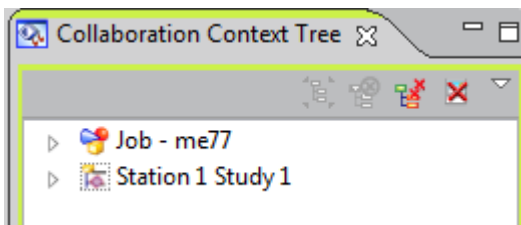
2. In **Study Manager** view, click **Create Study** .

The **Create Study** dialog box opens.

3. In the **Create Study** dialog box, select **Isolated Study**  or **Shared Study** .
4. Type a name and optional description.
5. Click **Create**.

The new study is shown in the **Study Manager** view.

The new study is also shown in the **Collaboration Context Tree** view.



The study is now attached to the collaboration context, but its relation is not shown by default in the **Collaboration Context Tree**. Your environment may contain hundreds of studies, and showing the relation for each study would cause the data to load slowly.

6. Copy the structures you want into the new study. You can add one or more of the following to the study:

- Process area objects from the process structure.
- Work area and resource objects from the plant structure.

Note

The objects that you add directly to a study are the root objects, which are searchable.

The new study opens in its own view and appears at the bottom of the collaboration context tree.

You can see it in **Study Manager** when you select the collaboration context and click .

Remove study in MPP

Procedure

1. In the Manufacturing Process Planner, right-click the collaboration context, an object in a process structure, or an object in the plant structure, and choose **Open with → Study Manager** .

The **Study Manager** view opens.

Tip

To switch the active object in the Study Manager, select a different object and choose **Set input to recent selection** .

To open a second **Study Manager** view, right-click a different object and choose **Open with → Study Manager** .

2. In **Study Manager** view, select a study.
3. Click **Remove Study**  and click **Remove**.

The study is removed from the collaboration context. However, it still exists in the database and you can reattach it to the collaboration context using the Manufacturing Process Planner.

Open a study with Study Manager

Procedure

1. Locate a study using Study Manager.
2. Open a study by selecting it in the **Study Manager** and clicking **Open** .

A view is opened for the study.

Load a study into Process Simulate

You can load a study directly into Process Simulate from Study Manager. Teamcenter Manufacturing Access keeps the collaboration context configuration when you load the study into Process Simulate.

Note

Your administrator must configure Process Simulate on Teamcenter before you can use this feature.

Procedure

1. Use Study Manager to locate and view a list of studies.
2. Select a study.
3. Click **Load in Line Simulation Mode**  or **Load in Standard Mode**  to load the study in Process Simulate.

What to do next

Teamcenter Manufacturing Access loads the study directly into Process Simulate. Process Simulate uses the same collaboration context configuration to display the study.

Set study status

In the **Study Manager** dialog box, the **Set Status**  command becomes available when you select one or multiple studies. This command is used to add or remove a status on the selected study using workflows.

Note

Your administrator must configure what status and workflows are used by the command to apply and remove the status. The Briefcase default is the approved status. However, there is no default workflow used by the **Set Status**  command.

Example business process

1. After completing the tasks for a milestone, a planner at a supplier uses the **Set Status**  command to approve a study for inclusion in a Briefcase export back to the OEM.
2. The data manager at the supplier creates a Briefcase export of all approved studies.
3. The simulation engineer uses the **Set Status**  command to remove the approved status before working on the next milestone.

Manage the status of a study using Study Manager

Add a status to the study

Procedure

1. Locate a study using the **Study Manager** view.
2. In the **Study Manager** view, select one or multiple studies.
3. Click **Set Status**  → **Approved**.
Status is added to the study object.

View the status of a study

Procedure

1. Locate a study using the Study Manager.
2. In the **Study Manager**, choose **Table Columns**  → **Select Columns**.
The **Columns Selector** dialog box is shown.
3. In the **Columns Selector** dialog box, type **stat** in the **Available Fields** box.
4. In the **Columns Selector** dialog box, select **Release Status** in the list of available fields, click **Add** , and click **OK**.
The **Release Status** column is added to the table.

Remove a status from the study

Procedure

1. Locate a study using the Study Manager.
2. In the **Study Manager** view, select one or multiple studies.
3. Click **Set Status**  → **Remove Approve State**.
Status is removed from the study object.

Convert study objects

Overview of the conversion process

If your Teamcenter database contains study objects created in the **Manufacturing Process Planner** using **File → New → Study** , you must convert them so that they can be seen in Teamcenter Manufacturing Access and the Teamcenter **Study Manager** view. The conversion process is performed using a Teamcenter workflow named **Attach_studies_to_cc**.

Convert legacy studies

If you are using Teamcenter Manufacturing Access to create and load your studies, you can no longer use **File → New → Study**  to create studies. Studies should be created in the **Study Manager** view in Manufacturing Process Planner. Legacy studies—studies that you created before working with **Study Manager**—must be converted to view them in the **Study Manager** view and **Load Study** dialog box.

Note

Converting a study allows it to work with Teamcenter Manufacturing Access, however, legacy tools and methods of opening and using studies continue to work.

Procedure

1. In Manufacturing Process Planner, select the process object with the associated study and choose **Tools → Search Study** .
2. From the search results view, double-click the study to open and display it in the **Collaboration Context**.
3. In the **Collaboration Context**, select one or many studies, as well as the collaboration context object.
4. Select **File → New → Workflow Process** .
The **New Process** dialog box is opened. The selected collaboration context and studies are shown in the **Targets** folder of the workflow to be created.
5. For the **Process Template**, choose **Attach_studies_to_cc**.
If the **Attach_studies_to_cc** process template is not shown, select **All** for the **Process Template Filter**.
6. (Optional) Add a configuration context to the **Targets** folder.
If a configuration context is not specified, the workflow references the **Latest Working** revision rule.

Note

Your administrator can configure the workflow to create or share a configuration context for each study structure context. See the *Teamcenter Manufacturing Access Deployment* documentation.

7. Click **OK**.
The study is now converted and attached to the collaboration context object. By default, this attachment relation is hidden.

What to do next

Note

In Teamcenter 11.2.3, Study Manager studies are only visible when the collaboration context is set as the current object. This issue is resolved in Teamcenter 11.3 and higher.

Perform the study conversion

The **Attach_studies_to_cc** Teamcenter workflow connects legacy studies to a collaboration context object. Studies that are connected to a collaboration context object can be viewed in the Teamcenter Manufacturing Access and the Teamcenter **Study Manager** view.

Note

Each study is placed in a new structure context object within the collaboration context and is related to the structure context using the **Mfg0CCStudyRel** relation.

Procedure

1. Log on to the Teamcenter rich client.
2. In the Teamcenter rich client, open a collaboration context using the **Manufacturing Process Planner**.
The collaboration context is shown in the **Collaboration Context Tree** view.
3. Search for studies related to process objects in the collaboration context using **Tools → Search Study** .
4. Open the studies from the **Search Study Results** view.
The studies are shown in the **Collaboration Context Tree** view.
5. In the **Collaboration Context Tree** view, select the collaboration context and studies.
6. Choose **File → New → Workflow Process**.
The **New Process** dialog box is opened. The selected collaboration context and studies are shown in the **Targets** folder of the workflow to be created.
7. In the **New Process** dialog box, select **Attach_studies_to_cc** for the **Process Template**.
If the **Attach_studies_to_cc** process template is not shown, select **All** for the **Process Template Filter**.
8. (Optional) Add a configuration context to the **Targets** folder.
If a configuration context is not specified, the **TCA0_attach_studies_to_cc** action handler references the **Latest Working** revision rule by default using the argument **-revision rule** with the value of **Latest Working**.

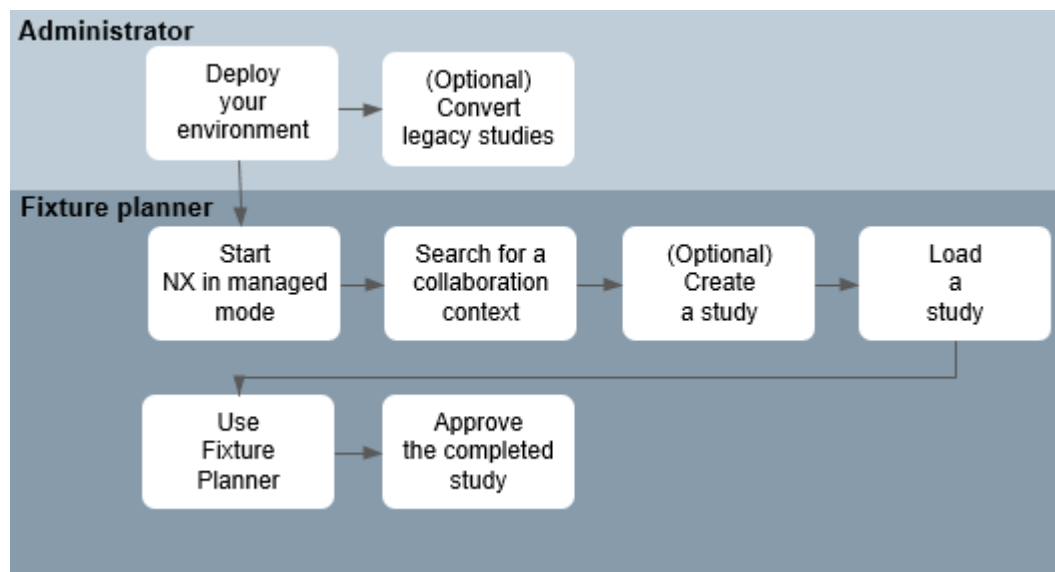
A configuration context can be created shared for each study structure context. To share it, use the argument **-config context** with the value of **share**.

9. Click **OK**.
10. In the **Collaboration Context Tree** view, right-click the collaboration context and choose **Open with** → **Study Manager** .
The related studies are shown in the **Study Manager** view.

Use NX tools to manage study

Use Teamcenter Manufacturing Access while designing a fixture

When you perform fixture planning using NX, you need to create, search, and load studies.



Administrator

See the *Teamcenter Manufacturing Access Deployment* documentation.

Your administrator completes the following data setup steps:

1. **Deploy your environment**
Install and configure NX, Teamcenter, and Teamcenter Manufacturing Access.
2. **Convert legacy studies**
Convert studies created before using Teamcenter Manufacturing Access using a workflow.

Fixture planner

The fixture planner completes the following steps in NX:

1. **Start NX in managed mode**
See the *NX* documentation.

2. Search for a collaboration context using Study Manager, and review its studies.

Note

The **Study Manager** is available to NX Fixture Planner users with Teamcenter Manufacturing Access configured.

3. (Optional) Create a study

If after searching, you do not find a suitable study, **create a study** using the **Study Manager**.

4. Load a study using the Study Manager.
5. Use NX Fixture Planner to begin designing a fixture.

See the *NX Fixture Planner* documentation.

Study Manager for fixture planning

Teamcenter Manufacturing Access is developed on top of the Active Workspace platform and is the technology behind the NX Fixture Planner **Study Manager** tab of the resource bar. This tab enables fixture planners to perform more of their tasks within NX and reduces the dependency on the Teamcenter rich client.

Using the **Study Manager** tab of the resource bar, fixture planners can do the following:

- Search for a collaboration context, and view a list of its studies.
- Set the project on which you are currently working, so you can see the project's related collaboration contexts and studies.
- Create a study.
- Edit study contents.
- Load a study into NX.

Note

Fixture Planner is an application within Teamcenter Integration for NX that you can use to design and manage the stations and other components using resources stored in Teamcenter. For more information see the *NX Fixture Planner* documentation.

Modifying session settings in NX Fixture Planner

As a fixture planner, you can modify the user name, current project, role and user group under which you are working in Study Manager before you load a study. Modifying any of these settings impacts the data that is loaded, and any new data that is created.

Note
Full functionality for this feature is available with NX Fixture Planner 12.0.2 or later. If you are running earlier versions of NX Fixture Planner, you can see settings information, but you cannot change it.

This table provides information about how session settings behave in Study Manager.

Note
The use cases in the following table depend on the Teamcenter configuration in your environment. For more information, contact your Teamcenter administrator, or refer to the Teamcenter Active Workspace Deployment documentation.

If you...	Then...
Change session settings in Study Manager	Teamcenter Manufacturing Access loads those settings the next time you start Manufacturing Process Planner or NX Fixture Planner.
Close Study Manager while working with updated session settings	The next time you launch Study Manager, it displays the last session settings in which you were working.
Do not have access to a process, project, or plant	That data does not display for you in the collaboration context.
Switch projects, user, or group roles	Access to data you can view does not change. You are able to access only data to which you are assigned.
Do not have access to studies within a loaded collaboration context	Those studies do not display for you in the collaboration context.
Change your user, group, or role while a study is loaded in NX Fixture Planner	A message warns you that the current study will be unloaded. - Click Yes: Current study is not loaded, and any unsaved changes are lost - Click No: The change you intended to make is canceled, and you can continue working in the current study

Modify session settings in NX Fixture Planner

The **Study Manager** dialog box contains a header that lists your session settings (user name, current project, role, and group). Use this process to modify session settings in NX Fixture Planner.

1. In the **Study Manager** dialog box header, click a session setting. For example, click the project.
2. Select a different session setting (in this example, a project) from the drop-down list.
 - Study Manager refreshes the page with data for the setting you selected.
 - After you select a new session setting, any new data you create (for example, a study or station) is affected by the selected session. For example, if you select a different project and create a new station, that station is assigned to the project you selected.
 - When you close this session, the next time you open Study Manager, the session settings you selected are applied.

Locate a study using the Study Manager

In NX, fixture planners use the **Study Manager** tab of the resource bar to search for and load studies in a particular collaboration context object. When using this dialog box, it is not necessary to search for structures in the Teamcenter rich client and send them to NX.

Note

If you want to be able to use a study in the NX **Study Manager** tab of the resource bar, you must create the study in the Teamcenter, NX, or Process Simulate **Study Manager** dialog box. Any studies created using the legacy **New Study** command must be **converted** before they can use used.

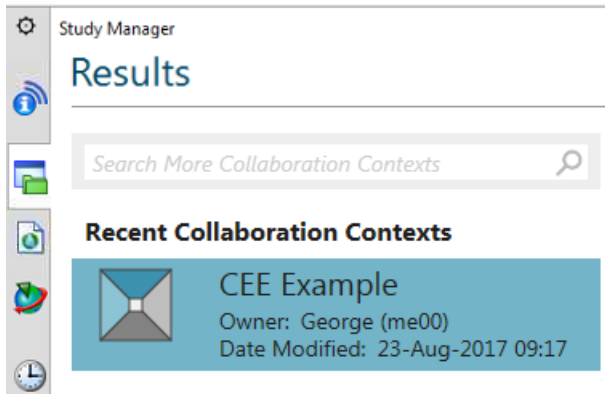
Note

For detailed information on collaboration contexts, see the *Tecnomatix Collaboration Context Reference Manual*.

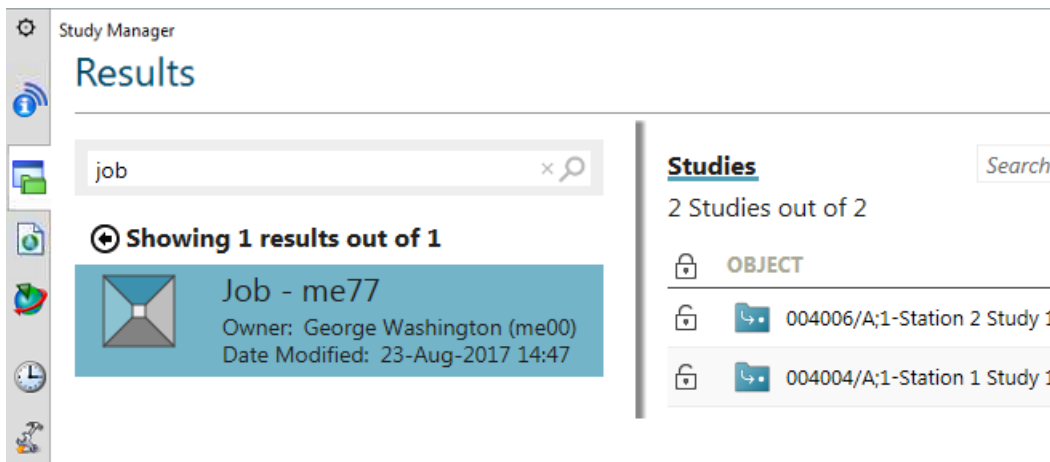
View studies using the NX Study Manager

Procedure

1. From the NX Fixture Planner resource bar, choose the **Study Manager** tab.
The **Study Manager** view appears, listing the most recent collaboration contexts you opened in the **Recent Collaboration Contexts** list.



- (Optional) In the **Search More Collaboration Context** box, type a search string to search for a collaboration context.



- Select a collaboration context object in the list in the left pane.
All studies associated to the collaboration context are displayed in the right pane.
The study properties are displayed in columns, for example, **Name**, **Owner**, **Description**. The object type is also shown.

- **Shared study**

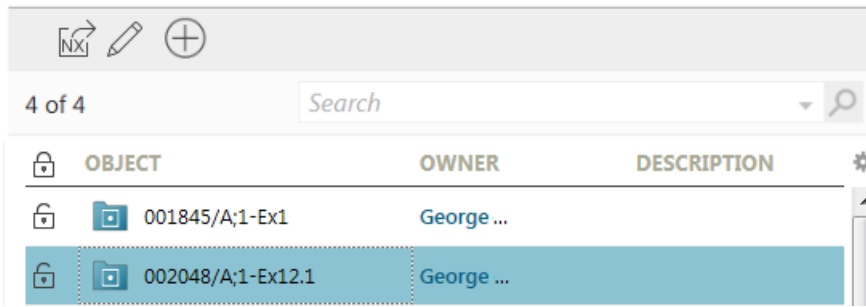
In the **Study Manager**, a shared study uses this icon . Changing the process in the study affects the original process in the process structure.

- **Isolated study**

In the **Study Manager**, an isolated study uses this icon . Changing the process in the study does not affect the original process in the process structure.

- Select a study in the right pane.

Studies



The screenshot shows the 'Studies' interface with a table containing two rows. The first row has object ID '001845/A;1-Ex1' and the second row has '002048/A;1-Ex12.1'. Both are owned by 'George ...'. The table has columns for OBJECT, OWNER, and DESCRIPTION. There are icons for adding, editing, and deleting at the top, and a search bar.

OBJECT	OWNER	DESCRIPTION
001845/A;1-Ex1	George ...	
002048/A;1-Ex12.1	George ...	

(Optional) View the study properties

Procedure

1. View studies using the **NX Study Manager**.

The studies are displayed in a table. Each column is a property of a study revision object. You can configure the columns that are displayed in this table. The columns are stored in the **TCMA_StudyMgrStudyGrid_Column** user preference.

2. On the **Study Manager** tab of the resource bar, click **Table Columns**  and choose **Select Columns**. The **Columns Selector** dialog box is shown.

3. By default, 17 properties of a study revision are shown in the **Available Fields** list. You can enter part of the name of the column you wish to display in the **Filter** to find it easily.

The contents of the **Available Fields** list can be configured by your administrator. See the *Teamcenter Manufacturing Access Deployment* documentation for details.

4. (Optional) Select the properties to add from the list on the left and click **Add** .
5. (Optional) Select the properties to add from the list on the right and click **Remove** .
6. (Optional) Drag the properties on the right to change the order of the columns.
7. Click **OK**.

The new properties are displayed in the table.

(Optional) Sort and organize table columns

Procedure

1. View studies using the **NX Study Manager**.
2. (Optional) To reorder the columns: On the **Study Manager** tab of the resource bar, drag a column header and place it in between two others.

(Optional) Filter the list of studies by name

For example, drag the **Description** column to the left of the **Object** column.

3. (Optional) To sort the studies by a property: On the **Study Manager** tab of the resource bar, click a column header.

For example, sort by the **Object** column.

(Optional) Filter the list of studies by name

Procedure

1. View studies using the NX **Study Manager**.
2. On the **Study Manager** tab of the resource bar, type part or all of a study name in the **Search** box.
For example, type **sh**.

Note

You cannot use wildcards (*) in your search (for example, **Isolate***).

3. Press Enter or click **Search** .

A subset of studies are shown.

All studies with names that begin with **sh** are displayed and all other studies are hidden. The search string is highlighted in yellow in the study name and description.

(Optional) Filter the list of studies using a study property

Procedure

1. View studies using the NX **Study Manager**.
2. On the **Study Manager** tab of the resource bar, click the down arrow ▼ to the right of the **Search** box, choose an object property.

For example, you could select **Owner**.

3. Enter a value, and press Enter.

For example for **Owner**, type either the user's name or ID in the parenthesis.

You can add additional properties to the search string, for example, **Name(me00), Description(Big)**. You can also type the search string manually.

Note

Your administrator can add custom fields to this list using Business Modeler IDE and then adding them to the required preference described in the Teamcenter Easy Plan Deployment documentation.

Create a study in NX

Procedure

1. In the NX Fixture Planner, click the **Study Manager** tab of the resource bar.
The **Study Manager** dialog box appears, listing the most recent collaboration contexts you opened in the **Recent Collaboration Contexts** list.
2. Select a collaboration context or search for another one.
3. In **Study Manager** view, click **Create Study** .
The **Create Study** dialog box opens.
4. In the **Create Study** dialog box, select **Isolated Study**  or **Shared Study** .
5. Type a name and optional description.
6. Click **Create**.
The **Edit Study Scope** page is shown.
You are now ready to add content to the study.

Edit a study in NX Fixture Planner

Rename a study

Procedure

1. In **Study Manager**, double-click the study to be renamed.
2. Type the new study name and press Enter.

Edit study content

Procedure

1. In **Study Manager**, select the study to be edited.
2. Click **Edit Study Scope** .

Add process or plant elements to the study

Use this procedure to add process or plant elements to a study. Work in the **Process** tab while adding process elements, and use the **Plant** tab to add plant elements.

Note

This procedure tells you how to quickly locate and add a specific element (for example, a process station) to your study, without having to browse an entire structure to locate elements. You can also browse a structure to add elements to a study.

Procedure

1. In the **Study Manager** dialog box, select the **Process** or **Plant** tab.
2. Select a study in the collaboration context, and click **Edit Study Scope** .
3. In the **Search for** field, type a partial name for the element for which you are searching.

Tip

You can type this wildcard character * for the search.

4. Click **Search** .
5. Select the correct element from the list of matches returned.
6. Click **Drill in**  to expand data within the element.
7. Drop an element object into the **Study Elements** area of the dialog box.
The element is added to the **Process** or **Plant** tab.
8. (Optional) You can remove study elements as well.
9. Return to the load study page by clicking **Back** .

Browse to process and plant elements

Use this procedure to browse to process or plant elements so you can add them to a study.

You can also search for specific elements and quickly add them to a study.

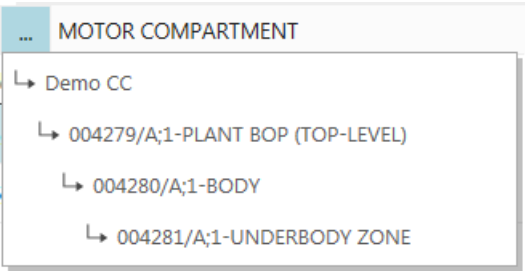
Procedure

1. In the **Study Manager** dialog box, select the **Process** or **Plant** tab.
2. In the **Process** or **Plant** tab, navigate the structure and locate the element you want to add to the study. Use the following options to navigate the structure:

Button	Action	Description
	Expand	Displays the complete object content. Click  to the left of the object.

←	Backward	Replaces the content of the section with the previous content in this section's history.
→		Forward

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	Home	Use it to return to displaying the top-level of the structure as the root object of the section. This button is displayed in the Product or Operations sections when the current focus is not the top-level of the structure.
	Drill up	You can select the parent objects from the Hierarchy breadcrumbs to navigate to them. 

Remove study in the NX Fixture Planner

Procedure

- 1. In the NX Fixture Planner, click the **Study Manager** tab of the resource bar.

The **Study Manager** dialog box appears, listing the most recent collaboration contexts you opened in the **Recent Collaboration Contexts** list.

2. Select a collaboration context or search for another one.
3. In the **Study Manager** dialog box, select a study.
4. Click **Remove Study**  and click **Remove**.

The study is removed from the collaboration context. However, it still exists in the database and you can reattach it to the collaboration context using the Manufacturing Process Planner.

Open a study from NX

Procedure

1. **Locate a study** using the **Study Manager** tab of the resource bar.
2. Click **Open**  to open the study in NX.

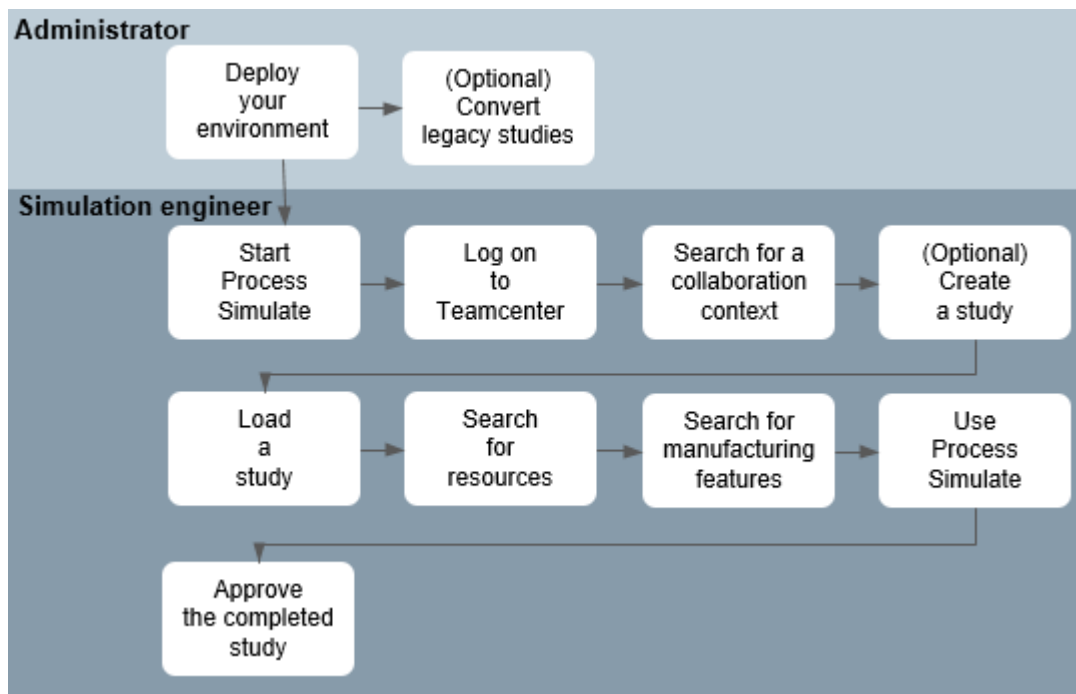
Open a study from NX

11. Simulation verification

Open TcMA from Process Simulate

Use Teamcenter Manufacturing Access while validating a process

When you perform process validation using Process Simulate on Teamcenter, you need to create, search, and load studies. You also may need to insert additional resources or manufacturing features.



Administrator

These data setup steps are completed by an administrator.

See the *Tecnomatix Installation* and *Teamcenter Manufacturing Access Deployment* documentation.

1. Install and configure Process Simulate, Teamcenter, Teamcenter Manufacturing Access.
2. **Convert studies** created before using Teamcenter Manufacturing Access with a workflow.

Simulation engineer

The simulation engineer completes the following steps in Process Simulate.

1. Start Process Simulate from the Teamcenter Rich Client or the desktop.

2. Log on to Teamcenter.
3. Search for a collaboration context in the Load Study dialog box, and review its studies.

Note

The **Load Study** dialog box is available to Process Simulate users with Teamcenter Manufacturing Access configured.

4. **Load a study** using the **Load Study** dialog box.
5. (Optional) If after searching you do not find a suitable study, **create a study** using the **Load Study** dialog box or Teamcenter Manufacturing Access.
6. Search Teamcenter and insert **classified** or **nonclassified** resources (items) into the current Process Simulate session.
7. Search Teamcenter and insert manufacturing features into the current Process Simulate session.
8. Use Process Simulate to begin creating a simulation and validating a process.
See the *Process Simulate on Teamcenter* documentation.
9. Approve the completed study by **setting the status** for briefcase export using the **Load Study** dialog box.

Starting Process Simulate (connected) from the desktop

Methods to start Process Simulate on Teamcenter

You can start Process Simulate on Teamcenter using three methods:

Procedure

1. Right-click a process or study in Teamcenter Manufacturing Planner and choose a command such as **Open with Process Simulate** . Your database connection from your Teamcenter rich client session is shared with Process Simulate.
2. **From your Windows desktop, start Process Simulate.**
3. If Teamcenter Manufacturing Access is installed and configured, from your Windows desktop, click the

Process Simulate Standalone - Teamcenter compatible  icon.

Start Process Simulate from the desktop

Procedure

1. From your Windows desktop, click the **Process Simulate on Teamcenter**  icon.
2. Log on to Teamcenter.
After authenticating your Teamcenter login credentials, the **Load Study** dialog box appears.
The **Recent Collaboration Contexts** list displays the most recent collaboration contexts you opened.
3. **Locate a study** using the **Load Study** dialog box.
4. Click **Load in Standard Mode**  or **Load in Line Simulation Mode**  to load the study in Process Simulate.

Create study in Process Simulate

Study Manager overview

Teamcenter Manufacturing Access is developed on top of the Active Workspace platform and is the technology behind the Process Simulate **Study Manager**  command. This command enables simulation engineers to perform more of their tasks within Process Simulate and reduces the dependency on the Teamcenter rich client.

Note

As of Process Simulate 14.1, the dialog box formerly called **Load Study** is renamed to **Study Manager**.

Simulation engineers can use the **Study Manager** dialog box to do the following:

- Log on to Teamcenter, search for a collaboration context, and view a list of its studies.
- Set the project on which you are currently working, so you can see the project's related collaboration contexts and studies.
- Load a study into Process Simulate in standard mode or line simulation mode
- Add or remove a status on a study.
- Create a new study.

Modifying session settings information in Study Manager

As a simulation engineer, you can modify the user name, current project, role and user group under which you are working in Study Manager before you load a study. Modifying any of these settings impacts the data that is loaded, and any new data that is created.

Note

Full functionality for this feature is available with Process Simulate 15.0 or later. If you are running earlier versions of Process Simulate, you can see settings information, but you cannot change it.

This table provides information about how session settings behave in Study Manager.

Note

The use cases in the following table depend on the Teamcenter configuration in your environment. For more information, contact your Teamcenter administrator, or refer to the Teamcenter Active Workspace Deployment documentation.

If you...	Then...
Change session settings in Study Manager	Teamcenter Manufacturing Access loads those settings the next time you start Manufacturing Process Planner or Process Simulate.
Close Study Manager while working with updated session settings	The next time you launch Study Manager, it displays the last session settings in which you were working.
Do not have access to a process, project, or plant	That data does not display for you in the collaboration context.
Switch projects, user, or group roles	Access to data you can view does not change. You are able to access only data to which you are assigned.
Do not have access to studies within a loaded collaboration context	Those studies do not display for you in the collaboration context.
Change your user, group, or role while a study is loaded in Process Simulate	A message warns you that the current study will be unloaded. - Click Yes: Current study is not loaded, and any unsaved changes are lost - Click No: The change you intended to make is canceled, and you can continue working in the current study

Modify session settings in Process Simulate

The **Study Manager** dialog box contains a header that lists your session settings (user name, current project, role, and group). Use this process to modify session settings in Process Simulate.

1. In the **Study Manager** dialog box header, click a session setting. For example, click the project.
2. Select a different session setting (in this example, a project) from the drop-down list.
 - Study Manager refreshes the page with data for the setting you selected.
 - After you select a new session setting, any new data you create (for example, a study or station) is affected by the selected session. For example, if you select a different project and create a new station, that station is assigned to the project you selected.
 - When you close this session, the next time you open Study Manager, the session settings you selected are applied.

Check out studies from Study Manager

You can check out a study before you work on it in Process Simulate or NX. The checkout feature helps you verify that no one else is editing a study before you load it, and it allows you to lock the data so that no one else can change it while you work with the study.

Note

The **Cancel Check Out** feature is no longer supported in **Study Manager** from **Process Simulate**.

Prerequisites

You must set the **CO_FOR_EDIT** preference value to **TRUE**. In addition, you must add **CO_FOR_EDIT** to the **AWC_Startup_preference** in the Teamcenter rich client.

See the *Preferences* section in the *Active Workspace Administration* documentation for a description of preferences and how to set them.

You must have write access to the data you want to edit.

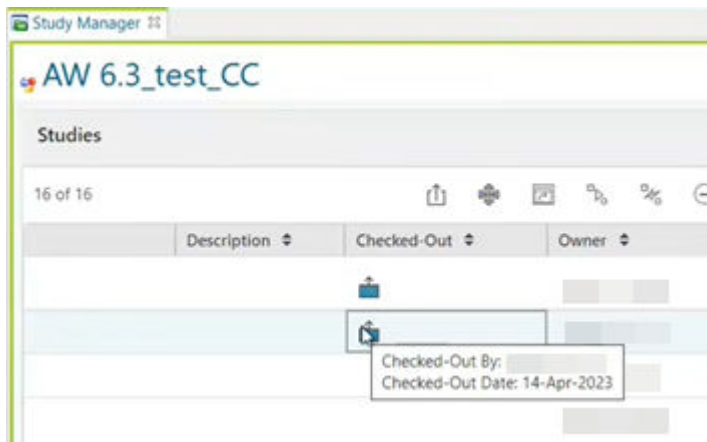
Procedure

1. Perform one of the following steps to open **Study Manager**.
 - From the Process Simulate on Teamcenter ribbon, choose **File → Study Manager**.
 - In the NX Fixture Planner, click the tab of the resource bar.
2. In **Study Manager**, select a study and click **Checkout** .
3. In the **Checkout** dialog box, indicate which study objects you want to check out:

- **Include sub-hierarchy**—Checks out the study and objects in the first level of the study hierarchy.
- **Include assigned Workareas and Resources**—Checks out work areas and resources assigned to the study.
- **Clear all checkboxes on the dialog box**—Checks out only the study.

Teamcenter Easy Plan checks out the study and any related objects you selected, and locks those objects to prevent anyone else from changing them. In addition, a lock icon is displayed next to the study and any related objects that you checked out.

4. (Optional) In **Study Manager**, hover over a study to determine who has the study checked out.



5. Perform simulation tasks within the study as needed.
6. Click **Check in** . All items within the study are checked in, and the data is unlocked so that other users can access it.

Create a study in Process Simulate

Procedure

1. From the Process Simulate on Teamcenter ribbon, choose **File → Study Manager** . The **Study Manager** dialog box appears, listing the most recent collaboration contexts you opened in the **Recent Collaboration Contexts** list.
2. Select a collaboration context or search for another one.
3. In the **Study Manager** dialog box, click **Create Study** . The **Create Study** dialog box opens.

Create Study

Select type

 Shared Study

 Isolated Study

4. In the **Create Study** dialog box, select **Isolated Study**  or **Shared Study** .
5. Type a name and optional description.
6. Click **Create**.

The **Edit Study Scope** page is shown.

You can now add process and plant objects to the study.

Edit a study in Process Simulate

Rename a study

Procedure

1. In **Study Manager** dialog box, double-click the study to be renamed.
2. Type the new study name and press **Enter**.

Edit study content

Procedure

1. In **Study Manager**, select the study to be edited.
2. Click **Edit Study** .

You can now add process and plant objects to the study.

Find and add process or plant nodes to the study

You can search for and add nodes from the bill of process (BOP) or bill of equipment (BOE) to a study without expanding either structure. When you find nodes, you can add them directly to the study from the search results.

Procedure

1. In the **Study Manager** dialog box, search for a collaboration context.
2. Select a collaboration context, select a study within the collaboration context, and click **Edit Study** .
3. Click the **Process** or **Plant** tab.
4. In the **Search for** field, type a name or item ID and click **Search** .
Easy Plan displays the search results.
5. Select an item in the list of search results.
Easy Plan expands the structure tree in the **Object** panel.
6. Drag the item from the search results or the structure into the **Study Results** pane.
Easy Plan adds the node to the study in the **Process** or **Plant** tab.

Return to the load study page by clicking **Back** .

Browse to process and plant elements

Use this procedure to browse to process or plant elements so you can add them to a study.

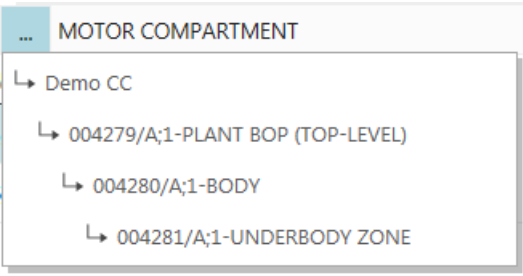
Note

You can also search for specific elements and quickly add them to a study. See the *Add process and plant elements* section of **Edit a study in Process Simulate** for details.

Procedure

1. In the **Study Manager** dialog box, select the **Process** or **Plant** tab.
2. In the **Process** or **Plant** tab, navigate the structure and locate the element you want to add to the study. Use the following options to navigate the structure:

Button	Action	Description
	Expand	Displays the complete object content. Click  to the left of the object.
	Backward	Replaces the content of the section with the previous content in this section's history.
	Forward	Replaces the content of the section with the next content in this section's history.

	Home	Use it to return to displaying the top-level of the structure as the root object of the section. This button is displayed in the Product or Operations sections when the current focus is not the top-level of the structure.
	Drill up	You can select the parent objects from the Hierarchy breadcrumbs to navigate to them. 

Remove study from Process Simulate

Procedure

- From the Process Simulate on Teamcenter ribbon, choose **File** → **Study Manager**  .
The **Study Manager** dialog box appears, listing the most recent collaboration contexts you opened in the **Recent Collaboration Contexts** list.
- Select a collaboration context or search for another one.
- In the **Study Manager** dialog box, select a study.
- Click **Remove Study**  and click **Remove**.
The study is removed from the collaboration context. However, it still exists in the database and you can reattach it to the collaboration context using the Manufacturing Process Planner.

Open a study using the Study Manager command

Procedure

- Locate a study** using the **Study Manager** dialog box.
- Click **Load in Standard Mode**  or **Load in Line Simulation Mode**  to load the study in Process Simulate.

Apply an SVR to a study in Study Manager

You can apply a saved variant rule (SVR) to a collaboration context so that when you launch Process Simulate, the study data is already configured according to the SVR. This feature supports both isolated and shared studies.

Restrictions and limitations

You must run Process Simulate version 2502 or later to use this feature. In addition, you must use Product Configurator variants in your structures. This feature does not support classic variants.

Prerequisites

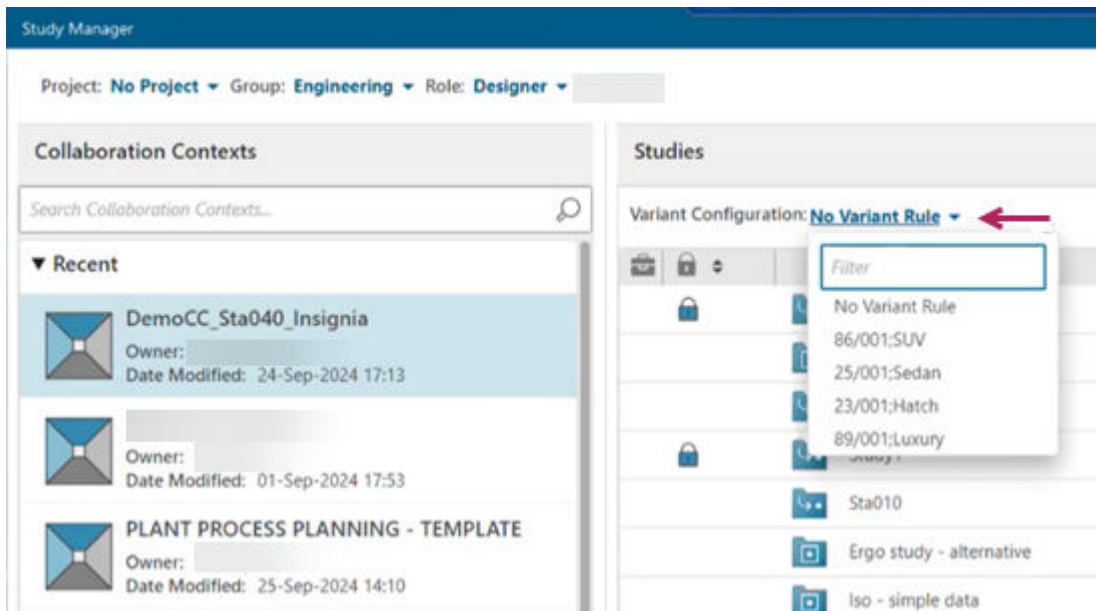
Ensure that the structures in which you work and your environment meet these prerequisites before you use this feature.

- **Associate a Product Configurator context to the bill of materials (BOM).**
- (Optional) **Associate the same Product Configurator to the bill of process (BOP) and the bill of equipment (BOE).**
- **Define a variant formula on the BOM** and optionally on the BOP and BOE nodes.
- **Define saved variant rules in the Product Configurator.**
- Set the **TCMA_EnableVariantOnStudyManager** value to **true**. In addition, you must add the **TCMA_EnableVariantOnStudyManager** value to the **AWC_Startup_preference** in the Teamcenter rich client.

See the *Preferences* section in the *Active Workspace Administration* documentation for a description of preferences and how to set them.

Procedure

1. If you have not done so already, **start Process Simulate** and then open **Study Manager**.
2. Search for a collaboration context and select one from the list.



3. Click **Variant Configuration** and select a variant rule.

You can also click in the **Filter** field and type characters to reduce the number of variant rules that are displayed. This feature does not support wildcard characters.

4. Select a study and then click **Load in Line Simulation Mode** or **Load in Standard Mode** to load the study in Process Simulate.

Process Simulate loads the study and configures the study data with the SVR. Process Simulate displays the name of the applied SVR on the screen.

Note

In study edit mode, Study Manager does not configure its variant data.

Set Study Manager status

In the **Study Manager overview** dialog box, the **Set Status**  command becomes available when you select one or multiple studies. This command is used to add or remove a status on the selected study using workflows.

Note

Your administrator must configure which statuses and workflows are used by the command to apply and remove the status. The Briefcase default is the approved status. However, there is no default workflow used by the **Set Status**  command.

Example business process

1. After completing the tasks for a milestone, a simulation engineer at a supplier uses the **Set Status**  command to approve and include a study in the Briefcase export back to the OEM.
2. The data manager at the supplier creates a Briefcase export of all approved studies.
3. The simulation engineer uses the **Set Status**  command to remove the approved status before working on the next milestone.

Resource Search viewer

Resource Search

Note

In earlier versions of Process Simulate, this viewer is called **Classification Search**. Starting in Process Simulate 14.0, this viewer is called **Resource Search**. In the documentation, the viewer is referred to as the **Resource Search**.

You can use the **Resource Search** viewer to search for classified resources and add them to a loaded study in Process Simulate. You can use different sets of attributes a text search to filter search results. After you load a single resource into Process Simulate, you can drag the resource to the correct location in the **Graphic Viewer**. Then, click your mouse to place the resource at that location in the **Graphic Viewer**. You can use the **Resource Search** viewer to search for library classified and general unclassified resources in Teamcenter and add them to the current study.

Note

Resource Search is part of the Teamcenter Manufacturing Access application. Teamcenter Manufacturing Access is based on the Active Workspace platform and provides tools for accessing and loading data from Teamcenter to Process Simulate.

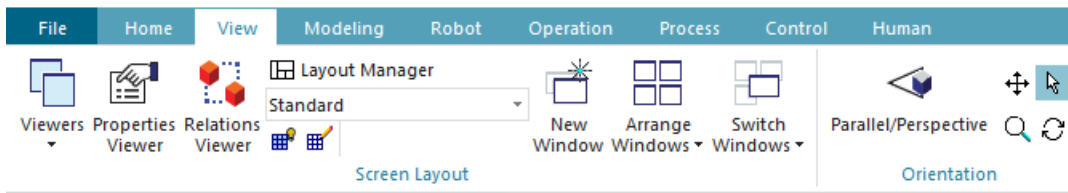
Open the Resource Search viewer

You can use the **Resource Search** viewer to locate and filter resources, and insert resources into a study.

Procedure

1. Open a study (or process) into Process Simulate on Teamcenter.
For more information, see the *Process Simulate on Teamcenter* documentation.

- From the Process Simulate ribbon, choose **View** tab → **Screen Layout** group → **Viewers**  → **Resource Search**.



Teamcenter Manufacturing Access opens the **Resource Search** viewer.

If you select a parent object in the **Resources**  folder, the object you insert from the **Resource Search** is added to the plant structure.

- Locate a resource to add to the study.
- Insert the resource into the loaded scope (a process or study).
Teamcenter Manufacturing Access adds the selected item to the current study. You can find it under the first compound resource listed in the **Object Tree** (for example, the first station or line).
- Move the resource you just added into the correct compound resource.

Get a list of desired classified resources

Procedure

- Open the **Resource Search**.
- (Optional) Navigate a Classification hierarchy to filter the components.
For example, in **Resource Search** under **Classification**, select a group such as **Manufacturing Engineering**.
After Teamcenter applies the filter, fewer resources are displayed in the right pane.
The Classification grouping shown in **Resource Search** may be defined as groups, classes, or abstract classes. For more information, see the *Teamcenter Classification Admin* documentation.
- Continue browsing into the Classification subgroups. For example, select **Automation**, **Robotics**, and then **Robots**.
As you browse the structure Teamcenter applies additional filters to the results.
- Scroll down the left pane to the bottom of the list to see the Classification attributes for this Classification grouping.

- ▷ Model
- ▷ Payload
- ▷ Manufacturer
- ▷ Dress Type
- ▷ Name
- ▷ Wrist Flange
- ▷ Reach (m)
- ▷ Mount Position
- ▷ Application

Classification attributes are only shown for the last Classification grouping (classes). However, you can still use the search box to **search for Classification attributes at other levels** (abstract classes).

5. (Optional) Enter search criteria to limit the results. For example, for **Manufacturer** select **Fanuc**.



The resources that are located at this level of the structure and have a **Manufacturer** of **Fanuc** are shown.

Get a list of resources (not limited to classification)

By default, nonclassified resources are not displayed during a regular search because the **Resource Search** applies a filter. To search for all resources regardless of classification, you can deselect **Classification** in the left pane. Then, **Resource Search** returns all results, regardless of whether the objects are classified.

Procedure

1. Open the **Resource Search**.

2. Locate a resource to add to the study.
Resources are shown in the right pane.
3. (Optional) In the search box, enter a search string. For example, enter part of the name for an object, such as **wrench**.
Several resources are shown in the right pane that begin with **wrench**.
4. (Optional) In the **Refine** list, click an attribute such as **Owner** to filter the results.
5. (Optional) Enter additional **search criteria** textually.

Searching for objects using object properties

It is easiest to filter the search results using the left pane of the Resource Search dialog box. However, not all attributes show in this pane.

In addition to performing simple text searches, you can define search criteria to refine the results of global searches. You can use this technique to search for resources based on any property on the object. Multiple properties can be specified at once.

The most basic syntax involves specifying the property name, a colon, and its value. Strings with spaces in them should be inclosed in double quotes and the asterisk is the wild card. For additional advanced syntax, see the *Tips on searching* in the *Active Workspace* documentation.

For example:

Procedure

1. Open the **Resource Search** dialog box.
2. (Optional) Filter based on the resource name beginning with wrench by typing **wrench** in the search box.
3. (Optional) Filter based on the manufacturer by typing **Manufacturer:Acme** in the search box.
4. (Optional) Filter based on the owner and application type **Owner:me00; "Application Type":"Material Handling"** in the search box.

Insert resources into Process Simulate

You can locate a single resource or multiple resources and insert the resources into Process Simulate.

Note

You must use Process Simulate 14.1.1 or later to select and insert multiple resources into a study at once. If you use an earlier version of Process Simulate, you can select and insert a single resource at a time into a study.

Procedure

1. From the Process Simulate ribbon, choose **View** tab → **Screen Layout** group → **Viewers**  → **Resource Search**.

2. Search for resources.

In the **Resource Search**, you can view items or item revisions. However, Process Simulate only adds item revisions to a work area.

3. In the right pane of the **Resource Search**, select a single resource or multiple resources.

Tip

Press and hold Shift to select multiple resources listed next to each other. Press and hold Ctrl and click each resource to select multiple, non-contiguous resources. A checkmark displays next to each selected resource.

Click a resource once more to deselect it.

Tip

You can also select an item from the results list to see a summary of its Teamcenter attributes and a list of attachments.

Click **Search Filters**  to return to the initial view and perform another search.

4. (Optional) To select all resources your search returned, click the **Select All** tooltip.

Note

The **Select All** tooltip displays after you select multiple resources.

5. Click **Open in Process Simulate**  .

Note

You must switch to the **Graphics Viewer** so that you can correctly position resources you loaded from Process Simulate.

The **Graphics Viewer** displays a preview of a single, selected resource. If you select multiple resources, the **Graphics Viewer** displays the Multiple Objects tooltip when you switch to Process Simulate.

Manufacturing feature search from Process Simulate

Mfg Search

Note

The **Mfg Search** feature will fully align with Active Workspace in a future release. Before you use the **Mfg Search** feature on Teamcenter Manufacturing Access, verify that your environment meets these requirements:

- Process Simulate 16.1 or later is installed in your environment.
- Beginning with Teamcenter Manufacturing Access 6.2, you can only use the **TCMAccessHosting.RAC.URL** preference to connect to Teamcenter.

Configure the hosting preference for **TCMAccessHosting.RAC.URL** and set the value to *http://web_server:port/EasyPlan*. For example, for a server named **hostname** on port **3000**, set the value to **http://localhost:3000**.

Tip

If you use the **ActiveWorkspaceHosting.PS.URL** preference, you cannot connect to NX or use the MFG Search in Process Simulate. Contact your Teamcenter administrator for help setting hosting preferences in your environment.



Use the **Mfg Search** command to **search** for manufacturing features in Teamcenter, **view** the results, and **load** them in Process Simulate on Teamcenter. This includes spot-welds and arc-welds (continuous features).

Search for manufacturing features

Use the **Search** dialog box to locate discrete and continuous joint features that match your search criteria.

Note

To search within dynamic in-process assemblies (DIPAs), the data you search for must be part of an operation.

Procedure

1. In Process Simulate, select a standard operation.

Note

Compound operations are not supported.

2. From the **Server** tab, in the **Scope** group, click **MFG Search** .

The **MFG Search** dialog box is displayed with the **Search** tab active.

3. In the structure to be searched, select and add parts, operations, or stations to the **Connected to Parts** group.

This step may take some time, depending on the number of manufacturing features included in the search.

Note

- If you do not specify anything, your search returns every MFG in the structure that matches your criteria (**Unassigned MFGs**, **Assigned MFGs**, or **Both**).

For example, if you load a study into Study Manager that contains a process station with consumed parts, and then use the **MFG Search** dialog box to search for **Unassigned MFGs**, your search returns all objects that are connected to consumed parts in the process station, even though you did not specify an object in the dialog box.

- For isolated studies, you can add only operations to the search. You cannot add parts.

The **Object** list displays the objects you added. Teamcenter Manufacturing Access searches within the listed objects (process lines, process stations, operations, or parts) for manufacturing features that match your search criteria.

4. (Optional) Select the **Include Dynamic In Process Assembly (DIPA)** check box to also search inside dynamic assemblies assigned to the selected processes or operations.
5. For **Connected to**, select one of the following:
 - **Any of the selected parts**—Returns any manufacturing feature connected to any of the selected parts (similar to an OR operation).
 - **Exact match-connected only to the selected part**—Returns only those manufacturing features connected to all the selected parts (similar to an AND operation).

Note

A manufacturing feature is not returned when a manufacturing feature is connected to all the selected parts and an additional part that is not in the **Objects** list.

6. To filter search results, in the **Manufacturing Type** group, select a **Class**.
 - To search for discrete features, select **Discrete**.
 - To search for continuous joint features, select **Continuous**.
7. (Optional) To filter search results within a feature class, select a **Type**.
 - Results in the **Discrete Features** class are filtered by weld type.
 - Results in the **Continuous Joint Features** class are filtered by process.

Note

If you do not select a type, the search returns all results in the class.

8. (Optional) In the **Assigned to Operation** group, select whether to search for **Unassigned Features**, **Assigned Features**, or **Both** (the default setting).
9. Click **Search**.

The **Results** tab is displayed.

Remove an object from a search

Procedure

1. In the **CONNECTED TO PARTS** group, hover over the object.
2. Click **Delete** .
Teamcenter Manufacturing Access removes the object from the object list, and no longer includes it in your search.

Assign weld features from a Process Simulate MFG search

Use the **Select All** and **Insert Feature** commands in Process Simulate to quickly select all welds in the **Mfg Search** dialog box.

Note

Alternatively, you can select multiple elements in the dialog box by clicking **Selection mode**  and then selecting objects without pressing your Shift or Ctrl key.

Procedure

1. In Process Simulate for Teamcenter, on the **Server** tab, organize your structure using commands in the **Scope** group. In addition to the operation to which you want to assign weld features, your structure might contain:

- Loaded parts that contain relations to welds.
- Process stations.

Tip

When you search for a process station, the query considers welds that are related to all consumed parts in that station. When you search for a process station with dynamic in-process assemblies (DIPAs), you can consider not only the welds that are related to all consumed parts, but also the DIPA calculated to the station.

2. Create or select the operation to which you want to assign weld features.

Note

Compound operations are not supported.

3. From the Process Simulate ribbon, click **MFG Search** .

The **MFG Search** dialog box is displayed with the **Search** tab active. The operation that you previously selected is displayed in the search title (for example, **MFG Search - weldOp1**).

4. In the structure you created in step 1, select parts, operations, or stations, and in the **Connected to Parts** group in the **MFG Search** dialog box, click **Add**.
5. (Optional) Select the **Include Dynamic In Process Assembly (DIPA)** check box to search inside dynamic assemblies.
6. From the **Connected to** list, select one of the following:
 - **Any of the selected parts** to include welds that are connected to parts but are not consumed in a station or DIPA.
 - **Exact match** to include only those manufacturing features connected to consumed parts.

Example

If three parts exist with weld features that connect them (**Part1**, **Part2**, **Part3**), and the structure only consumes two of those parts (**Part1** and **Part2**), **Exact Match** returns only welds from those two parts. Selecting **Any of the selected parts** returns welds from all three parts.

7. To filter search results, in the **Manufacturing Type** group, select a **Class**.
 - To search for discrete features, select **Discrete**.
 - To search for continuous joint features, select **Continuous**.
8. (Optional) To filter search results within a feature class, select a **Type**.

- Results in the **Discrete Features** class are filtered by weld type.
- Results in the **Continuous Joint Features** class are filtered by process.

Note

If you do not select a type, the search returns all results in the class selected in step 7.

9. (Optional) In the **Assigned to Operation** group, select **Unassigned Features** to detect unassigned welds.
10. Click **Search**.
The listed objects (process lines, process stations, operations, or parts) for manufacturing features that match your search criteria are displayed.
11. Click **Select All** .
All search results are highlighted in the results list.

Note

To deselect all results, click **Deselect All** . You can also remove any unwanted objects from the list by deselecting them.

12. Click **Insert Feature** .
The weld features are added to the selected operation in Process Simulate.
13. Click **Close** to close the dialog box.

Add manufacturing features from the search results to a study

1. **Search** for manufacturing features in Process Simulate using the **Search** tab of the **MFG Search** dialog box.
The **Results** tab is displayed.

Note

Features listed in bold text on the **Results** tab already exist in the current study.

2. (Optional) Click any table column header to sort data in ascending or descending order.
3. (Optional) Select a manufacturing feature to preview.

Note

Selected manufacturing features are synchronized with Process Simulate and display in its graphic viewer. Process Simulate displays selected manufacturing features as blue cubes in the graphic viewer.

When you select a manufacturing feature, it is only previewed in the study. Process Simulate does not add the manufacturing feature to the study.

4. (Optional) To preview multiple manufacturing features at once, perform one of the following actions:

- Press the Shift key to select multiple, adjacent manufacturing features and click **Show** .
 - Press the Ctrl key to select multiple manufacturing features and click **Show** .
5. (Optional) To hide a manufacturing feature that you do not need to see in the graphic viewer, right-click the feature and select **Blank**.
 6. (Optional) To add manufacturing features into the Process Simulate study, select one or more features and click **Insert Feature** .
 7. Click **Close** to close the dialog box.

Configure columns for features search results

You can configure the **MFG Search** results table to control the properties of features that are displayed.

Procedure

1. **Search** for manufacturing features using the **Search** tab of the **MFG Search** dialog box.
The **Results** tab is displayed.
2. Click **Table Columns** .
- The **Columns Selector** dialog box contains **Available Fields** and **Table Fields** columns. The **Available Fields** column lists fields you can add to the table. The **Table Fields** column lists fields that are currently in the table.
3. (Optional) To remove data from the table, select and move items to the **Available Fields** list.
To add data to the table, select and move items to the **Table Fields** list.
4. (Optional) To change the order of data on the table, drag items on the **Table Fields** list to a new location in the list.

What to do next

Columns Selector

Available Fields

Filter

Connected Part-1

Connected Part-2

Connected Part-3

Connected Part-4

Weld_length

X-Position

Y-Position

Z-Position

Table Fields

BOM Line

Weld Type

Number of Sheets Welded

Process

Weld_volume

>

<

Cancel

OK

Load study

Locate a study using Study Manager

In Process Simulate, simulation engineers use the **Study Manager**  command to search for and load studies in a particular collaboration context object. When using this command, it is not necessary to search for structures in the Teamcenter rich client and send them to Process Simulate.

Note

If you want to be able to use a study in the **Study Manager** view or the **Study Manager** dialog box, you must create the studies in **Study Manager**. Any studies created using the legacy **New Study** command must be converted before they can be used.

Note

For detailed information on collaboration contexts, see the *Tecnomatix Collaboration Context Reference Manual*.

View studies in using Study Manager

Procedure

- From the Process Simulate on Teamcenter ribbon, choose **File → Study Manager**  .
The **Study Manager** dialog box appears, listing the most recent collaboration contexts you opened in the **Recent Collaboration Contexts** list.
- (Optional) In the **Search More Collaboration Context** box, type a search string to search for a collaboration context.
- Select a collaboration context object in the list in the left pane.
All studies associated to the collaboration context are displayed in the right pane.
The study properties are displayed in columns, for example, **Name**, **Owner**, **Description**. The object type is also shown.
 - Shared study**
In the **Study Manager**, a shared study uses this icon  . Changing the process in the study affects the original process in the process structure.
 - Isolated study**
In the **Study Manager**, an isolated study uses this icon  . Changing the process in the study does not affect the original process in the process structure.
- Select a study in the right pane.

(Optional) View the study properties

Procedure

- View studies in the **Study Manager** dialog box.
The studies are displayed in a table. Each column is a property of a study revision object. You can configure the columns that are displayed in this table. The columns are stored in the **TCMA_StudyMgrStudyGrid_Column** user preference.
- In the **Study Manager** dialog box, click **Table Columns**  and choose **Select Columns**.
The **Columns Selector** dialog box is shown.
- By default, 17 properties of a study revision are shown in the **Available Fields** list.

You can enter part of the name of the column you wish to display in the **Filter** to find it easily.

The contents of the **Available Fields** list can be configured by your administrator. See the *Teamcenter Manufacturing Access Deployment* documentation for details.

4. (Optional) Select the properties to add from the list on the left and click **Add** ➤.
- For example you could add **Release Status** and **Is Approved**.
5. (Optional) Select the properties to add from the list on the right and click **Remove** ⬅.
6. (Optional) Drag the properties on the right to change the order of the columns.
7. Click **OK**.

The new properties are displayed in the table.

(Optional) Sort and organize table columns

Procedure

1. View studies in the **Study Manager** dialog box.
2. (Optional) To reorder the columns: In the **Study Manager** dialog box, drag a column header and place it in between two others.
For example, drag the **Description** column to the left of the **Object** column.
3. (Optional) To sort the studies by a property: In the **Study Manager** dialog box, click a column header.
For example, sort by the **Object** column.

(Optional) Filter the list of studies by name

Procedure

1. View studies in the **Study Manager** dialog box.
2. In the **Study Manager** dialog box, type part or all of a study name in the **Search** box.
For example, type **sh**.

Note

You cannot use wildcards (*) in your search (for example, **Isolate***).

3. Press Enter or click **Search** 🔍.

A subset of studies are shown.

All studies with names that begin with sh are displayed and all other studies are hidden. The search string is highlighted in yellow in the study name and description.

(Optional) Filter the list of studies using a study property

Procedure

1. View studies in the **Study Manager** dialog box.
2. In the **Study Manager** dialog box, click the down arrow ▼ to the right of the **Search** box, choose an object property.
For example, you could select **Owner**.
3. Enter a value, and press Enter.

For example for **Owner**, type either the user's name or ID in the parenthesis.

You can add additional properties to the search string, for example, **Name(me00), Description(Big)**.
You can also type the search string manually.

Note

Your administrator can add custom fields to this list using Business Modeler IDE and then adding them to the required preference described in the Teamcenter Easy Plan Deployment documentation.

12. Reporting

Work instructions authoring

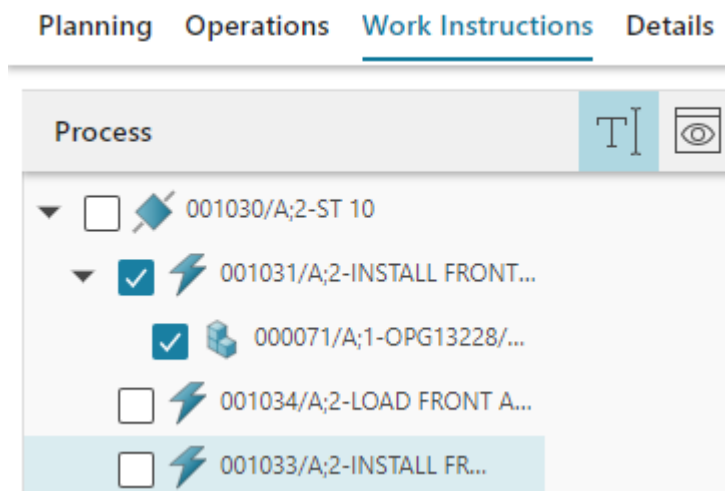
Getting started with work instructions

Author work instructions

You can author work instructions at the station level within Process Planning for BTO/BTS/CTO.

1. **Navigate to the plant bill of process (BOP).**
2. Open a process area or process line.
3. Open the process station.
4. Click the **Work Instructions** tab.
5. Expand the station in the **Process** list, and select an operation.

Process Planning for BTO/BTS/CTO automatically selects parts and subitems related to the operation.

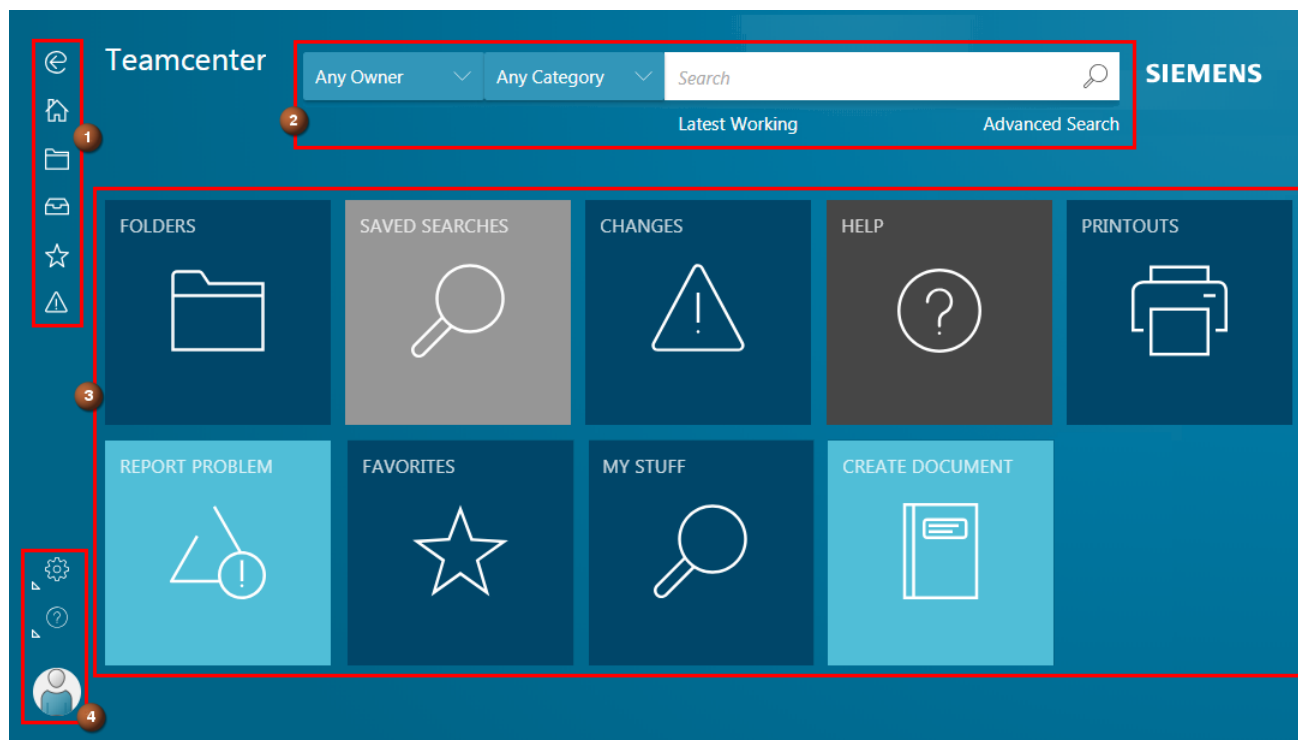


Note

You can author work instructions in Process Planning for BTO/BTS/CTO or Process Planning for ETO. However, you must use Process Planning for ETO for any planning tasks.

For detailed information about creating work instructions, see the *Process Planning for ETO* documentation.

Your Home page



Your home page may look different than the example above.

1	← – Takes you back to the previous screen. 🏠 – Takes you to the Home page. 📁 – Takes you to your mailbox and current work. 📧 – Displays tasks assigned to you. ★ – Contains the list of objects that you marked as your favorites. ⚠️ – Contains a list of available change objects.
2	Global search, including access to prefilters and Advanced Search . In this section, the revision status of the current view (in this case Latest Working) is displayed.
3	Work area. The tiles on the work area allow you to perform many tasks, such as access to your Home folder and saved searches. If there are more tiles than fit the screen, you can scroll vertically to view them.
4	⚙️ – Allows you to change the theme of the interface and to show or hide button labels. ❓ – Displays online help or Active Workspace version information.

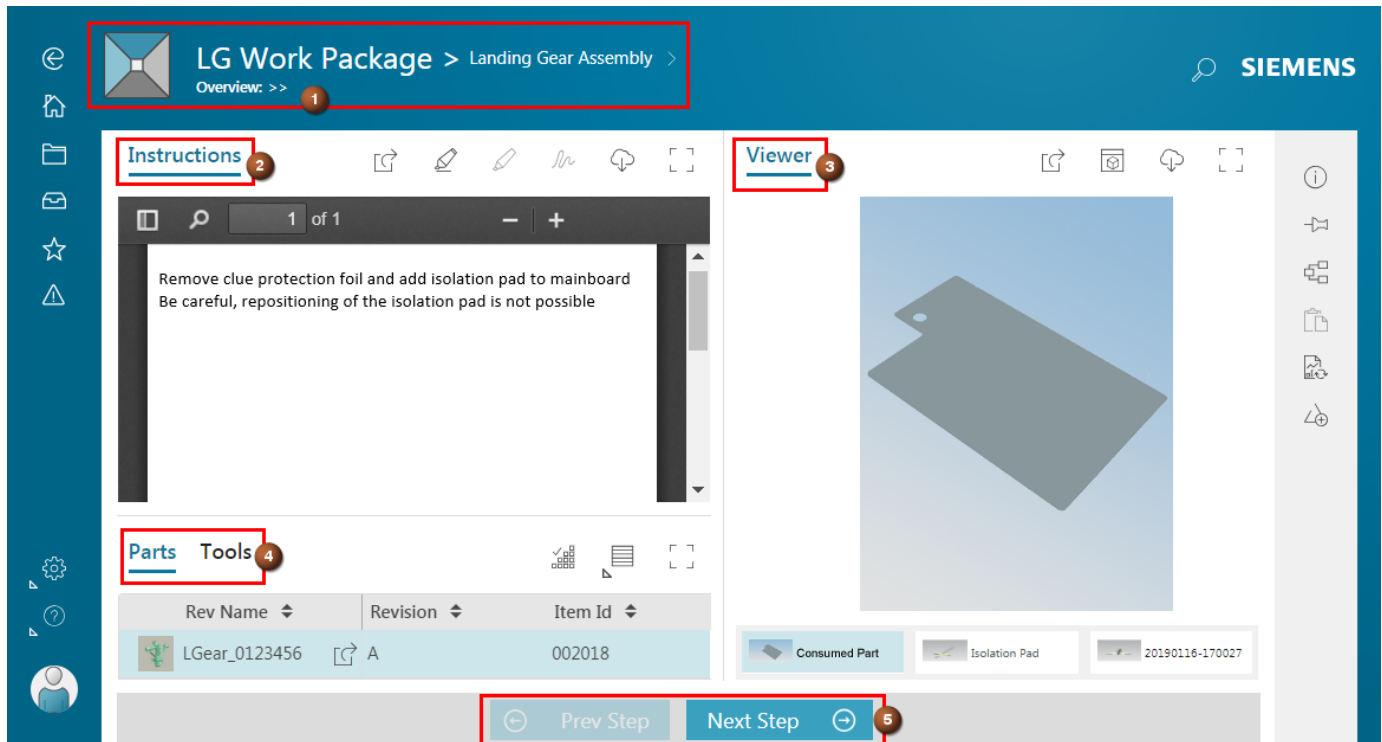


– Displays:

- Your current project, group, and role.
- The current revision rule setting.
- The current change context setting.

Also provides access to display and profile settings and allows you to sign out of Electronic Work Instructions. To log off from Teamcenter, click **Sign Out**.

Electronic Work Instructions user interface

**Note**

This graphic displays the default Electronic Work Instructions user interface. Your user interface may look different as your administrator can configure many aspects of it.

1

Selected work package or process

View the work package or process that is currently selected and whose work instruction information and associated documents you see in the different panes. You can also move between parent and child processes or operations using the bread crumb trail.

Note

Your administrator can:

- Specify which item types are used as a navigation structure in the **EWI_NavigationStructure** preference.
- Hide the header (area marked **LG Work Package** above), footer (**Prev Step**, **Next Step** below), or frame (the blue areas) using the **EWI_HiddenComponents** preference. Preference values include **Header**, **Footer**, and **Frame**.
- Configure which object properties are displayed in the following preferences:

EWI_package_header_cc_properties

EWI_package_header_process_properties
 EWI_package_header_product_properties
 EWI_package_header_plant_properties

2

Instructions pane

View a work instruction attached to a selected process or operation in the **Instructions** pane.

Your administrator can define the properties or relations that appear in the **Instructions** pane in the **EWI_InstructionRelationsInfo** preference.

Your administrator can specify different layouts using the **EWI_Layout** preference and also configure which tabs are visible using the following preferences:

EWI_SinglePanelLayout
 EWI_TwoPanelLayout
 EWI_ThreePanelLayout

3

Gallery viewer

Display 3D product views and images in the **Viewer** pane.

View mandatory documents associated with the selected process or operation in the **Documents** pane, if available.

View optional documents that support the selected process or operation in the **References** pane.

View movies associated with the selected process or operation in the **Animations** pane.

View individual activities that support the selected process or operation in the **Activities** pane.

Note

If there are no items of a specific type, the tab for that type of item is not displayed. For example, if no animations are attached, you do not see an **Animation** pane.

Your administrator can configure which objects are loaded in the following preferences:

EWI_ImageRelationsInfo
 EWI_AnimationRelationsInfo
 EWI_DocumentRelationsInfo
 EWI_ReferenceDocumentRelationsInfo

4

Parts and Tools panes

Display parts consumed and tools used by a step.

Your administrator can configure what is shown in these panes.



Navigation buttons

Move through the work package steps.

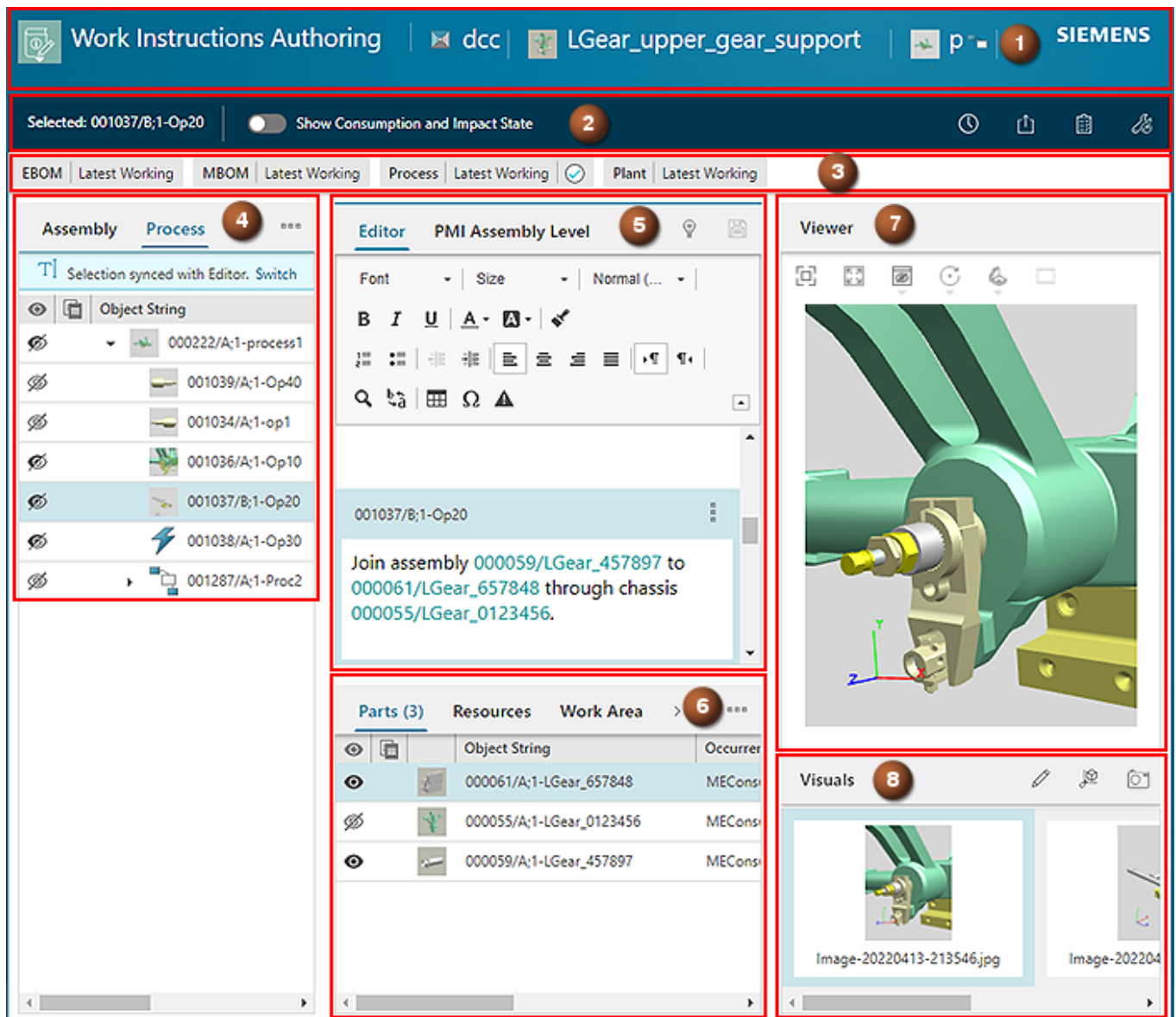
Your administrator can hide the navigation buttons using the **EWI_HiddenComponents** preference.

Authoring work instructions

Work Instructions Authoring page

Use the **Work Instructions Authoring** page to review and add to your assembly plan, to enrich text and graphical work instructions for workers on the shop floor, and to capture 2D images from linked 3D geometry as well as product views from Teamcenter Lifecycle Visualization. The page is similar to the **Process Planning** page, but offers enhanced capabilities for use in a manufacturing environment.

To access the **Work Instructions Authoring** page, see *Navigate to work package planning tasks*.



1 The **Work Instructions Authoring** page header lets you jump to:

- Another **work package planning task**. Click the tile  or text, and then select the task from the resulting list.
- The **work package page**, from which you can navigate to primary work package planning tasks. Select the work package icon .

The last two sections in the **Work Instructions Authoring** page header display the work package's root assembly and process (in this example, **LGear_upper_gear_support** and **p**), that appear in the **Assembly** and **Process** tabs.

For more information on these tabs, see **3** below.

2 The **Work Instructions Authoring** work space toolbar lets you:

- Enable the **Show Consumption and Impact State** to:
 - **Locate processes, operations, and product reviews affected by change notices**
 - **Verify MBOM consumption of many parts**
 - **Review missing-in-source PMI information**
- Use the toolbar with **Assembly** and **Process** tab selections to perform various tasks. For more details, see:
 - **Improve time management information in operations**
 - **Check data in and out**
 - **Run process data validation checks**
 - **Configure work package structures**

3 The **configuration header** lets you review the data configuration for each structure in your work package.

4 Using the **Assembly** and **Process** tabs. You can select key part, assembly, and process elements to work in the remaining authoring panels.

Note

Depending on your structure configuration, other tabs may also be available from this panel.

- The **Assembly** tab contains the manufacturing bill of management (MBOM) structure. This tab is similar to the **Assembly** panel in the **Process Planning** page. The **Assembly** tab and the **PMI Assembly Level** tab are synchronized so that selecting an object in the assembly structure displays related product manufacturing information (PMI) in the PMI structure. You can review the MBOM hierarchy and define the BOP skeleton accordingly, as well as perform additional tasks such as:
 - **Pack and unpack elements**
 - **Unpack parts consumed to an operation**
 - **Verify MBOM consumption of many parts**
 - **Manage occurrence effectivities on operations and processes**
- The **Process** tab contains objects that define the manufacturing process: a list of processes made up of one or more operations that you link to components needed to complete those operations, such as parts, assemblies, tools, and resources. The **Process** tab and the **Editor** tab are synchronized so that selecting an operation in the process structure selects the same operation in the editor, and vice versa. You can review the process hierarchy and define the process skeleton accordingly, as well as perform additional tasks such as:
 - **Edit object properties in Microsoft Excel**

- Regenerate object find number values
- Resequence or move operations
- Submit objects to a workflow
- Preview a process plan in Electronic Work Instructions
- Assign an operation to a work area

5 Using the **Editor** and **PMI Assembly Level** tabs, you can author work instructions and review, assign, and visualize PMI information on key part, assembly, and process elements that you select in the **Assembly** and **Process** panels.

- Use the **Editor** tab to add and edit textual work instructions to processes and operations selected in the **Process** tab. You can automatically add part, process, and image names using textual markers to increase text consistency and quality.

From each operation section on the panel, you can:

- Add or delete an operation in work instructions
- Clone processes and operations
- Manage occurrence effectivities on operations and processes
- Use the **PMI Assembly Level** tab to review, display, and consume PMI, such as linear dimensions and Geometric Dimensioning and Tolerancing (GD&T), assigned to parts and assemblies in the **Assembly** tab.

For more information, see **PMI**.

6 The information panel synchronizes with a selected process or operation in the **Process** tab. You can drag parts from the **Assembly** tab to the **Parts** tab to assign them to the selected process or operation.

- **Parts** tab. You can perform many of the same tasks as those available from the **Assembly** tab, plus:
 - Manage occurrence effectivities on operations and processes
 - Find consumed operations from an assembly
 - Find a consumed part that is out of scope
 - Find a consumed part that is within the current scope
 - Locate processes, operations, and product reviews affected by change notices
 - View and analyze consumption status data
- **Resources** tab. You can assign classified resources to the selected process or operation.
- **Work Area** tab. You can assign or remove the selected process or operation to or from a work area as described in **Assign an operation to a work area**.
- **Summary** tab. You can view and edit process or operation properties such as item description and find number.

- **Files** tab. You can **attach, remove, download, and replace files** to the selected process or operation. You can also **share files** to Teamcenter Share.
 - **Documents** tab. You can **view web links** in an operation outside of Process Planning for ETO.
 - **PMI** tab. Work with PMI information assigned to the selected process or operation in much the same way as you work with parts assigned to the same elements in the **Part** tab. From the **PMI** tab, you can also:
 - **Assign or unassign PMI objects to a BOP**
 - **Examine detailed PMI part information views**
 - **Review missing-in-source PMI information**
- 7 The **Viewer** panel lets you visualize 3D elements in the **Work Instructions Authoring** work space.
- 8 You can hide, show, and manipulate 3D graphics, as well as capture 2D images and product views in **Visuals** panel for use with operations authoring.

Navigating the Work Instructions Authoring page

Note

You cannot insert images into the **Editor** panel of the **Work Instructions** tab.

1. If you have not done so already, **search for and open** an existing work package, or **create** a work package, and **navigate** to the **Work Instructions Authoring** page.
2. On the **Work Instructions** page, populate the **Viewer** panel as described in **Interact with the Work Instructions Authoring page**.

The upper-left panel displays an **Assembly** tab that consists of parts and assemblies, as well as a **Process** panel that displays child operations and processes. Clicking objects on the **Process** tab shows consumed parts and assigned resources in the **Parts** tab of the middle-bottom panel.

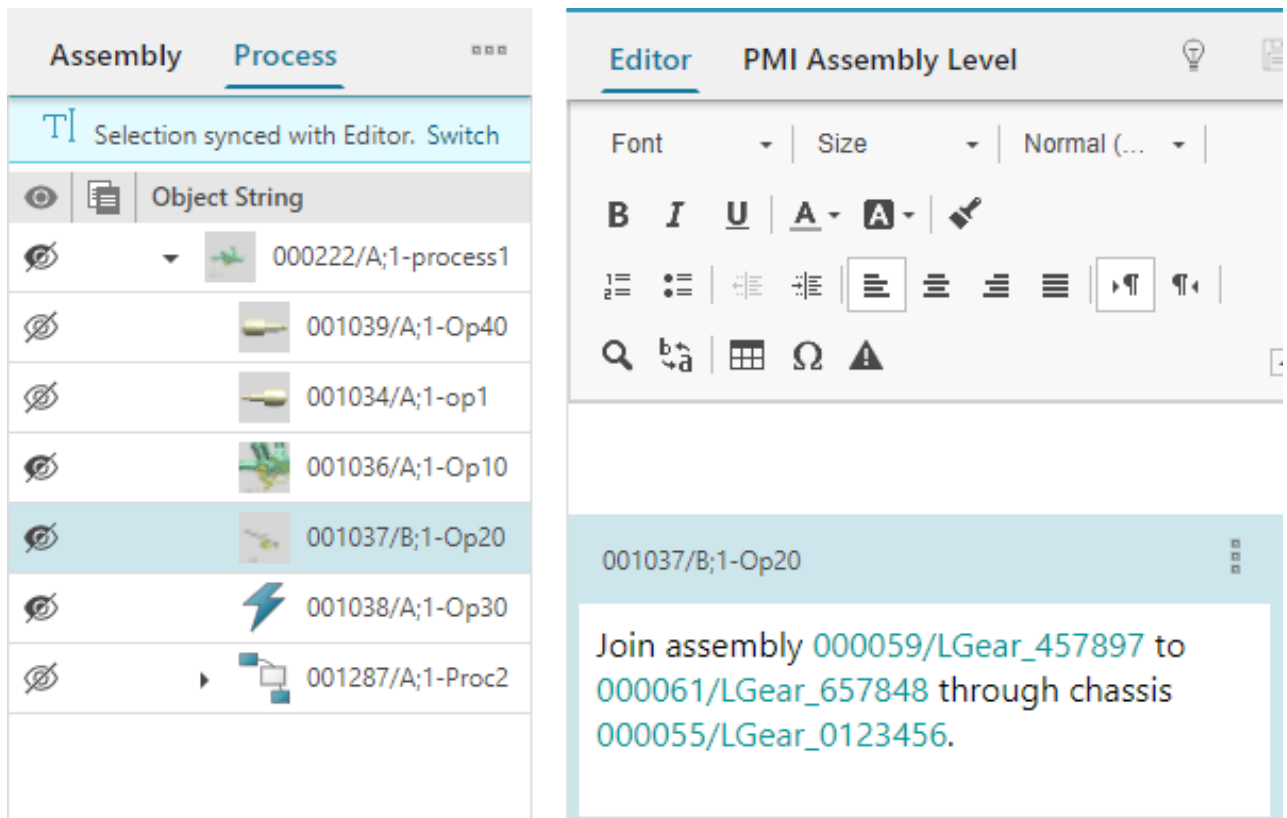
The **Editor** tab in the upper-middle panel is populated with work instructions for the loaded process and its process planning objects: child operations and processes. It displays the name of the process or operation before each work instruction section, as well as highlighted gray authoring tips if no work instructions exist yet. You can scroll down in the **Editor** panel to display child processes and operations.

Note

If you edit a section to add additional instructions to a process or operation, the scroll area increases.

3. Write the work instructions for the selected process or operation. You can use the tools in the **Editor** panel to:
 - Create numbered steps or bulleted lists, indent or outdent paragraphs, and specify text alignment.

- Create work instructions that contain bidirectional text. For example, you can create one set of work instructions that contains text in Hebrew and English.
- Create tables into which you can insert text and symbols.
- Find and replace text with matching text, including whole words and cyclic patterns of text, except in text created using the `[ ]` and `{ }` characters (see tip below).
- Specify the font, font size, and paragraph format of your text (default = Normal).
- Boldface, italicize, underline, and change the color of text as well as the background color, copy text formatting, and add special characters.
- Add symbols to indicate work situations such as prerequisites, safety precautions, or dangerous materials.

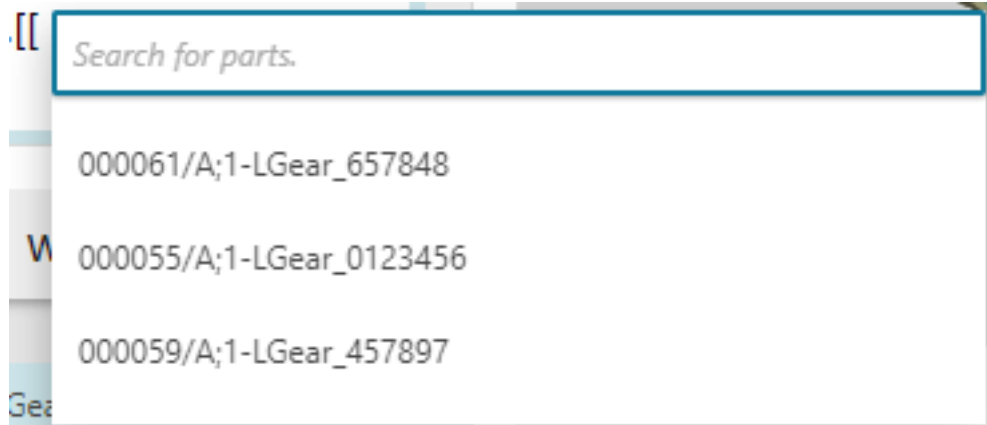


4. Type one of the following shortcut options to locate and add the correct parts and resources for a work instruction.

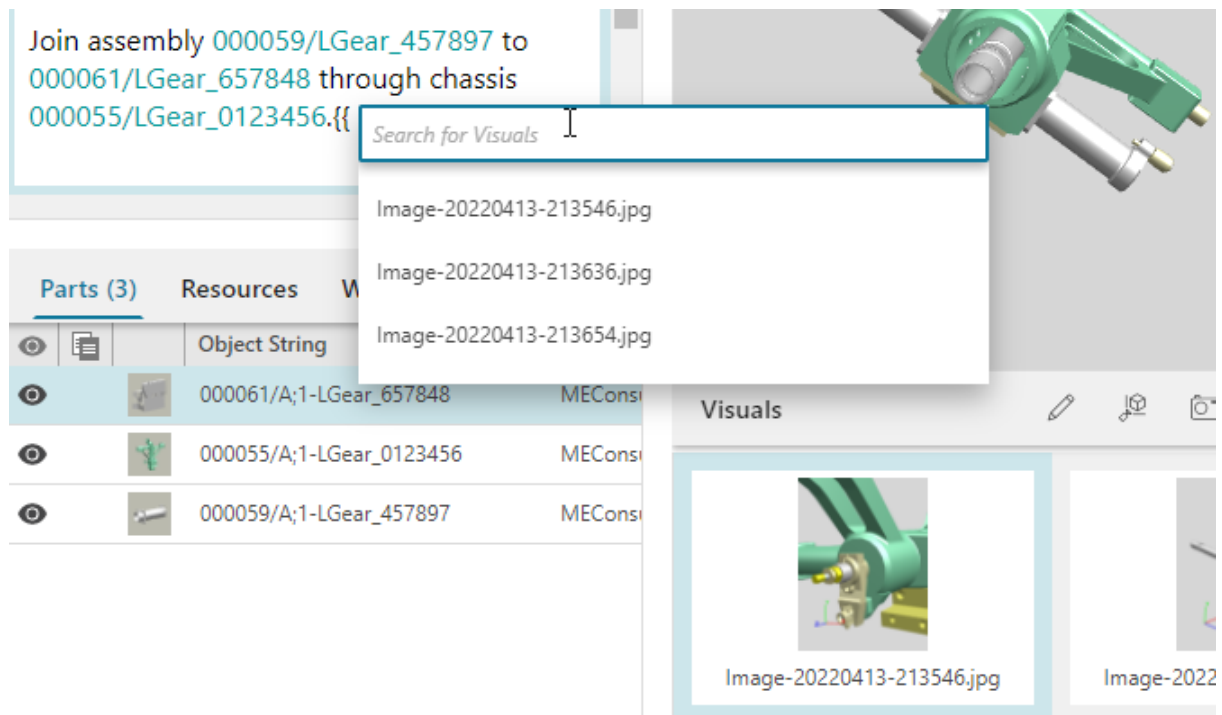
Tip

- As you start typing in the field, part and resource names based on the loaded assembly in the process plan are filtered.
- Press the down arrow to select the preferred part or resource part of the name or ID to filter the list until a unique selection is displayed, and then press **Enter**.

- Type **[** to select from a list of parts and resources that are assigned to the selected process or operation:



- Type **{** to display a list of visuals assigned to the selected process or operation:



- Type **** to display a list of standard work instructions that you can apply to the selected process or operation. You can also enter text to refine the results.

Note

Manually typing part, resource, and visual names or IDs can lead to mistakes. Use the **[** and **{** characters to reduce such mistakes.

You can insert a part, resource, or visual name, but you cannot edit it. To delete a name, place your cursor after the name and press the **Back** key.

When you select the part, resource, or visual, the part or resource name is displayed and the shortcut characters are removed from the text. When you specify a visual, the text "as seen in:" precedes the visual name.

5. (Optional) Click **Maximize Horizontally**  to expand the **Editor** panel; click **Restore Horizontally**  to collapse the **Editor** panel and restore the **Viewer** panel..
6. (Optional) Add symbols to indicate work situations such as prerequisites to an activity, safety precautions, or dangerous materials by doing the following.
 1. Click **Insert Symbol**  and navigate to the custom symbol file you want to add to the note.
 2. In the **Open** dialog box, navigate to the symbol file you want to upload, select the file, and then click **Open**.

The image appears in the work instruction.

Note

Symbol file height cannot be greater than 132 pixels. If you add a higher-resolution image, both the height and the width of the image are resized.

3. To delete a symbol, in the **Editor** tab, select it, and then press **Delete**.

Save a work instruction

You can create work instructions for specific objects including parts, operations, product views, and assemblies. If the object has a status of Released and you save a work instruction, Process Planning for ETO automatically prompts you to create a new item revision.

Note

You must create a new item revision if an object is statused as Released before you can save the work instruction.

You have two options when you save a work instruction for a Released object:

- **Yes, Revise**—Teamcenter Easy Plan creates a new item revision number for the object and the work instructions.
- **Cancel**—Teamcenter Easy Plan does not create a new item revision number and allows you to discard the work instruction you created.

Interact with the Work Instructions Authoring page

The **Work Instructions Authoring** page shows process content relevant to one worker in one shift. It does not display or navigate an entire process plan.

Procedure

1. If you have not done so already, **search for and open** an existing work package, or **create** a work package and then **navigate** to the **Work Instructions Authoring** page.
By default, parts are displayed in the **Assembly** tab of the upper-left panel but nothing is visible in the **Viewer** panel.

2. To visualize:

- Parts and assemblies in the **Viewer** panel, in the **Assembly** tab of the upper-left panel, click .

The icon changes to show  the part or assembly in the **Viewer** panel.

Note

Click  again to hide  a part or assembly.

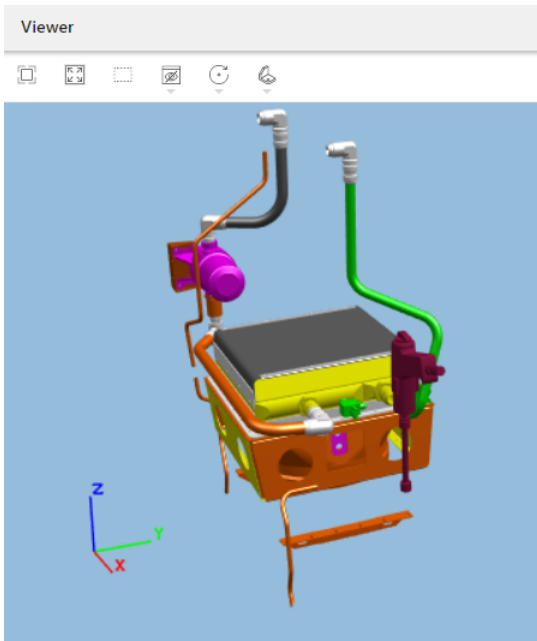
- Parts and assemblies with assigned processes and operations in the **Viewer** panel, in the **Process** tab of the upper-left panel, click .

The icon changes to show  associated parts or assemblies in the **Viewer** panel.

Note

Click  again to hide  parts or assemblies associated with the process or operation.

Visual  parts and assemblies in the **Assembly** tab, or visual  parts assigned to selected processes and operations in the **Process** tab, are displayed in the **Viewer** panel.



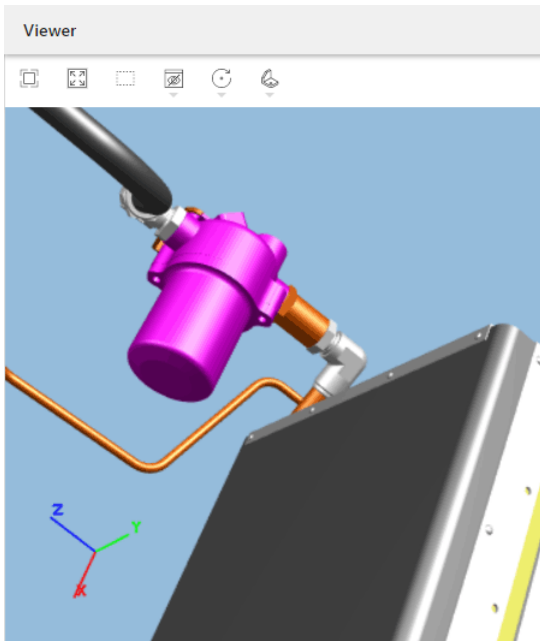
Note

- Displaying additional data in the graphic viewer may cause the viewer to zoom out. Click  to fit all shown parts and assemblies to the view.
- If a line does not contain visual data to render, Process Planning for ETO will display a message.

3. Drag the 3D model to rotate and inspect it in the **Viewer** panel; use your mouse wheel to zoom in and out, and press your middle and right mouse buttons to pan. If you do not have a middle mouse button, press your scroll button and right button to pan.

Note

You can also use the **Rotate** , **Zoom** , and **Pan**  buttons in the **Viewer** toolbar.



4. To blank or hide content in the 3D viewer, click **Hide All**  → **Hide All**.

Note

You can also **show or hide PMI information** in the **Viewer** panel.

5. To add product information, an object note, or a free note to a part in the **Viewer**, select the part, click , and do one of the following:
 - To display part number, revision, and part name, click **Add Object Information**.
The **Viewer** displays object information attached to the selected part.
 - To create a object note containing general information about a part or resource, click **Add Object Note**. In the **Create Note** dialog box, type the required information, and then click **Done**.
 - To create a free-style note, click **Add free note**, and in the **Create Note** dialog box, type the required information, and then click **Done**.

Note

You can also add a symbol to a free-style note, or use the **Preset** list to add text styles to a selected line in the note.

You must define the styling presets with the **WI_SavedPresets** preference before you can use preset styles. See *Configuring Process Planning for ETO* in the EasyPlan 2.11 Deployment for information about defining this preference.

Note

You can also add a symbol to a free-style note, or use the **Preset** list to add text styles to a selected line in the note.

- (Optional) Change the font, font size, and text color in the **Create Note** dialog box.

Note

- As needed, select the text and use text styles to emphasize a certain situation to workers on the shop floor, such as a red color to indicate a hazardous or dangerous step, or a gray color to indicate reference geometry.
- If you receive a message box stating that the operation needs to be revised because of a revision change, click **Yes, Revise** or **Cancel**.
- You can remove a label or note at any time by selecting the object and clicking **Delete object information** .

- To edit text after it has been created, in the **Viewer**, double-click the note.

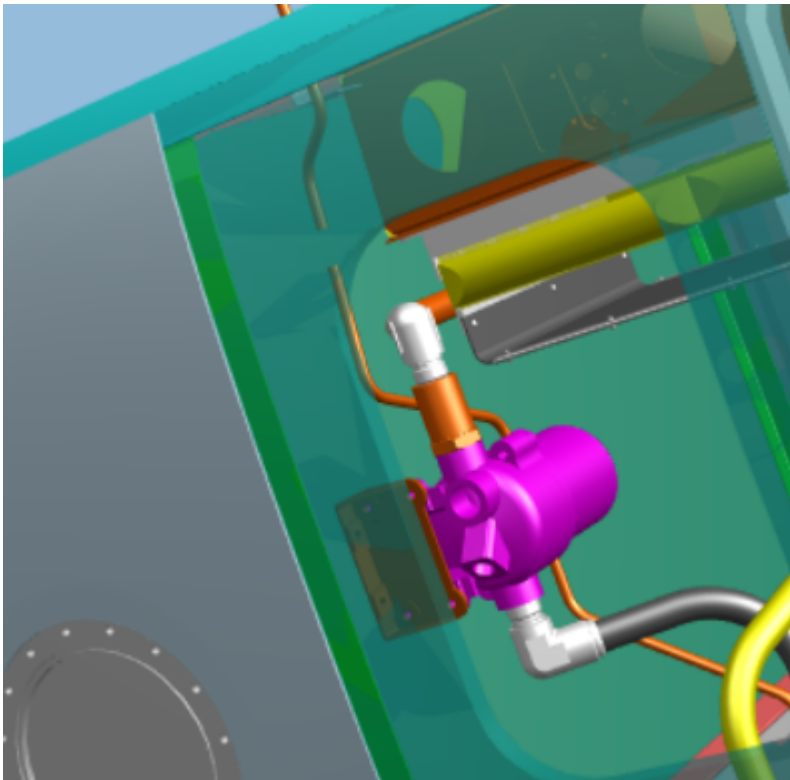
6. To change the color and transparency of a part in the **Viewer**, select the part and click **Highlight Part** .

7. In the **Highlight Part** dialog box, select a color. To change the transparency of the part so that you can see parts behind it, drag the **Set Transparency** slider to the appropriate percentage.

8. Click **Apply**.

To remove transparency and return to the original color, select the part, open the **Highlight Part** dialog box again, and click **Reset**.

9. To see the color and transparency, deselect the part by clicking outside the assembly.



Authoring a process plan with work instructions

Preview a process plan in Electronic Work Instructions

While authoring work instructions, you can preview the process plan and operations in Electronic Work Instructions, to visualize the plan as it will be displayed on the shop floor.

Prerequisites

Before you can use this feature, your Teamcenter administrator must install and configure Electronic Work Instructions.

Note

If Opcenter is installed, the **Open in EWI** command is replaced with **the command Open in Opcenter**.

Procedure

1. If you have not done so already, **search for and open** an existing work package that contains processes and operations and **navigate** to the **Process Planning** or **Work Instructions Authoring** page.
2. In the **Process** tab or panel, expand the structure and select an operation.

Note

Select a single operation. Multiple operation selection is not supported.

3. Click **Show Menu**  → **View in EWI** .

Results

Electronic Work Instructions opens directly to the process and operation that you are viewing. You do not need to locate the correct work package, or navigate through the bill of process (BOP) to see the data.

Note

Your organization can modify the values of the preference **EWI_HiddenComponents** to hide default **Electronic Work Instructions user interface** objects such as the header, footer, or blue border frame.

Preview a process plan in Opcenter

Preview a process plan and operations before a product release, to compare your Easy Plan process plan to its translation to Siemens Opcenter.

Note

Opcenter is a unified manufacturing operations management (MOM) solutions portfolio. When Opcenter is installed and the preference **EP_OpenInOpcenterUrl** has a URL value, the **default command Open in EWI** is replaced with the command **Open in Opcenter**.

Prerequisites

Before you can use this feature, your Teamcenter administrator must install and configure **Siemens Opcenter**.

Procedure

1. If you have not done so already, **search for and open** an existing work package that contains processes and operations and **navigate** to the **Process Planning** or **Work Instructions Authoring** page.
2. In the **Process** tab or panel, expand the structure and select a process.

Note

Select a single process. Multiple process selection is not supported.

3. In the **Process** tab or panel toolbar, click **Show Menu**  → **View in Opcenter** .

Results

Opcenter opens to a read-only preview of the process plan data in an **Operator Terminal** page.

Planning processes**Plan processes while you write work instructions**

You can create a process plan while you write work instructions. You can start in Teamcenter Easy Plan within the manufacturing bill of materials (MBOM), create a process linked to an assembly, and then consume parts to an operation at the assembly level.

Note

You can add a new work instruction or edit an existing work instruction within an assembly. This example demonstrates adding a new process and a new work instruction.

Procedure

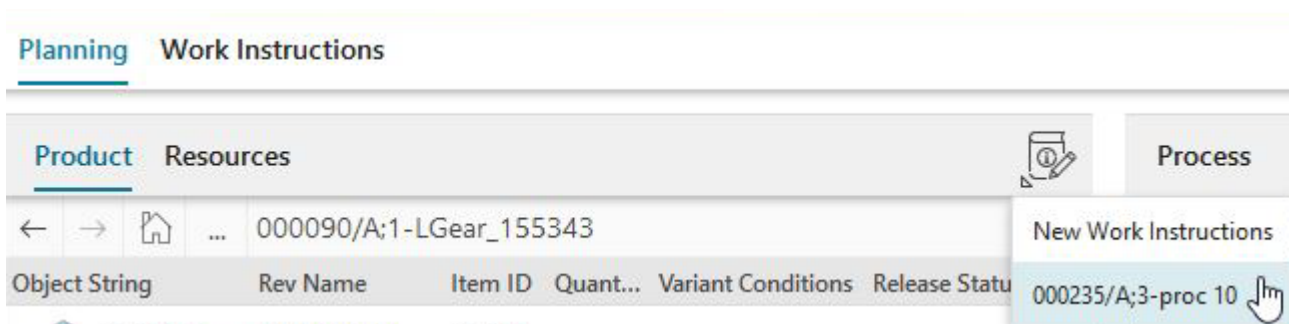
1. Open a work package.

- Under the **Planning** tab, and under the **Product** subtab, drill into the assembly and select the subassembly you want to work with from the list.
- Click **Open Work Instructions** , and then select **New Work Instructions**.
- In the **Create New Process** dialog box, select a process type and click **Next**.
- In the **Name** box, type a process name, and click **Create**.

Note

Process Planning for ETO creates a process and loads it to the **Work Instructions** page. Process Planning for ETO connects the new process to the subassembly exactly as if you used the **associate product as target** command in Manufacturing Process Planner.

- Click **Open Work Instructions**  and select the process that you just created.

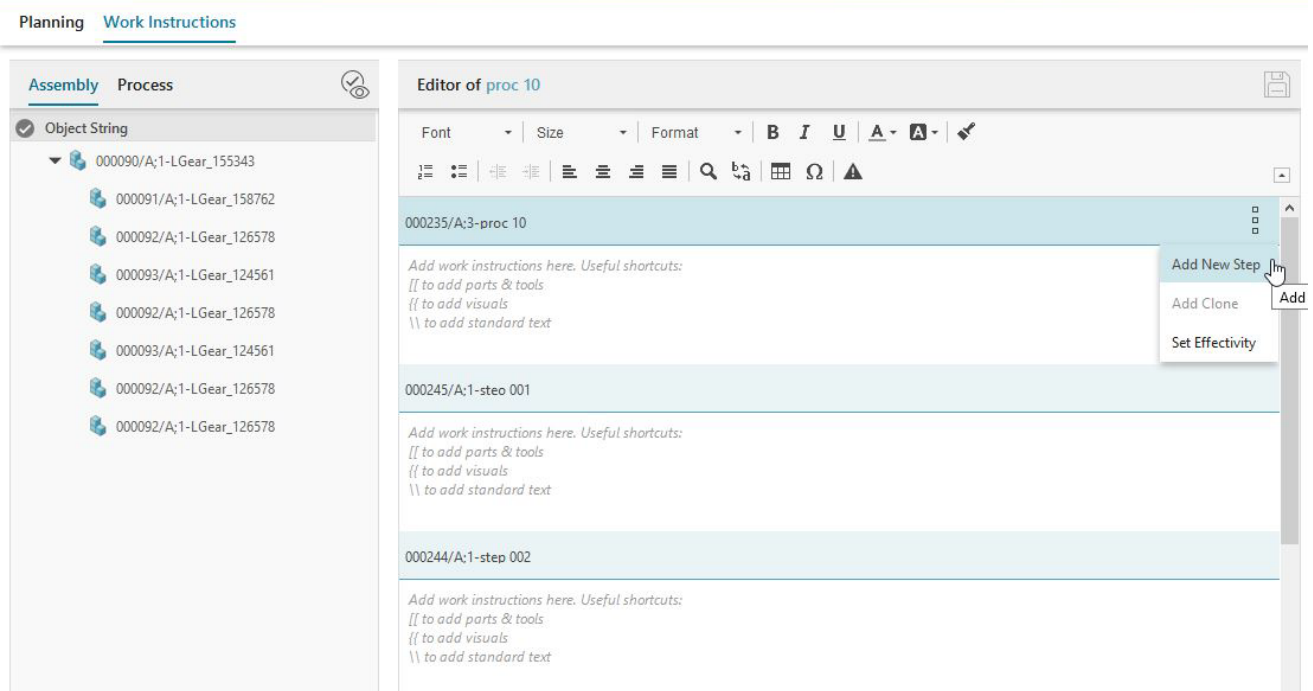


The new process is loaded, and it is connected to the subassembly that you selected. The **Work Instructions** tab is active.

Note

Alternately, you can create a new work instruction or load an existing work instruction from the **New Work Instructions** menu.

- Under the **Assembly** subtab, expand the subassembly. Parts for the subassembly are available for consumption.
- In the **Editor**, select the new process, click **More** , and select **Add New Step**.



Note

- If you add a new step at the process level, Process Planning for ETO creates the operation as the last step in the process.
- If you add a new step at the operation level, Process Planning for ETO creates the new operation directly after the current operation.

9. Select an operation type, and click **Next**.
10. In the **Name** box, type in an operation name, and click **Create**.
The operation is created and added to the process.
11. Author work instructions for the operation.

Note

You cannot add images to the **Editor** panel of the **Work Instructions** tab.

12. (Optional) Consume parts to the operation.

Clone processes and operations

If you have authored a process or operation, you can use that process or operation as a template to create a new process.

Note

When you clone a process, Teamcenter settings determine whether consumed parts and assigned resources are copied to the new process. Contact your Teamcenter administrator with questions about cloning rules in your environment.

Procedure

1. If you have not done so already, **search for and open** an existing work package that contains processes and operations, and **navigate** to the **Work Instructions Authoring** or **Process Planning** page.
2. If you are on the **Work Instructions Authoring** page, do the following.
 - a. In the **Process** tab or panel, select a process or operation.
 - b. In the **Editor** tab, next to the process or operation name you just selected, click **More**  → **Add Clone** .
3. If you are on the **Process Planning** page, in the **Process** panel, select the process or operation beneath which you want to create the clone and click **More**  → **Add Clone** .
4. In the **Add Clone** dialog box, in the search box, search for the process or operation that you want to clone.
5. From the results list, select a process or operation.
6. (Optional) Click **Revision Rule**, and select an option from the list.

Note

The default revision rule is **Latest Working**.

7. Click **Clone**.
If you are on the **Work Instructions Authoring** page, the cloned process or operation appears at the bottom of the **Editor** tab and the **Process** tab.

If you are on the **Process Planning** page, the cloned process or operation is added to the structure beneath the process or operation you selected in steps **2** or **3**.

Tip

If cloning rules in your environment copy all objects associated with a process, objects associated with the cloned process are displayed in the **Parts** tab in the information panel at the bottom of the page.

Clone objects from classification

During process planning, you can search the classification hierarchy for pre-classified objects and then clone those items and place them in a selected location.

The **Copy**  and **Paste**  commands are available, respectively, from the BOM and BOP toolbars. In Easy Plan, the ability to drag files or objects to other objects works the same way as it does in other applications. For more details on resequencing and moving elements, see [Rules for cloning, moving, and resequencing objects in the BOM or the BOP](#).

You can use this feature to clone specific objects in each page.

In this page	You can clone these objects
Process Planning	• Process • Operation • Compound operation • Execution step
Work Instructions Authoring	Operation
Plant BOP Authoring	• Process • Operation • Process area • Process line • Process station
Product BOP Authoring	• Process • Operation • Functional group

Prerequisites

You must define which cloning rule process template is used to clone items in a process structure, using the **Process.Template** preference. You can use the format **Process.Template.Mapping_<cloning_rule>** to set this preference. Cloning rule options include:

- **Mapping_Consumes**—Clones all consumed objects referenced by the template to the new object.

- **Referencing_Consumes**—References all consumed objects from the template to the new object.
- **Ignoring_Consumes**—Clones the process object from the template, but ignores all consumed objects in the template.

In addition, you must add the **Process.Template** preference to the **AWC_Startup_preference** in the Teamcenter rich client.

See the *Preferences* section in the *Active Workspace Administration* documentation for a description of preferences and how to set them.

Procedure

1. If you have not done so already, **search for and open an existing work package** that contains processes and operations, and **navigate to the task page in which you want to work**.
2. Perform one of the following steps.
 - In the **Process Planning** page, in the **Process** panel, select the object beneath which you want to create a clone and click **Add** ⊕.
 - In the **Work Instructions Authoring** page, in the **Process** tab, select an operation and then in the **Editor** tab click **Add** ⊕, and select **Add Clone**.
 - In the **Product BOP Authoring** page, in the **Product BOP** panel, select the object beneath which you want to create a clone and click **Add** ⊕, then select an option from the list.
 - In the **Plant BOP Authoring** page, in the **Plant BOP** panel, select the object beneath which you want to create a clone and click **Add** ⊕, then select an option from the list.
3. In the **Add** panel, perform the following steps.
 - a. Click the **Classification** tab.
 - b. Expand the classification list.
 - c. Select a specific class.
 - d. Select an object from the results list and click **Next**.
4. (Optional) Click **Revision Rule**, and select an option from the list.
5. Click **Cloning Rule**, and select an option from the list.
 - **Mapping_Consumes**—Clones all consumed objects into the new object.
 - **Referencing_Consumes**—References all consumed objects into the new object.
 - **Ignoring_Consumes**—Ignores any consumed objects in the clone template, and only clones the process object.
6. Click **Add as Clone**.

The cloned object is added to the structure.

Search for and clone existing process objects

You can search for an existing process object that was created in a process plan by its name or process ID, and clone that object into a selected process node. You can also choose which cloning rule to apply when you create objects from a template.

The **Copy**  and **Paste**  commands are available, respectively, from the bill of materials (BOM) and bill of process (BOP) toolbars. In Easy Plan, the ability to drag files or objects to other objects works the same way as it does in other applications. For more details on resequencing and moving elements, see [Rules for cloning, moving, and resequencing objects in the BOM or the BOP](#).

You can use this feature to clone specific objects in each page.

In this page	You can clone these objects
Process Planning	• Process • Operation • Compound operation • Execution step
Work Instructions Authoring	Operation
Plant BOP Authoring	• Process • Operation • Process area • Process line • Process station
Product BOP Authoring	• Process • Operation • Functional group

Prerequisites

You must define which cloning rule process template is used to clone items in a process structure, using the **Process.Template** preference. Cloning rule options include:

- **Mapping_Consumes**—Clones all consumed objects referenced by the template to the new object. Consumptions are mapped from the bill of materials (BOM) of the target work package.
- **Referencing_Consumes**—References all consumed objects from the template to the new object.
- **Ignoring_Consumes**—Clones the process object from the template, but ignores all consumed objects in the template.

In addition, you must add the **Process.Template** preference to the **AWC_Startup_preference** in the Teamcenter rich client.

See the *Preferences* section in the *Active Workspace Administration* documentation for a description of preferences and how to set them.

Procedure

1. If you have not done so already, **search for and open an existing work package** that contains processes and operations, and **navigate to the task page in which you want to work**.
2. Perform one of the following steps.
 - In the **Process Planning** page, in the **Process** panel, select the object beneath which you want to create a clone and click **Add** .
 - In the **Work Instructions Authoring** page, in the **Process** tab, select an operation and then in the **Editor** tab click **Add** , and select **Add Clone**.
 - In the **Product BOP Authoring** page, in the **Product BOP** panel, select the object beneath which you want to create a clone and click **Add** , then select an option from the list.
 - In the **Plant BOP Authoring** page, in the **Plant BOP** panel, select the object beneath which you want to create a clone and click **Add** , then select an option from the list.

The **Add** panel is displayed.

3. Click the **Search** tab and type the process name or process ID in the search box.
4. From the results list select one or more objects to use as clone templates, and then click **Next**.
5. (Optional) Click **Revision Rule**, and select an option from the list.
6. Click **Cloning Rule** and select an option from the list.
 - **Mapping_Consumes**—Clones all consumed objects into the new object.
 - **Referencing_Consumes**—References all consumed objects into the new object.
 - **Ignoring_Consumes**—Ignores any consumed objects in the clone template, and only clones the process object.
7. Click **Add as Clone**.
The cloned object is added to the structure.

Clone a process from a template while working in small product mode

When you work in small product mode you can load and work on a component that is part of a larger assembly, and not load and view the full assembly.

The **Copy**  and **Paste**  commands are available, respectively, from the BOM and BOP toolbars. In Easy Plan, the ability to drag files or objects to other objects works the same way as it does in other

applications. For more details on resequencing and moving elements, see [Rules for cloning, moving, and resequencing objects in the BOM or the BOP](#).

Restrictions and limitations

You must be working in small product mode to use this feature.

Prerequisites

You must set the value for the **EP_PlanningForSmallProduct** preference to **true**. In addition, you can also use the **Process.Template** preference to define which cloning rule process template is used to clone a process structure. Cloning rule options include:

- **Mapping_Consume**—Clones all consumed objects referenced by the template to a new object in the cloned structure.
- **Referencing_Consume**—References all consumed objects from the manufacturing bill of materials (MBOM) into the cloned structure.
- **Ignoring_Consume**—Clones the process from the template, but ignores all consumed objects in the original process.

In addition, you must add the **EP_PlanningForSmallProduct** and **Process.Template.Mapping** preferences to the **AWC_Startup_preference** in the Teamcenter rich client.

See the *Preferences* section in the *Active Workspace Administration* documentation for a description of preferences and how to set them.

Procedure

1. **Create** or **search for and open an existing work package** search for an existing work package.
2. In the **Process** tile, click **Add → Create Process from Template**.
Teamcenter Easy Plan displays the **Create Process from Template** dialog box.
3. In the **Search for Process** field, type a value and search for the process you want to clone.

Tip

You can use wildcard characters in your search. For example, type ***STN*** to search for a work area item name that begins with **STN**. To ensure the best search results, create a query with narrow parameters.

4. Select the process you want to clone from the search results, and then select a **Cloning Rule** from the drop-down list.
 - **Mapping_Consumes**—Clones all consumed objects into the new object.
 - **Referencing_Consumes**—References all consumed objects into the new object.
 - **Ignoring_Consumes**—Ignores any consumed objects, and only clones the process.

5. (Optional) Update values in any of the following fields, and then click **Create Process**.
 - **Revision Rule**—Select a different revision rule than the one applied to the template. The default revision rule is **Latest Working**.
 - **Name**—Type in a name for the cloned process. If you leave this field blank, Teamcenter Easy Plan provides a name.
 - **Description**—Type in a description.
 - **Process ID**—Type in a process ID for the cloned process. If you leave this field blank, Teamcenter Easy Plan provides a process ID.
 - **Revision ID**—Type in a revision ID for the cloned process. If you leave this field blank, Teamcenter Easy Plan provides a revision ID.

Teamcenter Easy Plan clones the new process and adds it to the work package. In the **Manage Work Package** page, the **Process Planning** tile is now available.

6. (Optional) Click the **Process Planning** tile to navigate to the **Process Planning** page to continue planning in the work package.

Tip

You can click the **Show Consumption and Impact State** button to **review consumed items** in the cloned process.

Clone a process using copy and paste during process planning

If you have authored a process, you can use that object as a template to create a new object. The **Copy**  and **Paste**  commands are available, respectively, from the BOM and BOP toolbars. In Easy Plan, the ability to drag files or objects to other objects works the same way as it does in other applications. For more details on resequencing and moving elements, see **Rules for cloning, moving, and resequencing objects in the BOM or the BOP**.

Prerequisites

You must set the **MEProcess.MEProcess.PasteDuplicateTemplate** preference to the correct values to control cloning rules:

- **MEProductBOP.MEProductBOP.PasteDuplicateTemplate**—defines cloning rules for the product BOP.
- **MfgMEPlantBOP.Mfg0MEPlantBOP.PasteDuplicateTemplate**—defines cloning rules for the plant BOP.

In addition, you must add the **MEProcess.MEProcess.PasteDuplicateTemplate** preference to the **AWC_Startup_preference** in the Teamcenter rich client.

See the *Preferences* section in the *Active Workspace Administration* documentation for a description of preferences and how to set them.

Procedure

1. If you have not done so already, **search for and open** an existing work package that contains processes and operations, and **navigate** to the **Process Planning** page.
2. In the **Process** panel, select the process that you want to clone.

Note

You can select and clone multiple processes only if they are under the same parent object.

3. Click **Copy**, and then select one of the following:
 - To add the processes within a current process resource, select another object under the process resource and click **Paste** → **Paste Before** or **Paste After**.
The cloned item is added to the process resource before or after the item you selected.
 - To add the processes to a different process resource, select the process resource into which you want to move the operations and click **Paste** →  → **Paste Into**.
The cloned item is added to the process resource as the last item in that process resource.

Resequence or move operations

You can move operations during process planning for various reasons, such as to place them in a specific process or resequence the order in which they are performed in a process.

The **Copy**  and **Paste**  commands are available, respectively, from the BOM and BOP toolbars. In Easy Plan, the ability to drag files or objects to other objects works the same way as it does in other applications. For more details on resequencing and moving elements, see **Rules for cloning, moving, and resequencing objects in the BOM or the BOP**.

Note

When you resequence an operation, all part and resource references assigned to it move with that operation.

Procedure

1. If you have not done so already, **search for and open** an existing work package that contains processes and parts and **navigate** to the **Process Planning** or **Work Instructions Authoring** page.
2. In the **Process** tab or panel, select an operation and in the **Process** toolbar, click **Show Menu**  → **Cut** , and do one of the following.

Caution

When you move operations, always use the cut and paste method. Do not use the copy and paste method.

- To move an object operation within its current process, select another operation in the process and click **Show Menu**  → **Paste** →  → **Paste Before** or **Paste After**.

The operation is resequenced before or after the selected operation within the process.

- To move an operation to a different process, select the process into which you want to move the operation and click **Show Menu**  → **Paste** →  → **Paste Into**.

The operation is moved into the selected process, as the last operation within that process.

Note

Paste Into is only listed as an option when you select a process into which to move an operation.

- To move an operation before or after a specific operation in a different process, select that operation in the process and click **Show Menu**  → **Paste** →  → **Paste Before** or **Paste After**.
- To move an operation to the same level as a subprocess (process beneath the root level of the process tree), select the process and click **Show Menu**  → **Paste** →  → **Paste Before** or **Paste After**.

Teamcenter Easy Plan resequences the operation before or after the selected process.

Resequence operations assigned to a process resource in the BOP tree

You can move operations assigned to a process resource in the bill of process (BOP) tree. For example, you can move operations either to place them in a different process resource, or to resequence the order in which the operations are performed in a process resource.

The **Copy**  and **Paste**  commands are available, respectively, from the BOM and BOP toolbars. In Easy Plan, the ability to drag files or objects to other objects works the same way as it does in other applications. For more details on resequencing and moving elements, see [Rules for cloning, moving, and resequencing objects in the BOM or the BOP](#).

Note

When you resequence an operation, all part and resource references assigned to it move with that operation.

Prerequisites

You must have write access to the work package, process resource, and the operations you want to move.

Procedure

1. If you have not done so already, **search for and open** an existing work package that contains processes and parts and **navigate** to the **Process Planning** page.
2. In the **Process** tab or panel, select one or more operations and in the **Process** toolbar, click **Show Menu**  → **Cut** , and do one of the following.
 - To move operations within a current process resource, select another operation under the process resource and click **Show Menu**  → **Paste** →  → **Paste Before** or **Paste After**.
 - To move operations to a different process resource, select the process resource into which you want to move the operations and click **Show Menu**  → **Paste** →  → **Paste Into**.

Caution

- If you select and move multiple operations, all operations you select must have the same direct parent. For example, if you select multiple operations to resequence, all operations must belong to the same process station.

Note

Paste Into is listed as an option only when you select a process into which to move an operation. A process can be a process, a process resource, or a process station.

Remove multiple operations and processes

Note

In this procedure, you perform the task to remove multiple processes. You can also perform this task to remove multiple operations.

Procedure

1. Open a work package that contains processes and operations.
2. Navigate to the assembly in which you want to remove a process or operations and expand the assembly.
3. In the **Process** panel, press and hold **Ctrl**, then select each process.
4. In the process toolbar, click **More**  → **Delete** .
When Teamcenter Easy Plan displays the confirmation dialog, click **Delete** again.

Attach a file to a selected process, process container, or operation

You can create and attach files and documents to a process, process container, or operation.

You work with two types of attachments in Teamcenter Easy Plan:

- Attachments are non-managed documents, because they follow the life cycle of the object to which they are attached. You use the **Files** tab to add and maintain attachments.
- Managed documents, or reference documents, have their own life cycle. You use the **Documents** tab to add managed documents.

Procedure

1. If you have not done so already, **search for and open** an existing work package that contains processes and parts and **navigate** to the **Process Planning** or **Work Instructions Authoring** page.
2. Select a process in the **Process** panel and then click the **Files** tab.
3. In the tab toolbar, click **More *****, and then select **Add to** .
4. In the **Attach File** task pane, click **New** to create a new object and perform the following steps.
 - a. Type in a **Name**.
 - b. (Optional) Type in a **Description**.
 - c. Select a file **Relation**, if Easy Plan did not automatically select the correct one for you when you uploaded the file.
5. Click **Done**.
6. (Optional) To download or delete the attachment, select the attachment in the **Files** tab.
7. (Optional) To search for files in Teamcenter Easy Plan, copy those files, and paste them into the **Files** tab for the selected process.

Open a duplicate structure

You can open a duplicate of a work structure in a bill of process (BOP) and make changes that do not affect the original structure. This allows you to review changes before you make them.

Procedure

1. **Search for and open** an existing work package and then navigate to the preferred page.
2. Select a process from the **BOP** panel or from the **Assembly** panel and click **View Other Configuration** 
The entire work package is duplicated and opens in a new tab.
Toolbar commands are hidden in read-only mode.
3. In the new tab select an item, make any changes, and save the **configuration**.
The changes made in this window do not affect the original work structure and you can move back and forth between the two views to easily compare your structures.

Note

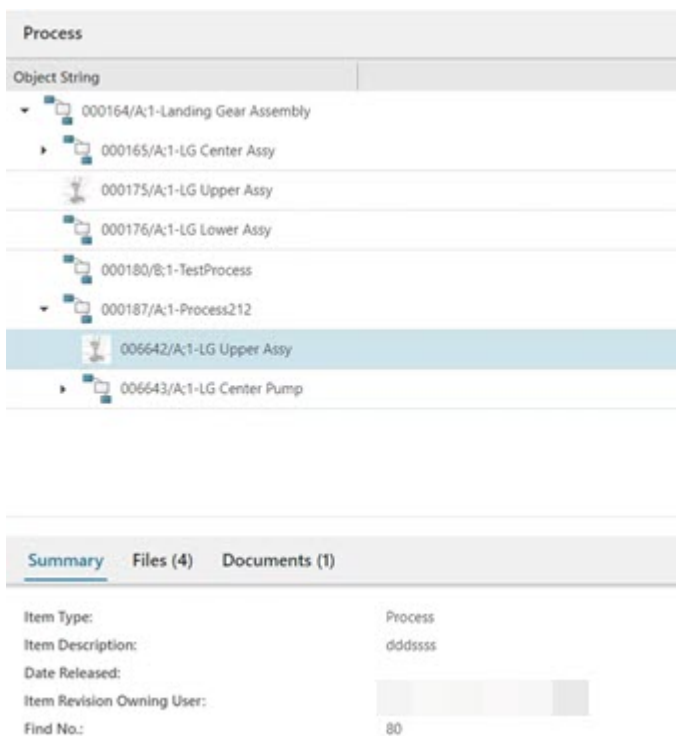
The administrator can delete the duplicated work packages.

View and edit process properties

You can view and edit property information for a selected process during process planning.

Procedure

1. Navigate to a plant bill of process (BOP) that has parts and tools assigned to processes.
2. Select an object in the **Process** panel.
Properties information for the process area displays in the **Summary** tab.



3. Click **Start Edit** .
Properties that you can edit are surrounded by a gray border.
4. Click inside the property you want to edit, and type in your changes.

Tip

When you place your cursor inside a property field, the border changes to a teal color to indicate that you are editing that property.

5. Click **Save Edits**  or **Cancel Edits**  when you complete the property changes.

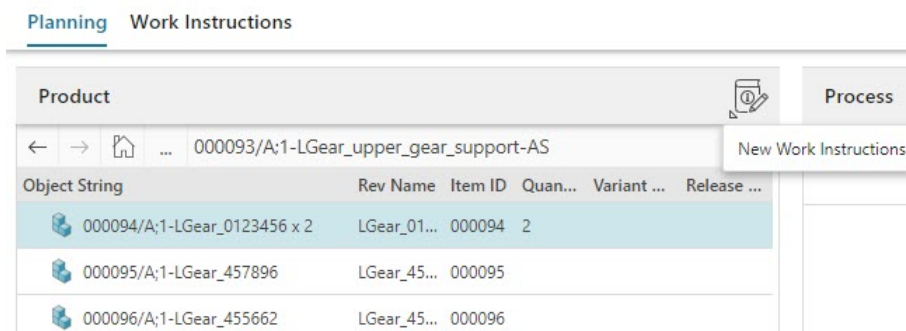
Planning parts

Author work instructions for a selected part

You can author work instructions for parts without child objects.

Procedure

1. Open a work package that contains processes and parts.
2. Under the **Planning** tab, and under the **Product** subtab, drill into the assembly and select the part with no child objects for which you want to author work instructions.
3. Click **Open Work Instructions** , and then select **New Work Instructions**.



4. In the **Create New Process** dialog box, select a process type and click **Next**.
5. In the **Name** box, type a process name, and click **Create**.
Process Planning for ETO connects the new process to the subassembly exactly as if you used the **associate product as target** command in Manufacturing Process Planner.
6. (Optional) To add more processes, in the **Editor**, select the new process, click **More** , and select **Add New Step**.

Note

- If you add a new step at the process level, Process Planning for ETO creates the operation as the last step in the process.
- If you add a new step at the operation level, Process Planning for ETO creates the new operation directly after the current operation.

7. Author work instructions for the process.

Note

You cannot add images to the **Editor** panel of the **Work Instructions** tab.

8. (Optional) Consume parts to the operation.

Pack and unpack elements

Packing an assembly lets you hide unnecessary elements, tools, and manufacturing elements, especially of the same type, such as a bolt or nut, by compacting them into single lines in an assembly. You can pack or unpack elements in an assembly and then allocate the elements to multiple operations within the structure.

Note

- Elements are unpacked for your current session only. You must unpack the components again the next time you log on.
- Elements can also be packed and unpacked in the manufacturing bill of materials (MBOM) on the **EBOM-MBOM Alignment page**, where packed or unpacked part occurrences may be assigned and unassigned from the engineering bill of materials (EBOM) to the MBOM. In the **Process Planning** or **Work Instructions Authoring** pages, you can review **assignment status icons** for packed lines by enabling **Show Consumption and Impact State** in the upper toolbars.

Procedure

1. If you have not done so already, **search for and open** an existing work package that contains processes and elements and **navigate** to the **Process Planning** or **Work Instructions Authoring** page.
2. In the **Assembly** tab or panel, expand the structure and do one of the following.
 - a. Select an assembly that contains multiple occurrences of one or more elements.

Tip

Elements with multiple occurrences contain identical names and find numbers.

Assembly			
Search for part			
		Object String	Find No.
		000064/A;1-LGear_666787	30
		000063/A;1-LGear_223546	30
		000064/A;1-LGear_666787	80
		000065/A;1-LGear_666786	10
		000065/A;1-LGear_666786	10
		000066/A;1-LGear_666785	20
		000066/A;1-LGear_666785	20
		000067/A;1-LGear_666784	30
		000067/A;1-LGear_666784	30
		000068/A;1-LGear_666783	40

- To pack all occurrences of the same element as a single line at the same level and all levels below the selected assembly, click **Pack All**

In the assembly, a packed line is indicated by an x, followed by the number of lines that are packed. For example, **x 2** indicates that the packed line contains two lines, or elements with the same name and find number.

Assembly			
Search for part 			
		Object String	Find No.
		000063/A;1-LGear_223340	50
		000064/A;1-LGear_666787	80
		000065/A;1-LGear_666786 x 2	10
		000066/A;1-LGear_666785 x 2	20
		000067/A;1-LGear_666784 x 2	30
		000068/A;1-LGear_666783	40

- To unpack all previously packed lines, click **Unpack All** .

Elements with multiple occurrences are displayed as separate lines, with identical names and find numbers.

Assembly			
Search for part			
	Object String	Find No.	
	000064/A;1-LGear_666787	30	
	000063/A;1-LGear_223546	30	
	000064/A;1-LGear_666787	80	
	000065/A;1-LGear_666786	10	
	000065/A;1-LGear_666786	10	
	000066/A;1-LGear_666785	20	
	000066/A;1-LGear_666785	20	
	000067/A;1-LGear_666784	30	
	000067/A;1-LGear_666784	30	
	000068/A;1-LGear_666783	40	

- b. Select an element for which multiple occurrences exist in the assembly.

	000064/A;1-LGear_666787	80
	000065/A;1-LGear_666786	10
	000065/A;1-LGear_666786	10

- To pack all occurrences of the element into a single line, click **Pack** .
- Instances with the same name and find number are packed into a single line.

	000064/A;1-LGear_666787	80
	000065/A;1-LGear_666786 x 2	10

- To unpack all occurrences of the element as individual lines, click **Unpack** .
- All occurrences of the unpacked line are displayed.

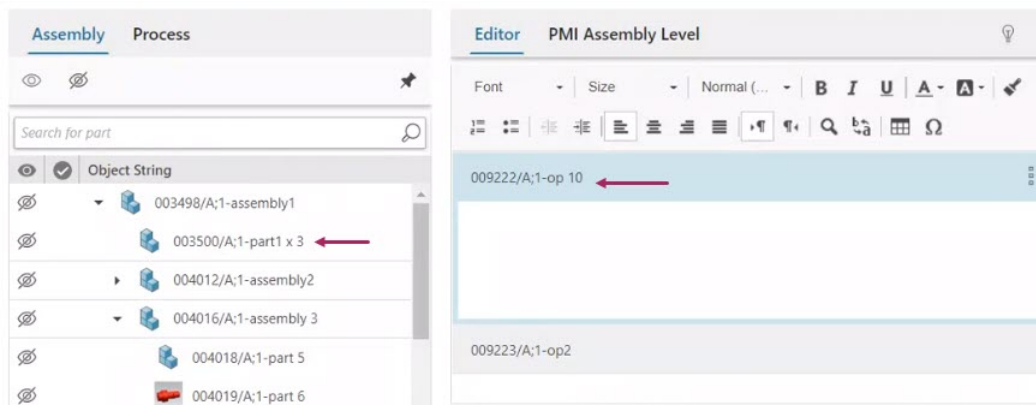
▼	 000064/A;1-LGear_666787	80
	 000065/A;1-LGear_666786	10
	 000065/A;1-LGear_666786	10

Unpack parts consumed to an operation

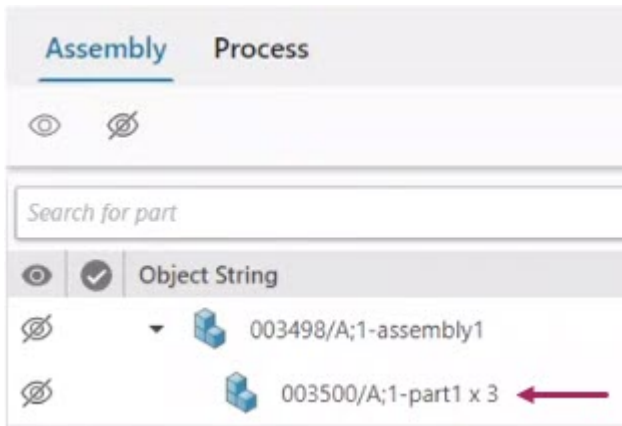
You can unpack part occurrences, or instances of the same identical part, that are consumed to an operation during planning. For example, if too many fasteners are consumed to one operation, you can unpack the part, reassign some fasteners to a different operation, and then pack the remaining parts.

Procedure

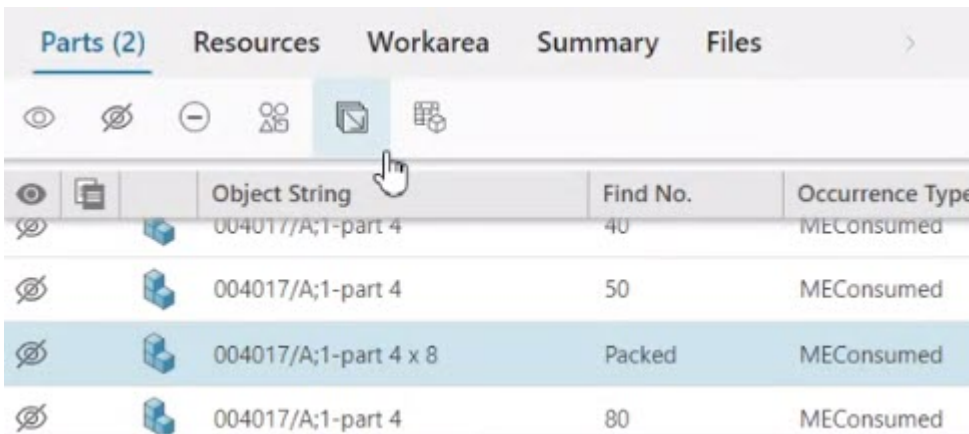
1. If you have not done so already, **search for and open** an existing work package that contains processes and parts and **navigate** to the **Process Planning** or **Work Instructions Authoring** page.
2. On the **Assembly** tab, expand the structure and select an assembly.
3. In the **Editor** tab, select a packed part that contains part occurrences assigned to operations within the assembly.



In the assembly, a packed line is indicated by an x, followed by the number of lines that are packed. For example, **x 3** indicates that the packed line contains three lines, or part occurrences.



4. (Optional) In the information panel below the **Editor** panel, drag the packed part from the **Assembly** tab to the **Parts** tab to consume the part to the operation.
5. In the **Parts** tab, select a packed line and click **Unpack** .



6. Select and consume the unpacked parts to separate operations within the structure.
7. In the **Parts** tab, select an unpacked part that is still consumed by an operation and click **Pack** . The part is once again packed and its individual occurrences are assigned to the operations.

View NC program files

You can view numerical control (NC) program files and work instructions and submit them to a workflow in Teamcenter Easy Plan.

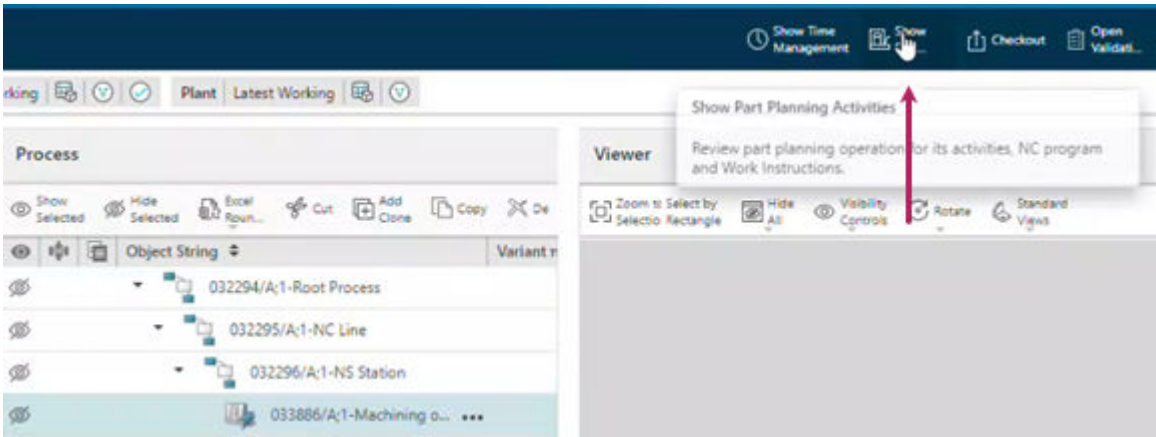
Prerequisites

You must be using Active Workspace version 6.2.3 or later.

In NX CAM, you must create an NC machine operation with machining activities. In addition, you must attach NC program and work instruction files to the machining activities associated with the NC machining operation.

Procedure

- 1. If you have not done so already, **search for an existing work package**.
- 2. In the **Process** panel, expand a process and select an NC machining operation.
- 3. (Optional) Select the NC machining operation, then click **Show Part Planning Activities**.



Teamcenter Easy Plan lists machining activities, NC program files, and work instructions associated with the machining operation.

Activites			
Object	Name	Duration (seconds)	Frequency
033886/A	033886/A	0	1
NC_PROGRAM	NC_PROGRAM	0	1
FLOOR FACING	FLOOR FACING	0	1
PROGRAM	PROGRAM	0	1

- 4. (Optional) In the **Activities** panel, select an **NC_Program** object or a work instruction and view its attachments in the **Files** subtab.
- 5. (Optional) In the **Activities** panel, select an NC Program or a work instruction and **submit it to a workflow**.

Part planning with Easy Plan and NX CAM

You can create a numerical control (NC) machining operation, assign the part to be machined, and allocate the necessary resources. Once the operation is set up, you can open the NC machining operation in NX CAM to update the machining information, such as the NC program and work instructions.

After updating the information in NX CAM, you can save the changes to be viewed. This integration ensures that all machining details are captured accurately and easily accessible.

Prerequisites

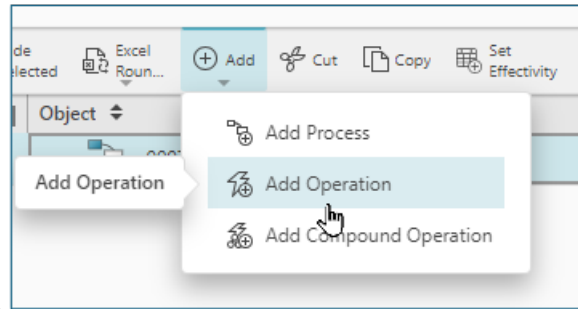
- Active Workspace version 6.2.3 or later along with Teamcenter version 14.2.0.3 or later, and the corresponding NX version.
- Install the following templates:
 - NX for Active Workspace
 - NX Integration
 - NX Foundation
 - NX Part Family Classification Integration
 - NX Rich Client Integration
 - NX Templates for Teamcenter
- Set the following preferences.

Preference	To do this	Do this
AW_NX_OpenSupportedTypes	View the Open in NX command for an NC operation in Easy Plan	Add the value MENCMachiningRevision
EP_CreateSubTypesForType_MEOP	Create an NC operation in Easy Plan	Add the value MENCMachining
EP_Enable_PartPlanningActivities	View the part planning activity panel in Easy Plan	Set the value to true
EP_PartPlanning_ActivitiesTableColumnConfiguration	Specify columns to be displayed in the part planning activity panel	
AWC_defaultViewerConfig.VIEWERCONFIG	View content of the attached NC program and work instruction for the selected activity in Preview in the Files section under Part Planning Activities	add the value UGCAMPTP.Awp0TextViewer=PT P, Fnd0MPF,Fnd0SPF,Fnd0H, Fnd0NC,Fnd0TXTFnd0H, Fnd0NC,Fnd0TXT

- Select a configuration file for an operation in NX CAM.
 - If you are using the Manufacturing Resource Library and have the necessary license, you can select **cam_part_planner_mrl.dat**.
 - If you do not have the necessary license, you can select **cam_teamcenter_ascii_library.dat**.

Procedure

1. If you have not done so already, **search for an existing work package** or **create a work package**.
2. In the **Process** panel, expand a process and select a process station.



3. Click **Add**, then select **Add Operation**.
4. In the **Add Operation** dialog box, select the type **NC Machining Operation**, type an operation **Name**, and then click **Create**.
Teamcenter Easy Plan creates the NC machining operation as a child of the process station.
5. To assign parts to the NC machining operation, select the NC machining operation and verify that the **Parts** tab below the **Process** panel is active.
6. Select the **Assembly** subtab, expand the MBOM, and drag objects to the **Parts** tab.
Alternatively, you can assign the part by copying and pasting it onto the operation or by dragging and dropping it onto the operation.

Note

The assigned part may be considered as the work part in NX CAM.

Teamcenter Easy Plan assigns the parts to the operation.

7. (Optional) To assign resources to the NC machining operation, select the **Resources** subtab, then expand the work area.
8. You can either:
 - Drag and drop resources in the **Resources** tab.
 - Copy and paste the resources to the operation.

Alternatively, you can assign a **Work Area** to the NC machining operation.

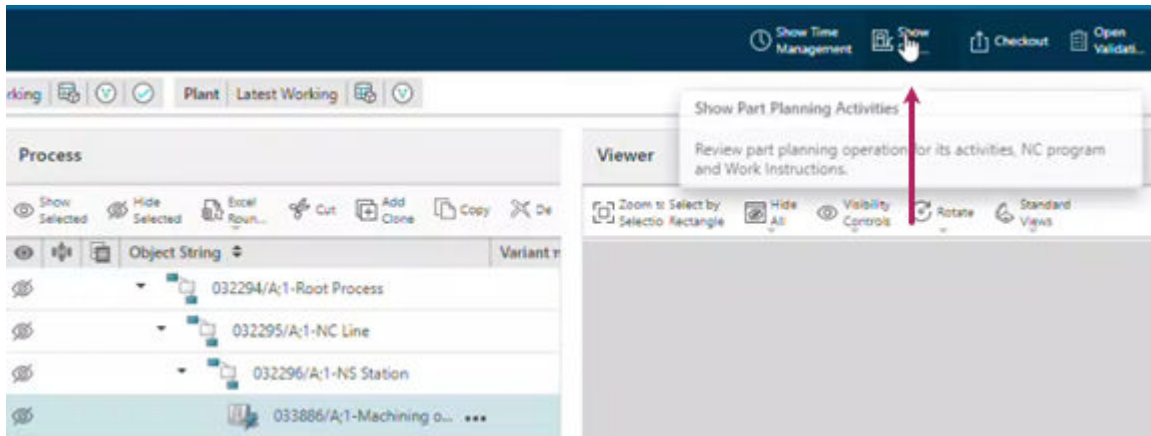
Teamcenter Easy Plan assigns the resources or work area to the NC machining operation.

9. In the **Process** panel select the NC machining operation, click **...**, and select **Open in NX**.
The NC machining operation is opened in NX. You can author or make changes to the NX CAM data, and save those changes back to Easy Plan.

Note

When saving changes from NX CAM, the displayed datasets depend on whether only the dataset for the post-processed NC program is available or if the dataset for the published work instruction is also available.

10. Select the NC machining operation, then click **Show Part Planning Activities**.



Teamcenter Easy Plan lists machining activities or operations created in NX CAM, NC program files, and work instructions (if available) associated with the machining operation.

11. View the activities, like the operations created in NX CAM, NC program files, and published work instructions associated with the activities.

Viewing background parts during process planning

Managing background parts

During planning you may need to display parts that were installed earlier in the manufacturing process, to give operators a clear view and clear instructions for the current operation. Parts and assemblies that are installed earlier in the manufacturing process are called *background parts*.

You must complete the following tasks, in order, when you work with background parts:

1. Verify that the work package you are using has an engineering bill of materials (EBOM) associated with it.
2. **Assign parts as background parts** in your assembly.
3. **Show or hide assigned assemblies for background parts.**

On these pages, you can work with background parts:

- **Background Parts Management**
- **EBOM-MBOM Alignment**
- **Process Planning**
- **Work Instructions Authoring**

Assign parts as background parts

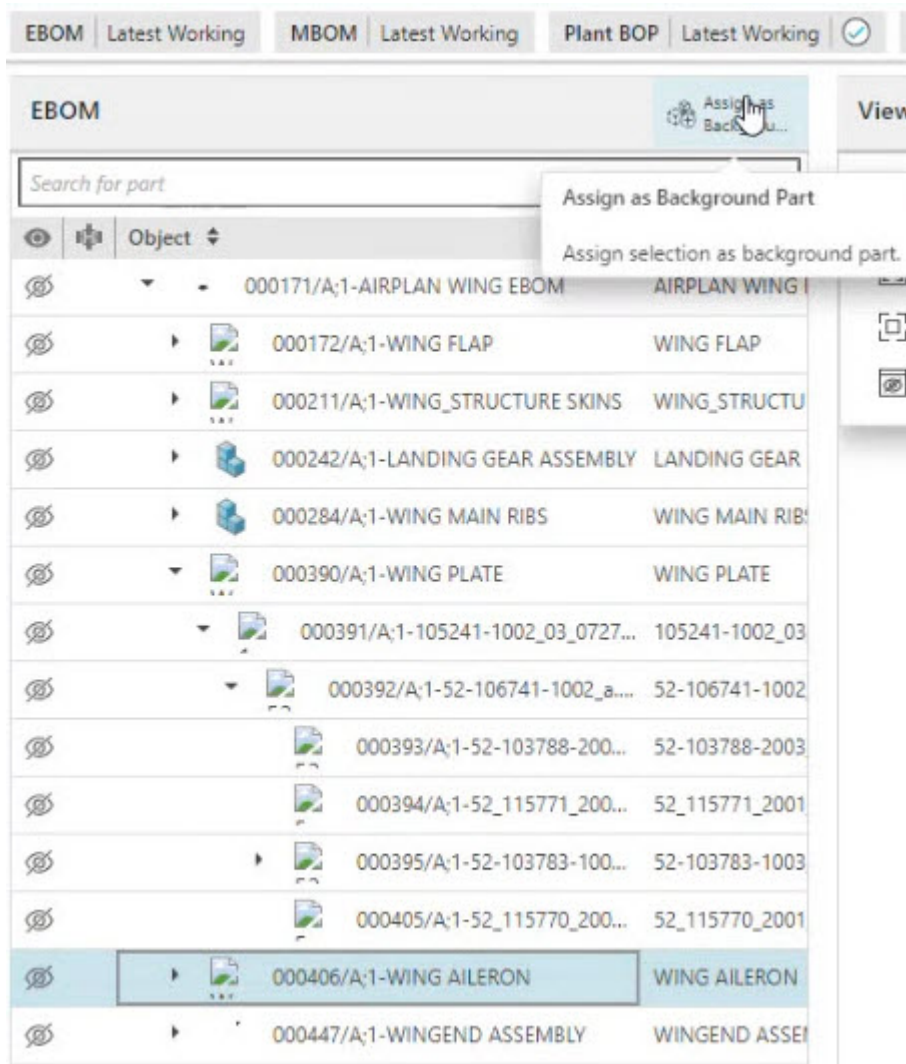
You must assign parts as background parts before you can view those background parts in a structure during planning.

Prerequisites

The work package you are using must have an engineering bill of materials (EBOM) associated with it before you can assign parts as background parts in a structure.

Procedure

1. Open an existing work package, then navigate to the **Background Parts Management** page. Easy Plan loads the EBOM for the work package.
2. (Optional) In the **EBOM** tab, click **Show Selected** to indicate which lines you want to display in the **Viewer** panel.
3. Select one or more parts in the EBOM and click **Assign as Background Part**.



Easy Plan assigns the selected items as background parts in the assembly, and lists those parts in the **Assigned as Background Parts** panel.

4. (Optional) To remove assigned background parts, select one or more parts in the **Assigned as Background Parts** panel and click **Unassign**.
5. (Optional) **Navigate to the Process Planning or Work Instructions Authoring** pages to plan manufacturing processes or create work instructions for the assembly.

Show or hide assigned assemblies for background parts

You can show and hide assigned assemblies for background parts in the **Viewer** panel on the **Process Planning** and **Work Instructions Authoring** pages.

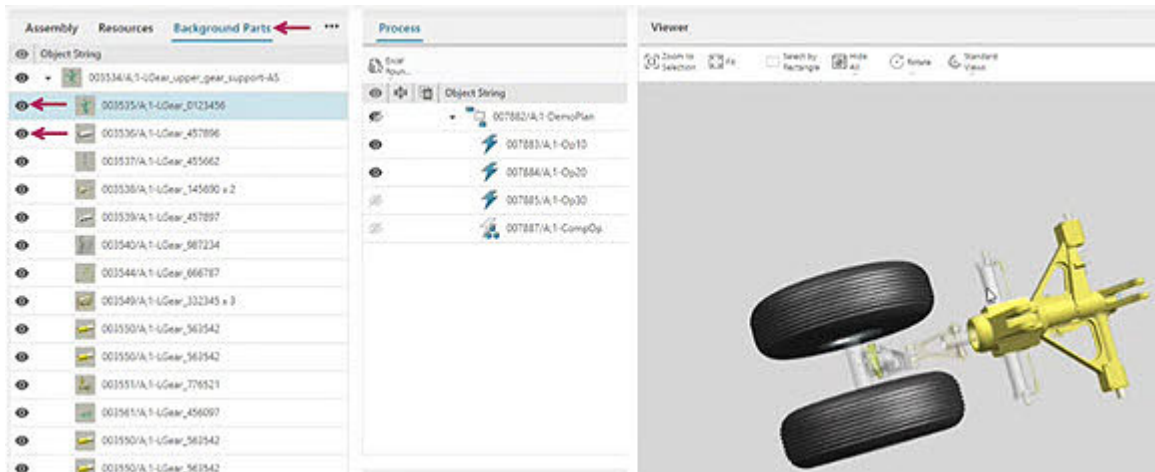
Prerequisites

Before you begin, verify that:

- Your work package has an engineering bill of materials (EBOM) associated to it.
- You have **assigned objects as background parts** in the work package.

Procedure

1. **Open** an existing work package, or **create** one and open it, and then **navigate** to the **Process Planning** or **Work Instructions Authoring** page.
2. Click the **Background Parts** tab, and then click **Show Selected**  to select items that you want to display in the 3D viewer.



Teamcenter Easy Plan shows the background parts as transparent images, and shows assembly parts in full color so that you can quickly distinguish between them in the viewer.

Teamcenter Easy Plan synchronizes the display between the 3D viewer and the assembly tree. If you select an item in the 3D viewer, Teamcenter Easy Plan highlights that item in the assembly tree. If you select an item in the assembly tree, Teamcenter Easy Plan highlights that item in the 3D viewer.

3. (Optional) Click **Hide Selected**  to hide the background parts in the 3D viewer.

Show or hide the target MBOM subassembly while working with background parts

You can show or hide the target manufacturing bill of materials (MBOM) subassembly in the **Viewer** panel while you work with background parts in the **Background Parts Management** page.

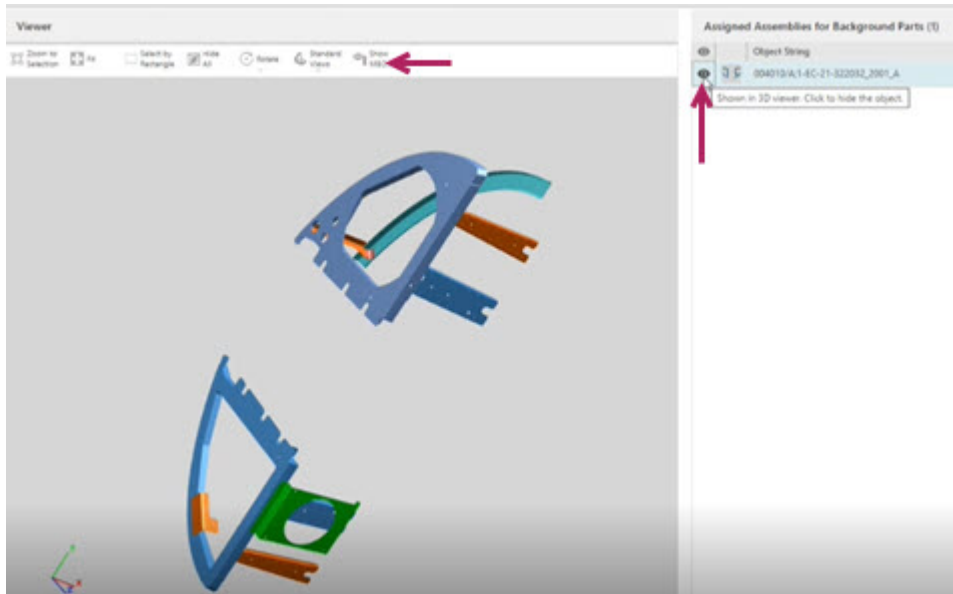
Prerequisites

Before you begin, verify that:

- Your work package has an engineering bill of materials (EBOM) associated to it.
- You have **assigned objects as background parts** in the work package.

Procedure

1. **Open** an existing work package, or **create** one and open it, and then **navigate** to the **Background Parts Management** page.
2. Load the engineering bill of materials (EBOM) that you want to work with and in the **Assigned Assemblies for Background Parts** panel, click **Show in 3D viewer** .



Teamcenter Easy Plan displays the assigned assemblies for background parts in the 3D viewer.

Teamcenter Easy Plan synchronizes the display between the 3D viewer and the EBOM. If you select an item in the 3D viewer, Teamcenter Easy Plan highlights that item in the EBOM. If you select an item in the EBOM, Teamcenter Easy Plan highlights that item in the 3D viewer.

3. (Optional) Click **Hide in 3D viewer**  to hide the assigned assemblies for background parts.
4. In the 3D viewer, click **Show Target Assembly** to view the target MBOM assembly. Teamcenter Easy Plan displays the target MBOM subassembly in the 3D viewer.

Teamcenter Easy Plan shows the background parts as transparent images, and shows the target MBOM subassembly parts in full color so that you can quickly distinguish between them in the viewer.

5. (Optional) Click **Hide Target Assembly** to stop displaying the target MBOM assembly in the 3D viewer.

Drag parts and files onto the Editor

You can drag one or more parts or files to the **Editor** and assign those objects to an operation, regardless of which tab is active for the operation.

For example, if the **Resources** tab is active, you can drag several parts to the **Editor** without first switching to the **Parts** tab.

Prerequisites

You must set the **EP_FileDatasetRelations** value to include the following relation type values:

- IMAN_specification
- IMAN_reference
- IMAN_manifestation
- IMAN_Rendering
- TC_Attaches
- IMAN_UG_altrep
- IMAN_UG_scenario
- IMAN_Simulation

In addition, you must add the **EP_FileDatasetRelations** preference to the **AWC_Startup_preference** in the Teamcenter rich client.

See the *Preferences* section in the *Active Workspace Administration* documentation for a description of preferences and how to set them.

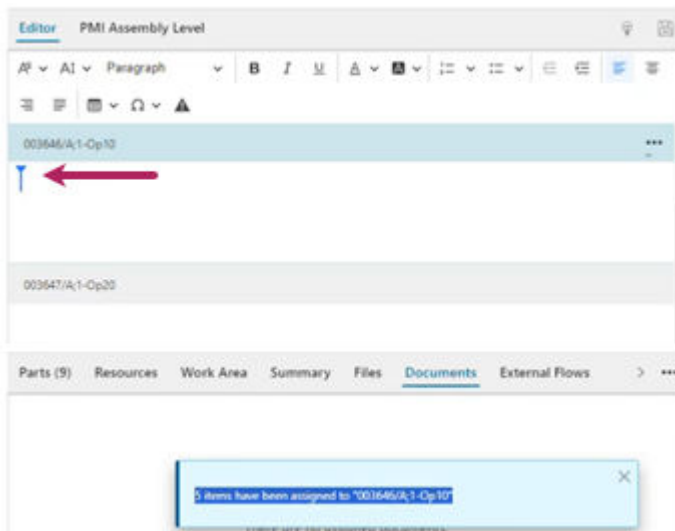
Procedure

1. **Search for and open** a work package, and then **navigate** to the **Work Instructions Authoring** page.
2. Expand the bill of process (BOP) and select one or more objects within it.
For example, expand a subassembly and select one or more parts.

Note

This topic uses parts in the example, but you can perform this task with parts or files.

3. Drag the selected objects to an operation on the **Editor**.



Teamcenter Easy Plan does the following:

- Changes the cursor within the operation to indicate that items were dragged onto it.
 - Assigns the correct relations type to the objects that you dragged onto the operation.
 - Displays a message that states how many objects were assigned to the operation.
4. (Optional) Click the tab to view the objects you just dragged to the **Editor**.
- For example, if you dragged parts to an operation, click the **Parts** tab to view them.

Planning operations

Add or delete an operation in work instructions

To perform planning tasks, load a target process and its assembly, then add operations and work instructions to the assembly.

Procedure

1. If you have not done so already, **search for and open** an existing work package that contains processes and parts, and **navigate** to the **Work Instructions Authoring** page.
2. In the **Assembly** tab, select a part or assembly that has assigned processes and operations. Processes and operations assigned to the part or assembly are displayed in the **Editor** tab.
3. In the **Editor** tab, next to a process or operation, click **More**  → **Create Operation** .

Note

- If you add a new operation to a process, the operation is added as the last in the process.
- If you add a new operation to an operation, the operation is added after the current operation.

4. In the **Create Operation** dialog box, in the **Name** box, type an operation name, and click **Create**. The operation is added to the **Editor** and **Process** tabs.
5. **Author** the work instructions for the process or operation.
6. (Optional) Add additional operations to the process plan.

Tip

As you plan a process, click on process objects to synch the work instruction to the processes or operations you need to document. The tabs in the information panel beneath the **Editor** tab are also synched to the selected process or operation.

The screenshot displays the software interface for creating and editing work instructions. The left pane shows the **Process** tab with a list of operations. The right pane shows the **Editor** tab for the selected operation.

Process Tab:

Object String	Find N
000222/A;2-process1	10
001039/A;2-Op40	10
001650/A;1-MyOp	15
001034/A;2-op1	20
001036/A;2-Op10	30
001037/B;2-Op20	40
001038/A;2-Op30	50
001287/A;2-Proc2	60
001288/A;2-10	10
001289/A;2-20	25
001290/A;2-30	30

Editor Tab:

The **Editor** tab is titled **PMI Assembly Leve**. It contains a text area for the work instruction. Below the text area, the **Parts (4)** tab is selected, showing a list of parts:

Object String
000058/A;1-LGear_145690
000070/A;1-LGear_563542
000070/A;1-LGear_563542
000070/A;1-LGear_563542

7. (Optional) To remove or replace a process or operation, next to its heading, click **More** → **Delete**.

Add compound operations and execution steps

You can add compound operations to a process or a process area. Unlike a standard operation, which can define only a single activity, a compound operation can contain multiple execution steps that break that operation into specific steps to be executed.

Procedure

1. **Open** an existing work package, or **create** one and open it.
2. **Navigate** to work package planning tasks, and then **navigate** to the **Process Planning** page.
3. On the **Process Planning** page, select a process, and in the process toolbar, select **Create**  → **Create Compound Operation** .

Note

If you add a compound operation under a released process, you are prompted to revise the process before continuing.

4. In the **Create Compound Operation** dialog box, type a **Name** and optional **Description**.
5. Do one of the following.
 - To create a single compound operation, click **Create**.
 - To create an additional compound operation, click **Create & Add More**.

Note

The compound operations  are created as the last child element of the selected process. If the compound operations have mandatory properties (including customized properties), those automatically appear in the new object dialog box.

6. In the **Process** panel, select the compound operation, and in the process toolbar, select **Create** .
7. To create one or more execution steps, type a **Name** and optional **Description**.
8. Do one of the following.
 - To create a single execution step, click **Create**.
 - To create an additional execution step, click **Create & Add More**.

Note

The execution steps  are created as the last elements under the selected compound operation.

Results

Once they are created, compound operations and execution steps are visible in the **Process** tab and **Editor** pane of the **Work Instructions Authoring** page, as well as in Electronic Work Instructions.

Clone operations

If you have authored operations, you can use those operations as templates to clone new operations, and paste duplicate multiple operations at once.

The **Copy**  and **Paste**  commands are available, respectively, from the BOM and BOP toolbars. In Easy Plan, the ability to drag files or objects to other objects works the same way as it does in other applications. For more details on resequencing and moving elements, see [Rules for cloning, moving, and resequencing objects in the BOM or the BOP](#).

Note

When you clone an operation, Teamcenter settings determine whether consumed parts and assigned resources are copied to the new operation. Contact your Teamcenter administrator with questions about cloning rules in your environment.

Procedure

1. Open a work package that contains processes and operations.
2. Under the **Work Instructions** tab, with the **Process** tab active, expand the structure.
3. In the **Process** table, select the operation you want to clone and click **Open** .
 - To clone the operations and add them to the current process, select another operation in the process and click **Paste Before** or **Paste After**.

Note

If you open a separate browser tab, you can use the **Paste Before** or **Paste After** commands to clone operations:

- a. Into a different process scope.
- b. Into a different work package.

- To clone the operations to a different process, select the process and click **Paste Into**.

Note

Paste into is only an option when you select a process into which you want to clone operations.

If you open a separate browser tab, you can use the **Paste into** command to clone operations into a different process scope.

- To clone the operations and add them to the same level as a process, select a process in the structure and click **Paste Before** or **Paste After**.

4. Click **Clone** and select **Clone Operation** .

Select one of the following options:

- To clone the operations and add them to the current process, select another operation in the process and click **Paste Before** or **Paste After**.

Note

If you open a separate browser tab, you can use the **Paste Before** or **Paste After** commands to clone operations:

- a. into a different process scope.
- b. into a different work package.

- To clone the operations to a different process, select the process and click **Paste Into**.

Note

Paste into is only an option when you select a process into which you want to clone operations.

If you open a separate browser tab, you can use the **Paste into** command to clone operations into a different process scope.

- To clone the operations and add them to the same level as a process, select a process in the structure and click **Paste Before** or **Paste After**.

What to do next

Teamcenter Easy Plan clones the operation and adds it to the structure.

Tip

If cloning rules in your environment copy all objects associated with an operation, the **Parts** and **Resources** subtabs display objects associated with the cloned operation.

Product Configurator variants

Analyze variant formulas defined for an operation

You can view and analyze the variant formulas that are defined for an operation. You can complete this task while you work in a process station, or while you work on operations from the line balancing page.

Procedure

1. In the plant bill of process (BOP), open or navigate to a process area or process line.
2. Select a station, and then select multiple operations within the station.

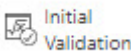
You can also select and analyze a single operation.

3. Click **Open Variant Formula**  icon.

- Click **Show Families**  to expand the **Filter** column.

- Review and analyze variant formulas defined for the operations.

A check mark in a table cell indicates that the formula is defined for that operation.

- (Optional) Click **Initial Validation**  to validate whether defined variants meet the rules.

Note

If all variant conditions are within guidelines, Teamcenter Easy Plan displays a message that states "Variant Conditions were validated."

If some variant formulas are not within guidelines, Teamcenter Easy Plan displays a message that states some variant conditions were not validated. You must resolve those variant formulas.

- Click **X** to return to the **Balance** page.

Define variant formulas for operations

You can add and remove variants from operations in your production plan. You can complete this task while you work in a process station, or while you work on operations from the line balancing page.

Procedure

- In the plant bill of process (BOP), open or navigate to a process area or process line.
- Select a station, and then select multiple operations within the station.

You can also select and define the variant formula for a single operation.

Operations (ST 30)		
       		
Rev Name	Allocated Time Converted	Associated Process Resource
 OBTAIN AND INSTALL BREMBO ...	17.00	
 OBTAIN AND INSTALL ROTOR T...	21.00	Operator 30
 SECURE ROTOR WITH LOCK NUT	19.50	Operator 35
 SECURE ROTOR WITH LOCK NUT	9.00	Operator 30

- Click **Open Variant Formula**  .
The **Variant Formula** dialog box opens.

Filter					Show Families Initial Validation Start Edit		
					001188/A...	001189/A...	001190/A...
					001191/A...		
▼ [Teamcenter]doors							
4					✓		⊗
5						✓	
▼ [Teamcenter]engine							
1.6					⊗		
2.0							

Within the **Variant Formula** dialog box:

- Each operation that you selected is a table column.
- Table cells indicate the status of variant formulas for each operation.
A check mark in a table cell indicates that the formula is defined for that operation.
- The variant families or options are listed as table rows.
- The caret in each column heading opens a drop-down menu with additional options for that operation.

4. Click **Show Families** to expand the **Filter** column.

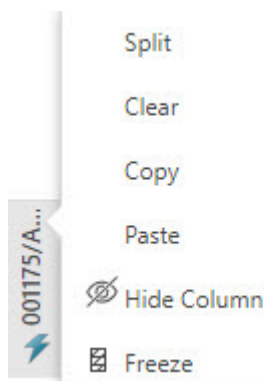
5. Click **Start Edit** .

Click inside a table cell to add a variant formula to an operation.

6. A check mark is displayed in the table cell.

7. (Optional) Click inside a table cell to remove a variant formula from an operation.

8. Click the caret in a column heading to open a menu for that operation, and select an option:



- **Split**—Creates a second column for the operation, so that you can author variants with an OR formula.

- **Clear**—Removes all variants that are defined for the operation.
- **Copy**—Copies all variants for the operation, so that you can paste them onto another operation.
- **Hide Column**—Hides data for the selected operation.
This setting is active only while the dialog box is open.
- **Freeze**—Locks data for the selected operation. Other users cannot change variant definitions for the operation.
This setting is active only while the dialog box is open.

9. Click **Save Edits**  , and click **X**.
Teamcenter Easy Plan returns to the **Balancing** page. The **Variant Formula** column displays defined variant formulas for each operation within the station.

Operations (ST 30) (2 missing time allocations)

Rev Name	Variant Formula
 OBTAIN AND INSTALL BREMBO ...	[Teamcenter]doors = 4 AND [Teamcen...
 OBTAIN AND INSTALL ROTOR T...	[Teamcenter]doors = 5 AND [Teamcen...
 SECURE ROTOR WITH LOCK NUT	[Teamcenter]doors = 5 AND [Teamcen...
 SECURE ROTOR WITH LOCK NUT	[[Teamcenter]doors = 5 AND [Teamce...

Copy defined variant formulas to another operation

After you define the variant formula for an operation, you can copy and paste the variant formula into other operations to save time. You can complete this task while you work in a process station, or while you work on operations from the line balancing page.

Procedure

1. In the plant bill of process (BOP), open or navigate to a process area or process line.
2. Select a station, and then select multiple operations within the station.

Tip

One operation must contain the variant formula you want to copy.

3. Click **Open Variant Formula**  .
The **Variant Formula** dialog box opens.

Show Families

Initial Validation

Start Edit

Filter	001188/A... ⚡	001189/A... ⚡	001190/A... ⚡	001191/A... ⚡	
▼ [Teamcenter]doors					
4	✓			⊘	
5		✓			
▼ [Teamcenter]engine					
1.6	⊘				
2.0					

Within the **Variant Formula** dialog box:

- Each operation that you selected is a table column.
- Table cells indicate the status of variant formulas for each operation.
A check mark in a table cell indicates that the formula is defined for that operation.
- The variant families or options are listed as table rows.
- The caret in each column heading opens a drop-down menu with additional options for that operation.

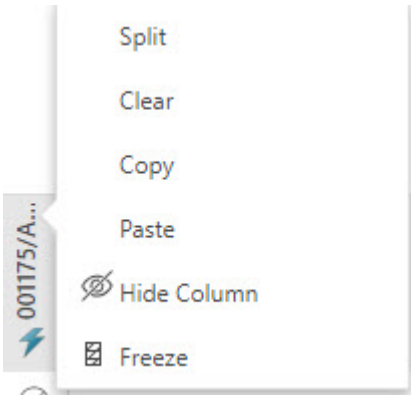
4. Click **Show Families**

Show Families

 to expand the **Filter** column.
5. Click **Start Edit**

Start Edit

 .
6. Click the caret for the operation from which you want to copy variants, and select **Copy** from the menu.



- Click the caret for the operation into which you want to paste the copied variants, and select **Paste** from the menu.

- Click **Save Edits** .

Teamcenter Easy Plan returns to the **Balancing** tab. The **Variant Formula** column displays defined variant formulas for each operation within the station.

Operations (ST 30) (2 missing time allocations)

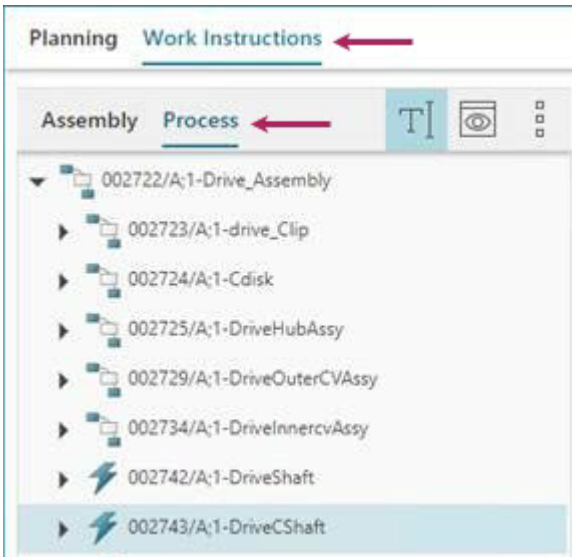
Rev Name	Variant Formula
 OBTAIN AND INSTALL BREMBO ...	[Teamcenter]doors = 4 AND [Teamcen...
 OBTAIN AND INSTALL ROTOR T...	[Teamcenter]doors = 5 AND [Teamcen...
 SECURE ROTOR WITH LOCK NUT	[Teamcenter]doors = 5 AND [Teamcen...
 SECURE ROTOR WITH LOCK NUT	([Teamcenter]doors = 5 AND [Teamce...

Assign classified tools and resources to operations

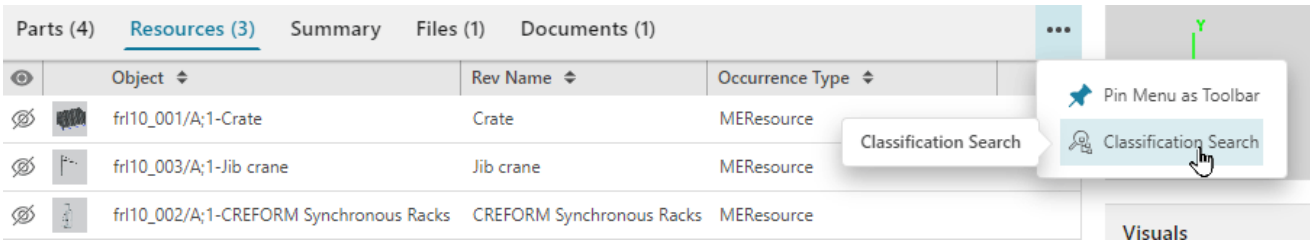
You can assign tools and resources from a classified library to operations in many task pages.

Procedure

- If you have not done so already, **search for and open** an existing work package that contains processes and operations and **navigate** to the **Process Planning, Work Instructions Authoring, or Product BOP Authoring** page.
- In the relevant task panel (usually the **Process** tab or panel), select the operation to which you want to assign classified tools and resources.



3. In the **Information** panel, click the **Resources** tab, and then click **Classification Search** .



The **Resources** tab, as shown in the **Product BOP Authoring** page above, shows resources that are already assigned to the selected operation. When you click **Classification Search**, the Active Workspace **Classification** library is opened.

4. In the **Class Navigator**, locate and select the preferred resource and click **Copy** .

Note
For more information, see [Classification and Library Management](#).

5. Return to the Easy Plan task page, and in the **Resources** toolbar, click **Paste** .

The **Resources** table now lists the classified objects you assigned to the operation. Columns, which are customizable, might include the following.

- The **Classifications** column indicates which resources in the table are classified. If this field is blank, the object in that row is non-classified.
- The **Occurrence Type** column indicates which occurrence type is assigned to each assigned resource. Your Teamcenter administrator defines which occurrence types are assigned to assigned resources in the structure.

What to do next

Note

To remove an assigned resource from an operation, select the row in the **Resources** subtab and click **Unassign** .

Classify processes and operations

You can assign processes and operations to a classified library to enrich your data with attributes and classification properties, and make it easier to locate for future reuse.

Prerequisites

You must set the **lcs_classifiable_types** value to **MEProcess**, **MEProcessRevision**, **MEOP**, and **MEOPRevision** to enable classification of processes and operations.

To enable the **Classification** column on the **Process** table, add the **ImanItemBOPLine.bl_rev_fndOlcsClassNames** value to the **EP_ProcessTreeAssemblyPlanningColumnConfiguration** preference.

In addition, you must add the following preferences to the **AWC_Startup_preference** in the Teamcenter rich client:

- **EP_ProcessTreeAssemblyPlanningColumnConfiguration**
- **lcs_classifiable_types**

See the *Preferences* section in the *Active Workspace Administration* documentation for a description of preferences and how to set them.

Procedure

1. If you have not done so already, search for and open an existing work package that contains processes and operations, and navigate to the **Work Instructions Authoring** or **Process Planning** page.
2. If you are on the **Work Instructions Authoring** page, select a process or operation, and in **Editor** tab, next to the process or operation name you just selected, click **More → Classify**.
3. If you are on the **Process Planning** page, in the **Process** panel, select a process or operation and click **More → Classify**.
4. In the **Classify** panel, expand the **CLASSES** list.
5. (Optional) Use the keywords field to filter your search.
6. Select one or more classes from the list and click **Classify**.

The **Summary** tab now lists classification hierarchy and attribute objects you assigned to the process or operation.

Assign an operation to a work area

You can assign an operation to the work area where it is to be performed.

Procedure

1. If you have not done so already, **search for and open** an existing work package, or **create** a work package, and **navigate** to the **Work Instructions Authoring** or **Process Planning** page.
2. In the **Process** tab or panel, expand the structure and select an operation.

Note

A single work area can have one or multiple operations assigned to it. Press **Ctrl** to select multiple operations.

3. Click **More**  → **Assign Work Area** .
The **Assign Work Area** dialog box lists all plants and work areas in the plant bill of equipment (BOE).
4. Select a work area, and click **Assign**.
5. (Optional) In the information panel at the bottom of the screen, click the **Work Area** tab.
The **Work Area** tab shows work areas that are assigned to the selected operation. You can also assign work areas to the selected operation from the **Work Area** tab.

Parts (4) Resources Work Area (1) > 			
	Object String	Item Revision T...	Item Revisi
	001649/A;1-Factory 1	Plant Revision	

Note

To remove an assigned work area from an operation, select the row in the **Work Area** tab and click **Remove Work Area** .

View the full BOE and assign objects to the BOP

You can view the full bill of equipment (BOE) structure in a tree view, and efficiently assign objects from it to the bill of process (BOP).

This is most useful if the BOE for your product has one layer or a few layers. It is not practical for a larger product that has a larger BOE.

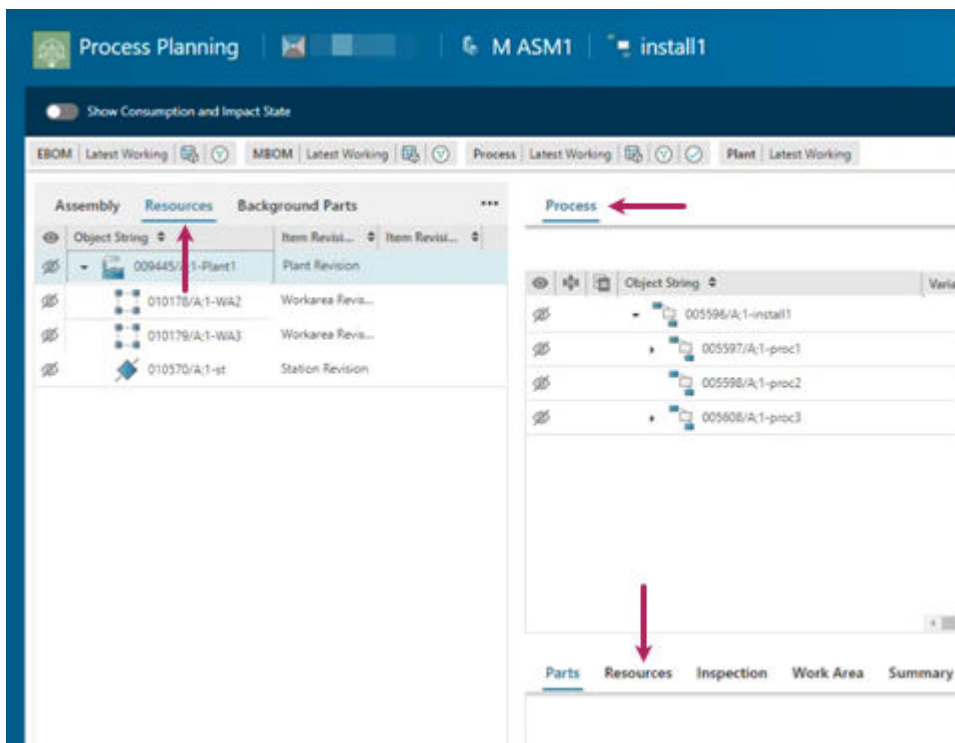
Prerequisites

You must set the **EP_ShowFullBOEInResources** preference value to **true**. In addition, you must add **EP_ShowFullBOEInResources** to the **AWC_Startup_preference** in the Teamcenter rich client.

See the *Preferences* section in the *Active Workspace Administration* documentation for a description of preferences and how to set them.

Procedure

1. If you have not done so already, **search for and open an existing work package**, and then **navigate to the Process Planning page**.
2. In the **Assembly** panel, select the **Resources** subtab.



Teamcenter Easy Plan displays the BOE for the structure.

3. Expand the structure in the **Process** panel, and select the process object to which you want to assign an object from the BOE.
4. Drag items from the BOE to the **Resources** tab in the **Process** panel.

You can also drag classified resources from the BOE to the **Resources** in the **Process** panel.

Teamcenter Easy Plan assigns those objects from the BOE to the object in the **Process** panel.

Assigning operations to a process resource

You can assign operations to a process resource such as a worker, fixture, or robot, on both the **Process Planning** page and the **Work Instructions Authoring** page.

In this example, on the **Process Planning** page, the **Process** panel shows two process resources, **Operator1** and **Operator2**, who are assigned to a station. Two operations are associated with **Operator1**, while **Operator2** is currently unassociated with any operations.

Process		
	Object String	Find No.
	011093/A;1-D_Station	60
	011094/A;1-OP1	10
	011095/A;1-OP2	20
	011096/A;1-Operator1	30
	011099/A;1-OP3	40
	011100/A;1-OP4	50
	011102/A;1-Process2	70
	011101/A;1-Process1	60
	011104/A;1-Operator2	80

On the **Work Instructions Authoring** page, the **Process** panel shows the same structure. Here, the operation is a node in the **Editor** panel, where you can add instructions to the operator using all standard editing tools.

Assembly

Process

...

Selection synced with Editor. Switch

	Object String	Find No.
	011093/A;1-D_Station	60
	011094/A;1-OP1	10
	011095/A;1-OP2	20
	011096/A;1-Operator1	30
	011099/A;1-OP3	40
	011100/A;1-OP4	50
	011102/A;1-Process2	70
	011101/A;1-Process1	60
	011104/A;1-Operator2	80

Editor

PMI Assembly Level

A²

A₁

Paragraph

B

I

U

A

A

:

:

:

011095/A;1-OP2

011096/A;1-Operator1

011099/A;1-OP3

Note

Process toolbar options such as cut, copy, and paste are not available when you select a process resource in the process tree.

Add or remove DCDs

You can add and remove data collection definitions (DCDs) to a process, process station, operation, compound operation, or execution step in both plant and classic bill of process (BOP) data models to better define your inspection plan.

Note

- The purpose of DCDs is to collect operational production data that is associated with production equipment and processes on the shop floor.
- You can add DCDs by creating them yourself, importing them from CAD applications to operations, or defining them in Teamcenter Manufacturing Process Planner (MPP).
- DCDs that you create share the same behaviors as those generated in MPP.

Procedure

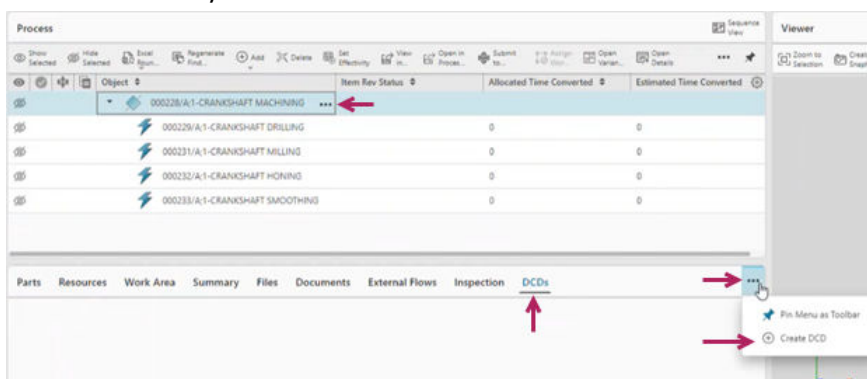
1. If you have not done so already, **search for and open** an existing work package, or **create** a new work package, and then **navigate** to the **Process Planning** or **Work Instructions Authoring** page.
2. On the **Process** tab or panel, select the process, process station, operation, compound operation, or execution step for which you want to add or remove DCDs.
3. In the information panel, select the **DCDs** tab.

The **DCDs** tab contains any DCDs previously created for the selected object.

Tip

If you do not see the **DCDs** tab, click the arrow in the tabs menu to expand or collapse the tabs list.

4. In the **DCDs** tab, click ***** More Commands** and then select **Create DCD** ⊕.



5. In the **Create DCD** dialog box, click **Type** and select the type of DCD you want to create.

You can choose from:

- **Boolean**
- **Buyoff**
- **Duration**
- **Image**
- **Integer** (whole number)
- **Procedure Completion**
- **Real Number** (can include fractions)
- **String**
- **Time Stamp**
- **User Defined LOV** (list of values)

6. Type a unique **Name**, and add any properties required for the DCD you are creating.

You can define DCD details for numeric, string, and Boolean DCDs, including:

- Upper and lower limit specifications for numeric DCD types, such as standard, alert, and caution **Low Limit** and **High Limit** numeric values. Default values are validated against the **Minimum Alert Allowed Value** and **Alert Maximum Value** values. String DCDs are similarly restricted by the value of **Allowed Characters**.
- **Data Acquisition Method**, in which you specify how data should be acquired (manually, semiautomatically, or automatically).
- **Out of Limits Result**, in which you define the result if a value is outside a low or high limit.
- **Field Precision**, in which you define the number of decimal places required after the point in real numbers.

7. Select one of the following options.

Option	Description
To create a DCD and define another DCD	Click Create & Add More
To create a single DCD	Click Create

8. In the list on the **DCDs** tab in the information panel, review the properties you defined in step 6.
9. (Optional) If you need to remove one or more DCDs, select the DCDs to be removed in the list, and in the **DCDs** tab toolbar, click **Remove DCD** .
10. Select **Yes** to the prompt verifying that you want to remove the DCDs.

Teamcenter Easy Plan removes the selected DCDs.

Edit DCD properties

You can edit the properties for existing data collection definitions (DCDs) you created for a process, process station, operation, compound operation, or execution step.

Procedure

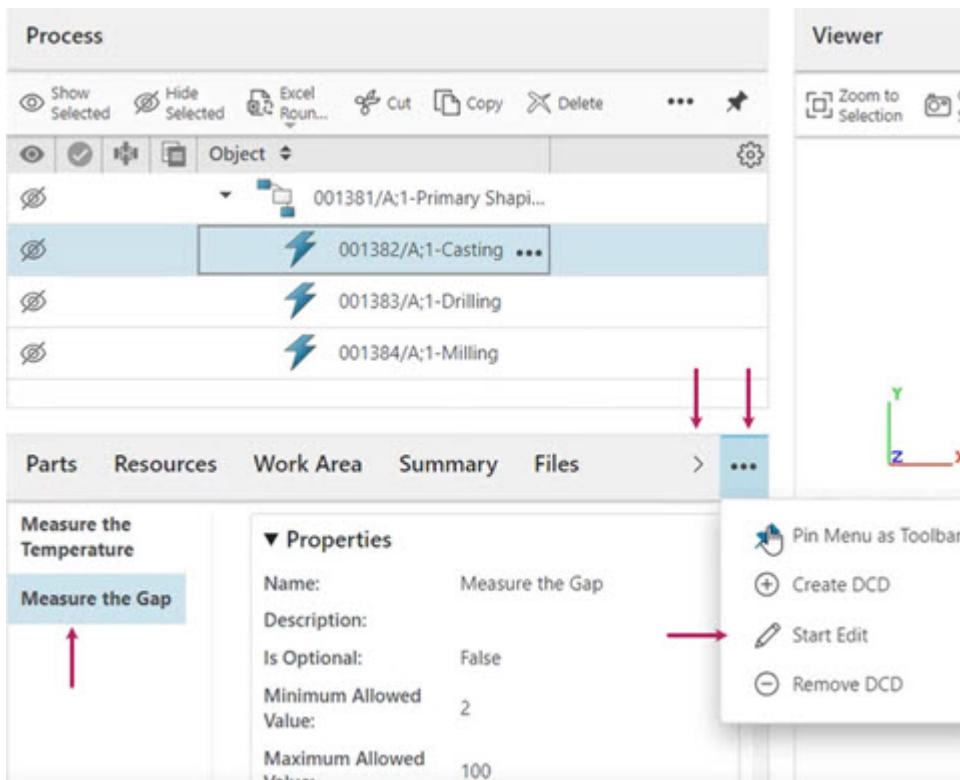
1. If you have not done so already, **search for and open** an existing work package that contains DCDs and then **navigate** to the **Process Planning** or **Work Instructions Authoring** page.
2. On the **Process** tab or panel, select the process, process station, operation, compound operation, or execution step for which you want to edit DCD properties.
3. In the information panel, click the **DCDs** tab.

The **DCDs** tab contains any DCDs previously created for the selected process, operation, compound operation, or execution step.

Tip

If you do not see the **DCDs** tab, click the arrow to expand or collapse the tabs list.

4. In the **DCDs** tab select a DCD, then click ***** More Commands** and then select **Start Edit**.



5. Change properties for the DCD and click ***** > More Commands > Save Edits**.

Caution

To ensure that your edits are saved before you switch to another tab, save the changes in the **DCDs** tab. If you switch to another tab before saving your changes, you will lose those changes.

This issue will be resolved in a future release.

Easy Plan updates the properties and saves the DCD. You can click the **DCDs** tab to verify that all properties are correct.

Sequence DCDs

You can resequence data collection definitions (DCDs) to reduce downtime and improve shop floor workflows.

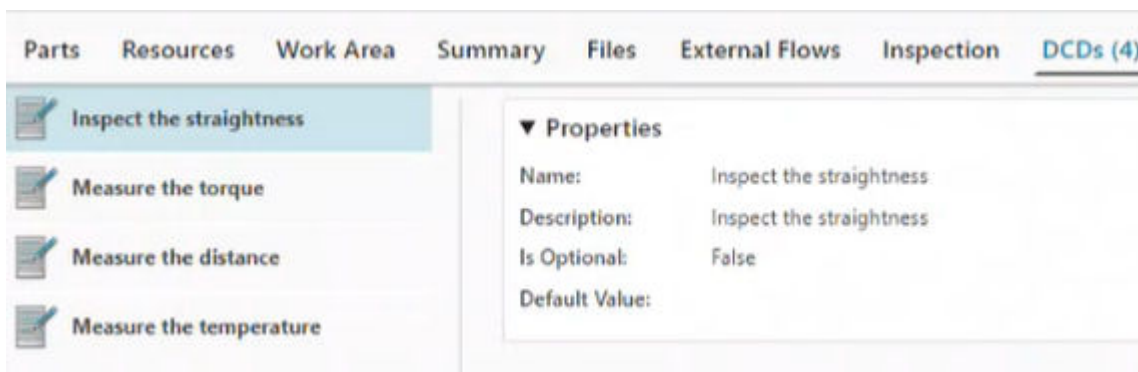
Procedure

1. If you have not done so already, **search for and open** an existing work package, or **create** a new work package, and then **navigate** to the **Process Planning** page.
2. In the **Process** tab or panel, select the process, process station, operation, compound operation, or execution step for which you want to resequence DCDs.
3. In the information panel, select the **DCDs** tab.

The **DCDs** tab contains any DCDs previously created for the selected object.

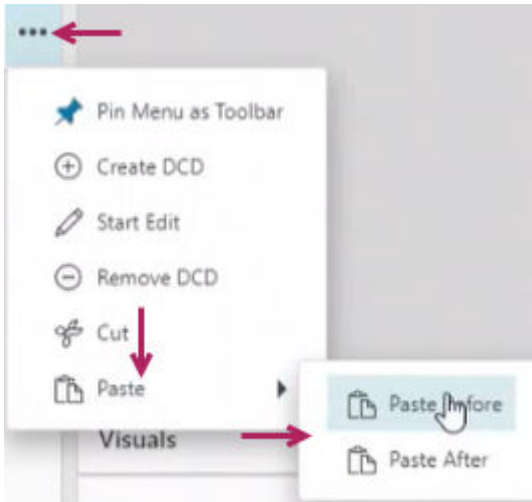
Tip

If you do not see the **DCDs** tab, click the arrow in the tabs menu to expand or collapse the tabs list.



4. In the **DCDs** tab, select one or more DCDs to resequence and then click ***** More Commands > Cut**. Teamcenter Easy Plan displays a message to indicate how many DCDs were cut.
5. In the **DCDs** tab, select a DCD and then click ***** More Commands > Paste** and then select one of the following options.

- **Paste Before**—Pastes the DCDs that you cut before the selected DCD.
- **Paste After**—Pastes the DCDs that you cut after the selected DCD.



Teamcenter Easy Plan resequences the DCDs.

6. (Optional) View the work package data in the **Work Instructions Authoring** page, or in Electronic Work Instructions.

The DCDs are resequenced in all applications.

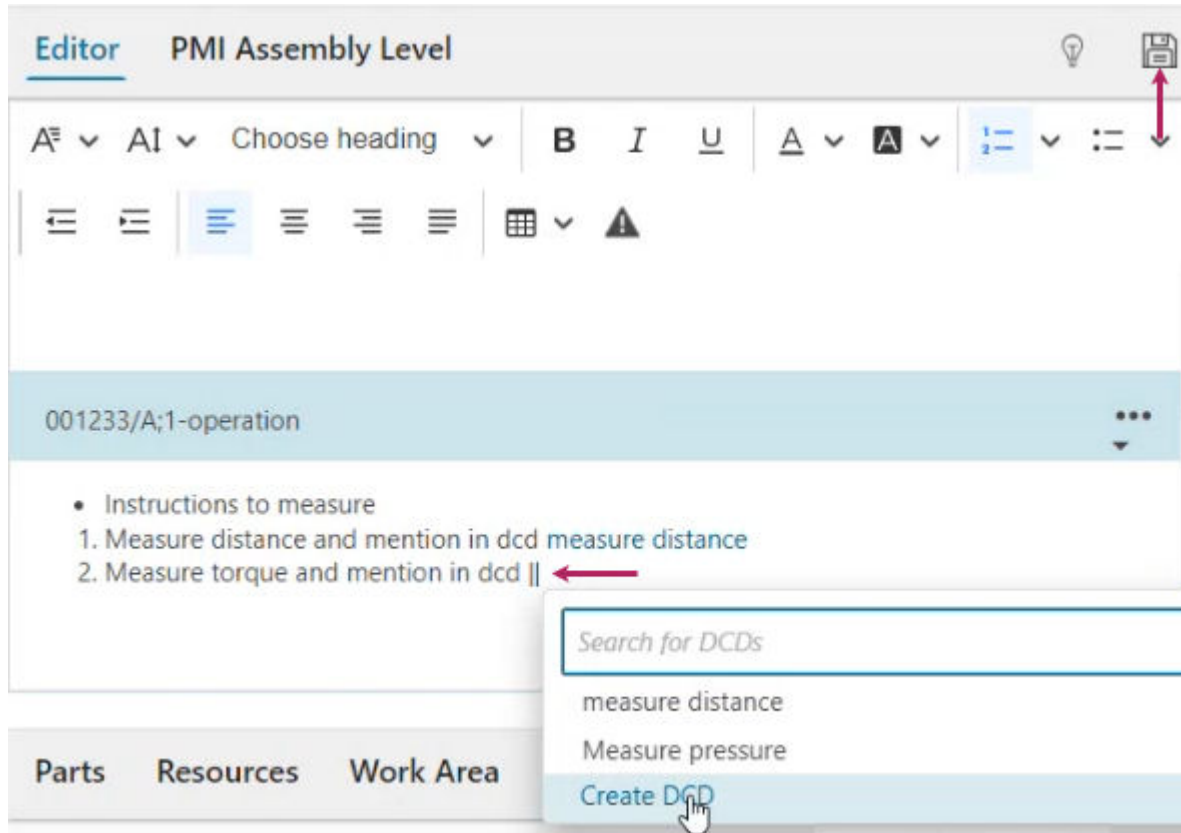
Create or add DCDs while authoring work instructions

You can create a new data collection definition (DCD) or add an existing DCD while you author work instructions, and then view the DCD in Electronic Work Instructions.

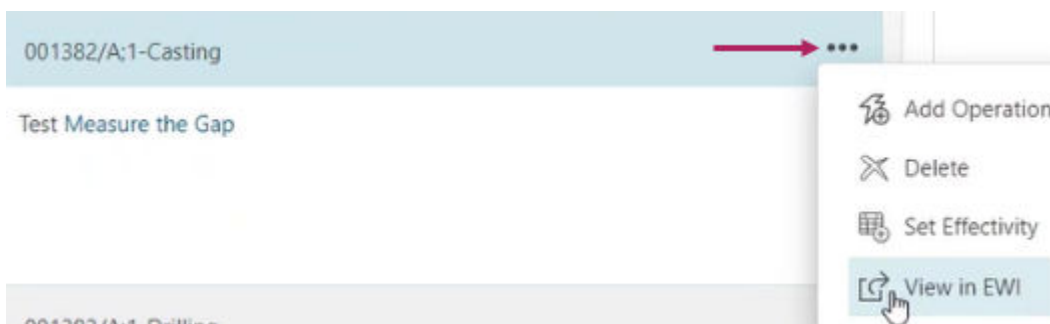
Procedure

1. If you have not done so already, **search for and open** an existing work package, or **create** a new work package, and then **navigate** to the **Work Instructions Authoring** page.
2. Load and expand the assembly, and click in the **Editor** panel to place the cursor in the operation or process for which you want to write a work instruction and include a DCD.
3. To add or create a new DCD, type a work instruction and then type a double pipe (||), and do one of the following:
 - To add an existing DCD, select it from the list and then proceed to step 5.

- To create a new DCD, click **Create DCD** and then proceed to step



4. In the **Create DCD** panel, perform the following steps:
 - a. Click **Type** and select a DCD type.
 - b. Type a **Name** and click **Create**.
Easy Plan adds the DCD to the work instruction and displays it in the **DCDs** tab
5. To attach the DCD to the work instruction click **Save**.
6. (Optional) In the process or operation click **More^{...}** > **View in EWI**.



Easy Plan opens Electronic Work Instructions so that you can review the work instruction and all DCDs attached to it. Electronic Work Instructions lists all DCDs attached to the process or operation in the same order in which they are listed in Easy Plan.

View PMI while authoring a process plan

You can view and filter **product and manufacturing information (PMI)** while you author a process plan.

Procedure

1. Open a work package that contains an assembly with PMI.
2. On the **Work Instructions** tab, under the **Process** subtab, expand the structure.
3. Select a process or operation for which you want to author a process plan.

The **PMI Assembly Level** subtab populates with PMI data for the selected object.

Note

If you select a process or operation that does not have associated PMI data, Process Planning for ETO displays a message in the **PMI** tab.

4. (Optional) To view connected parts for PMI data, hover on a line in the **PMI Assembly Level** panel and click **More**  .
Process Planning for ETO displays the list of parts connected to the PMI data.

Improve time management information in operations

You can modify time values for each activity in an operation associated with a process in the **Process Planning** or **Work Instructions Authoring** page.

Procedure

1. **Search for and open** an existing work package, or **create** one and open it.
2. **Navigate** to work package planning tasks, and then **navigate** to the **Process Planning** or **Work Instructions Authoring** page.
3. In the **Process** tab or panel, select a process or operation, and in the page toolbar, click **Show Time Management**  .
The **Time Management** panel replaces the **Viewer** panel and displays a list of activities associated with the process and its associated operations, or the selected operation.
4. Select an activity in the **Time Management** panel.
The selected activity synchronizes with its associated process or operation.

EditorPMI Assembly Level

Font | Size | Format | B | I | U | A - | A - |

008907/A:1-Op50



1. Wearing hand gloves before touching the hot surface.

Time Management (8 activities out of 32)

Process: 008902/A:1-ProcessDuration: 4.00 min

Object String	Activity Uni...	Activity Wo...
Activity1	2	2
Activity1	0	0
Activity1	0	0
Activity1	0	0
Activity1	2	2
Activity1	0	0
Activity1	0	0
Activity1	0	0

5. Review the selected operation to verify whether the time values are accurate based on the **Time Unit** measurement selection displayed in the upper-right corner of the page.

Time Unit: second

SIEMENS

6. (Optional) If you are working in the **Work Instructions Authoring** page, in the **Editor** panel, modify operation work instructions associated with the activity.
7. (Optional) Correct the time values in the editable columns in the **Time Management** panel by double-clicking the existing values and typing new values.

Time Management (8 activities out of 32)

Process: 008902/A:1-Process3Duration: 4.00 min

Frequency...	Assigned ...	Object String	Activity Uni...	Acti
		Activity1	2	2
		Activity1	0	0
		Activity1	0	0
		Activity1	0	0
		Activity1	4	2

Tip

Editable columns include:

- **Activity Unit Time** (the time required to complete a single instance of an activity, such as the time to walk one meter).
- **Frequency** (the number of times to perform the activity).

Note

Activity Work Time is the calculated total time to perform a specific activity, and is not editable.
Activity Work Time = Activity Unit Time * Frequency.

8. (Optional) To close the **Time Management** panel, click **Hide Time Management** ⌚.

Linking previously associated BOPs and revised MBOMs

When a manufacturing bill of materials (MBOM) assembly is revised, any bill of process (BOP) associated with that MBOM retains its relationship only to the previous version. Process associations are not automatically carried forward to the new MBOM revision.

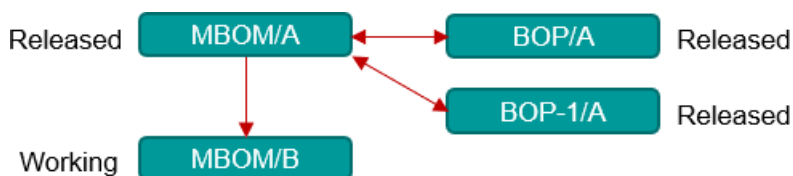
For this reason, when an MBOM revision exists and you use it to **navigate** to the **Process Planning** or **Work Instructions Authoring** page, Teamcenter Easy Plan prompts you to associate the correct process revisions to the assembly revisions, according to several scenarios. These scenarios often involve distinguishing between assembly and process statuses (for example, **Released** versus **Working**). The most common cases are described below.

Note

(Alternative use cases only) If an object's release status matches an internal name value that your administrator defined in the **MEReleaseStatusListForAutoRevise** preference, that object is automatically revised when changes are propagated.

Revising and linking the preferred BOP revision

In this case, more than one BOP is associated with the original MBOM (revision A), and all the BOPs have a status of **Released**.

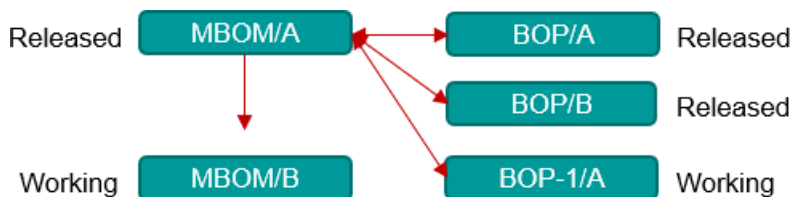


The system provides a list of BOPs associated with MBOM/A and prompts you to reassociate the appropriate process with the MBOM/B. When you select the preferred process and click **Revise and Link**, the selected BOP is revised to BOP/B and is associated with the revised MBOM/B.



Linking the working BOP

In this case, more than one BOP is associated with the original MBOM (revision A), and all the BOPs except BOP-1/A are released. The status of BOP-1/A is **Working**.



The system displays working BOP-1/A and prompts you to associate that BOP with the MBOM assembly. When you select BOP-1/A and click **Link**, the BOP is not revised, but the BOP with the status of **Working** is associated with revised MBOM/B.



Note

- Processes that you previously configured out of your BOP structure are not considered for revision or linkage.
- If an MBOM is associated with multiple BOPs, you are prompted to select the appropriate BOP from a list of those associated BOPs.

How do I?

Review activities

You can review a list of activities related to a loaded operation if your Teamcenter administrator has configured Electronic Work Instructions to do so.

Procedure

1. Load an operation containing activities.
Activities are displayed in table or list view, in a pane or a tab; your administrator configures the layout. In this example, categories indicate non value-added and value-added activities, as well as the estimated unit time (in seconds) that each activity should take to complete.

Viewer Activities



Line	Category	Description
Walk to Bin	NVA	Approach Bin 1
Get center frame	NVA	Retrieve center frame...
Place center frame	VA	On fixture 2, place the...
Visually inspect for...	VA	QA check for fit

2. Mouse-over an activity and click to review that activity.
3. When finished with the activity, click .
4. (Optional) Create a report if your administrator has set activities to be included in reports.

Review operations from a process

The **Operations** table view allows you to review a list of operations that contain information about the operations, such as Operator and Status.

For configuration, see **Configuring the Operations table view** in Electronic Work Instructions Deployment.

Filter processes and operation by operator

When there is more than one operator at a station, each of the operators can see the other's operations in addition to their own. The operators can filter the operations using a parameter in the URL or a control in Electronic Work Instructions that can filter operations per operator. To do this, the operator item id is passed as a parameter in the URL.

Example:

```
http://<serverName>:<port>/
tc.html#/com.siemens.splm.clientfx.tcui.xrt.showObject?page=
EWI&uid=GpbpPMGL4i0inD&stepUid=SR::N::Mfg0BvrProcessStation..2.x
HCLz4vGMe00ZA.GpbpPMGL4i0inD.GpfpPMGL4i0inD.1CSpPMGL4i0inD.1&resource=000171
```

An operators list in the header area allows you to filter by operator.

Note

To see the operators list, the **EWI_ShowOperatorSelection** preference value should be set to **true**.

Set a step status

If your organization supports execution features, you may be required to set the status of work on a step process or operation. Step statuses track the progress, execution, and success or failure of tasks or task results.

Procedure

1. In the step for which you want to set a status, click **Set Step Status** .
2. In the **Set Step Status** pane, select a **Step Status**.

Note

These are default Electronic Work Instructions values. Your organization may use different values than those listed.

- **Pending** indicates that work on the step is awaiting a decision or action.
 - **In Work** indicates that work on the step is in progress.
 - **Complete** indicates that work on the step has finished successfully, including any required serial or lot numbers and other information.
 - **Failed** indicates that work on the step is incomplete due to a failure of some sort.
3. Drag the **Step Progress** slider to the appropriate percentage of work still pending, completed in progress, or completed prior to failure. If you selected **Complete**, the step progress locks at 100%.
 4. (Optional) In the **Comments** text box, type comments on why the work is pending, your current progress, the step completion, or possible reasons it failed.
 5. Click **Save**.

Results

The information is stored along with your user name and the time you saved the status.

Attach a document to a step

Procedure

1. If your organization supports execution features, you can upload a document from your hard drive and attach it to a step or attach a previously loaded document to a step.
2. To copy an attached document from one step to another, do the following.
 - a. In the step where the document resides, click **Collected Attachments** .
 - b. In the **Collected Attachments** panel, click the **Palette** tab.
 - c. Move your cursor over the document to be copied and click .
 - d. Click **Copy** .
3. In the step to which you want to attach a document, click **Collected Attachments** .
4. Do either of the following.
 - To upload a document on the **New** tab, click **Choose File**, navigate to and select the document, and click **Open**.
The document is displayed in the **Current Attachments** list.
 - To add an existing document, click the **Palette** tab, select it from the **Clipboard**, **Favorites**, or **Recent** list, and click **Attach**.
5. Click the **New** tab.
The document is now visible in the **Current Attachments** list and is attached to the step.
You can:
 - Download the document by selecting it in the **Current Attachments** list and clicking **Download** .
 - Delete the document by selecting it and clicking **Delete** .

Enter data collection information

If your organization has enabled data collection execution and your Teamcenter administrator has configured EWI to do so, you can enter optional or required data collection details from the shop floor. For example, if you are required to measure and enter a length value for a part during an operation, you must enter its value in the **Data Collection** table or list view to complete a step.

Procedure

1. Open the work package that contains the step with a **Data Collection** panel.
2. Select the data collection item for which you want to define values and click **Capture Data Collection** .

3. In the **Capture Data Collection** panel, type or select any required or optional values and type any relevant comments.
4. Click **Save** and repeat this process for any additional required data collection. The information is stored along with your user name and the time you saved the data.

Mark up a PDF

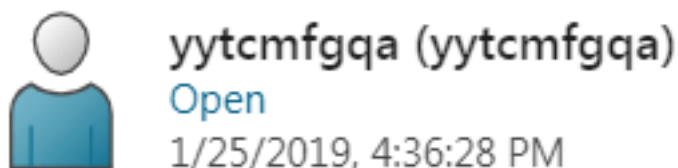
Procedure

1. If your administrator has given you permission for specific documents, you can mark up PDF instructions, documents, and reference documents. The markup exists only in Electronic Work Instructions and does not affect the actual PDFs.
2. In the **Instructions** pane, **Documents** tab, or **References** tab, open a PDF.

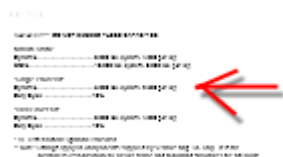
If the PDF is editable, a **Markup this Document**  icon is displayed above the PDF.

3. Click **Markup this Document** .
The **Markup** panel is displayed.

Any previous or in progress text comments or freehand markup are displayed in the panel with login names.

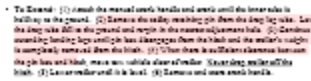


4. To review existing markup, click any sub-panel.
The PDF jumps to the page where the freehand markup or comment was made. If a comment was made, the red-lined panel expands to show it. If freehand markup was added, a shadow appears below it in the PDF.



5. To comment on an area of the document, do the following.
 - a. Click **Create Highlight Markup** .
A new sub-panel with your login ID appears in the **Markup** panel.

- b. Drag to select the area that you want to address.
The selected text is highlighted in red.



- c. Type your comment and when finished, click **Create**

6. To freehand draw on the PDF, follow the procedure to **create freehand markup on a 2D image**.

Create freehand markup on a 2D image

Procedure

1. Display a captured image in the viewer.

2. Open the markup panel by clicking .

3. Click **Freehand** .

The image background is displayed in gray to indicate markup is expecting your freehand drawing.

4. In the 2D image in the left panel, create a freehand drawing.

The software guesses the shape you are attempting to draw. It recognizes ellipses, rectangles, polygons, and polylines.

Tip

The software also helps you draw arrows . Create a barb on the end of a line, and an arrow is displayed. You can also create a two headed arrow in the same manner. However, arrows are limited to lines and cannot be created with arcs.

5. Click one of the following.

-  to accept the shape.

Note

You can draw more than one shape before clicking . Once the shape is accepted, you can enter markup text in the comment window.

-  to delete the shape.
-  to undo the recognized shape.
-  to redo the recognized shape.

Tip

If you clicked **Freehand**  but wish to cancel, click it again.

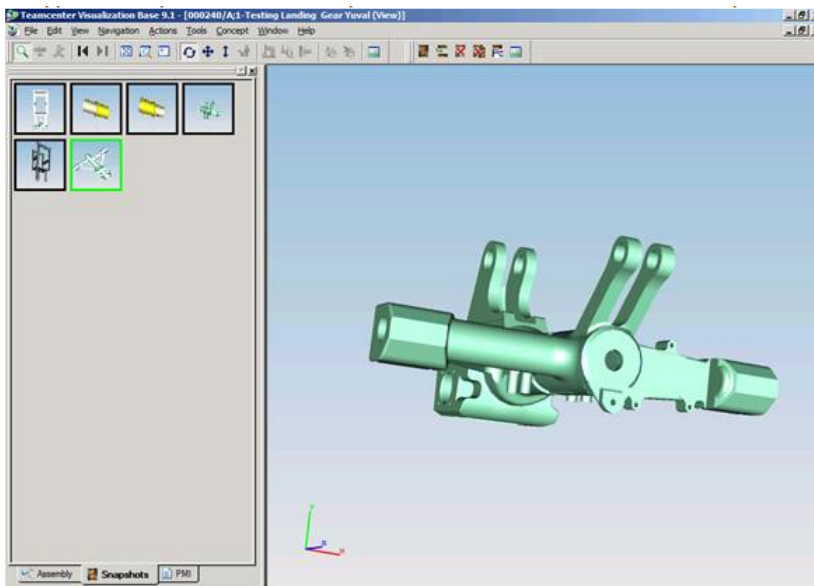
6. If you are finished creating markups, click **Done** .

Open a 3D product view in Lifecycle Visualization

If you have Lifecycle Visualization installed on your computer, you can display 3D product views associated to the currently loaded step for viewing and further analysis.

Procedure

1. Open a step that contains 3D product views.
2. Display the images associated with the step in the **Viewer** pane.
3. Click the **Open in Teamcenter Visualization** button . This button is only displayed if there is a 3D product view associated with the step.
Lifecycle Visualization opens and displays all the 3D product views present on the current step.



View objects with the universal viewer

You can use the universal viewer in Electronic Work Instructions (EWI) to display various file types on Linux or Windows platforms without having to switch between several different viewers. In addition, the universal viewer displays MS Office documents without first converting those files to PDF format.

Prerequisites

If your Teamcenter administrator has not already done so, you must set the **AWC_defaultViewerConfig.VIEWERCONFIG** value for any datasets you want to view in your environment. The format for the preference is **<Dataset_Type>.<Viewer_Name>=<reference_Name>**.

For example, these are the preference values for MS Office:

- MSWord.Awp0TcooViewer=word
- MSWordX.Awp0TcooViewer=word,Fnd0word
- MExcel.Awp0TcooViewer=excel
- MExcelX.Awp0TcooViewer=excel
- MSPowerPoint.Awp0TcooViewer=powerpoint
- MSPowerPointX.Awp0TcooViewer=powerpoint

Caution

To ensure that thumbnail images align properly in the universal viewer, please change the preference value from `SnapShotViewData.Awp0ImageViewer=Image` to `SnapShotViewData.Awp0ImageViewer=Image,ThumbnailImage`.

In addition, you must add **AWC_defaultViewerConfig.VIEWERCONFIG** to the **AWC_Startup_preference** in the Teamcenter rich client.

See the *Preferences* section in the *Active Workspace Administration* documentation for a description of preferences and how to set them.

Procedure

1. With EWI open, load data for an electronic work instruction.
2. In the **Viewer**, **References**, or **Documents** tab, select an object that you want to view. For example, in the **References** tab, select an Excel file.
The universal viewer loads the file that you selected.

Note

You cannot edit the file.

3. (Optional) Use the features available for the file you are viewing. For example, you may be able to **Print**, add **Comments**, or **Find** data within the file.

View Cortana 3D animation files in a BOP

You can play Cortana 3D animation files in Electronic Work Instructions (EWI) at the part or process level of a bill of process (BOP).

Prerequisites

You must have access to EWI version 6.2.8 or later to use this feature, and you must have access to the data you want to view.

Procedure

1. With EWI open, **search for and open** a work package that contains processes and operations.
2. Expand the BOP and select an object within it. For example, expand a subassembly and select a part.

Note

In this example, we are using a part. However, you can view Cortana 3D animation files for either parts or processes.

3. In the **Animations** tab, click a file.
The Cortana 3D player displays a message while the animation file loads.
4. Use the controls within the Cortana 3D player to play the animation file.
5. (Optional) Manipulate the animation to search for missing data. For example, you can search for missing parts in an assembly, or for problems within a process.

Generate a process report

You can generate a report for a work package on a process structure, a plant bill of process (BOP), or a single step in a process.

You cannot generate a reports for a BOM structure. Your administrator can customize reports to change the properties displayed and the layout.

Note

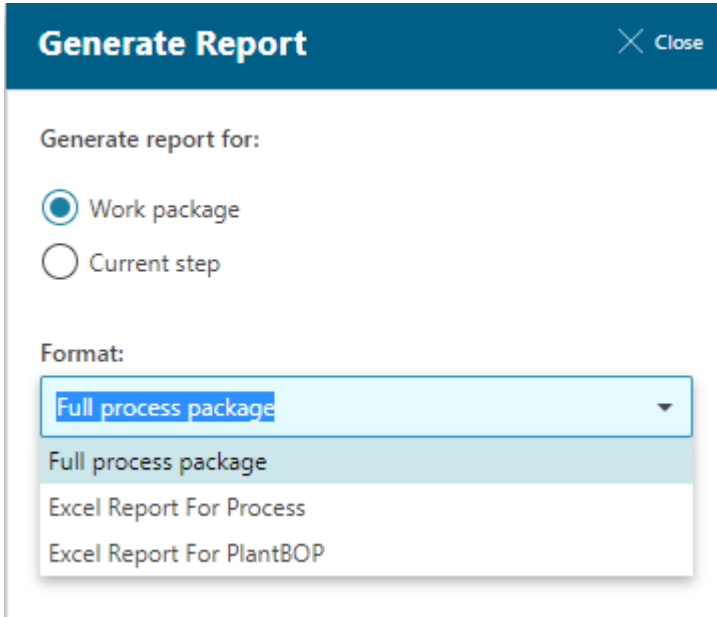
Your administrator must install specific templates before you can generate reports in Excel format. If you cannot generate Excel reports, open a Teamcenter command prompt and execute these commands:

- `add_req_templates -u=your-administrator-user-name -p=your-administrator-password -g=dba -t=ExcelTemplate -i=%TC_ROOT%\install\ewi\electronicwi\data\ewiExcelReportTemplateForPlantBOP.xlsm`
- `add_req_templates -u=your-administrator-user-name -p=your-administrator-password -g=dba -t=ExcelTemplate -i=%TC_ROOT%\install\ewi\electronicwi\data\ewiExcelReportTemplateForProcess.xlsm`

Use the following procedure to generate a report.

Procedure

1. Click **Generate Report** .



2. Select **Work package** or **Current Step**.

The work package report contains the following information:

- Work package description (for example, top level process name information, product information).
- List of first level steps within the work package (ordered according to the find number in Teamcenter).

For each step there exists:

- A list of children for each first level step (ordered according to the find number in Teamcenter).
- Instructions (from property or PDF).
- Attached images.
- Consumed parts.
- Assigned tools.

The current step report contains the following information:

- Assigned tools.
- Attached images.
- Instructions (from a property or PDF).
- Consumed parts.

3. Click the **Format** list, and select an option:

- **Full process package** – generates a PDF report for a work package on a process structure, or a single step within a process.
- **Excel report for Process** – generates an Excel-based, hierarchical structure with properties. To customize the Excel output, modify the **ewiExcelReportTemplateForProcess** template.
- **Excel report for Plant BOP** – generates an Excel-based, hierarchical structure of the plant bill of process (BOP) with properties. To customize the Excel output, modify the **ewiExcelReportTemplateForProcess** template.

4. Click **Generate Report**.

Teamcenter generates a report in Excel or PDF format.

What to do next

When the report is generated, you can choose to open it or save it to your operating system. This is an example of a PDF report generated for a single step.

WORK INSTRUCTION			SIEMENS
Operation:	Landing Gear Assembly / A	Product:	LGear__asm_landing_gear-ASIA
Instructions: Installation Instructions for LG Wheel AS Assy: Before starting with the installation make sure to review safety instructions of process sheet 6756IA. Obtain bin 33a with necessary parts.		Gear 	
PRINT DATE: 28-JAN-2015		Page 1 of 3	

This is an example of a report generated for a hierarchical structure in Excel format.

Siemens PLM Software
Teamcenter Excel Export
"Use" will be the spreadsheet register. To activate the Excel Export for Microsoft Office.

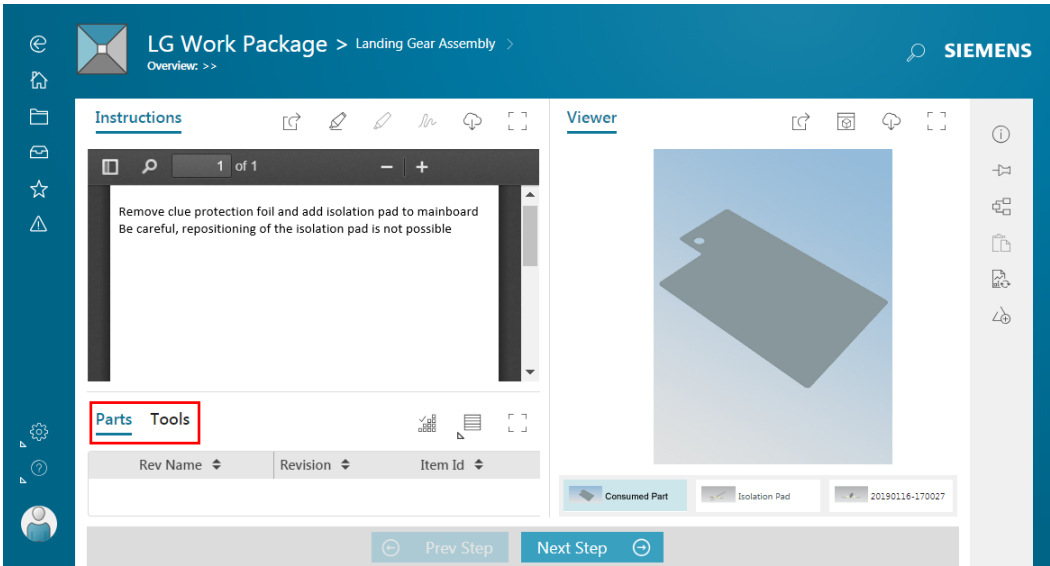
	Rev Name	Revision	Item ID	Find No	Item Description	Quantity
NEW PROCT		A	000133			
	sp1	A	000128		18	
	sp2	A	000128		20	

Show consumed parts and assigned tools

By default, the **Parts** and **Tools** tabs show the parts and tools assigned to the selected step.

Procedure

- 1. Click the **Parts** or **Tools** tab.



- 2. (Optional) To view the list of parts or tools:
 - In a table, click → **Table**.
 - In a list, click → **List**.
- 3. To show all aggregated parts and tools—those used in the current step as well as those in the step's immediate parents and/or children—click .
To hide aggregated parts and tools, click again to switch off the view.
- 4. Select the part or tool you want to see and click **Information** . The consumed part or tool information is displayed in a pop up window.

Note
If there are no parts or tools available, the respective tab is hidden.

- (Optional) Click **Attachments** to view datasets attached to the part or tool.

Note

The **Attachments** tab is displayed only if there are datasets attached to the selected part or tool. Your administrator can configure which dataset types are displayed in the **Attachments** tab using the **EWI_PartToolAttachmentsRelationInfo** preference.

- Click  to close the window.

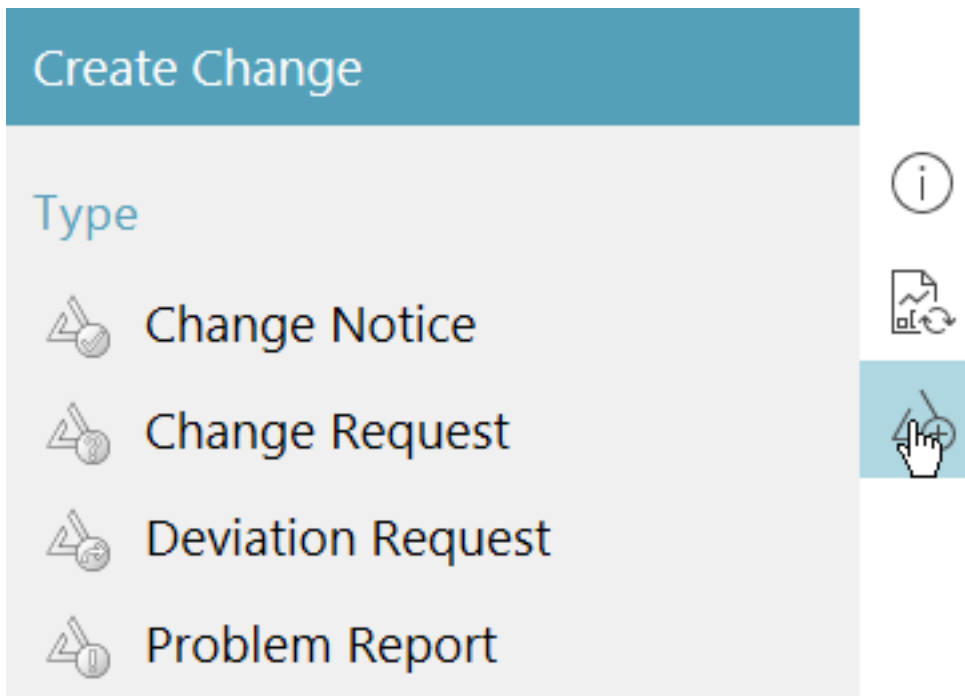
Create a change notice, request, or report

If you are confronted with a problem with your work, you can create a change notice, request a change or deviation, or report the issue. attach objects such as images or documents, and send it through a workflow for resolution.

Learn more about creating change notices and reports in the *Active Workspace User Assistance* documentation.

Procedure

- With the problematic step visible, click **Create Change**  at the right side of the screen.



- Select the type of change you want to record.
- Type a brief title (**Synopsis**) and description of the problem report.

4. If you are creating a deviation request, in the **Change Type** text box, type the type of change to be used for the deviation.
5. (Optional) Click **Add Attachments**  to add documents from your operating system or an image capture. The work package and selected step are attached by default.
6. Click **Save** to save the report or **Submit** to submit it to a workflow.
You can view problem reports assigned to you through a workflow by clicking the **Inbox** tile on the Active Workspace home screen. You can display saved problem reports by clicking the **Report Problem** tile.

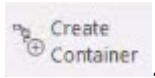
Authoring a process plan without work instructions

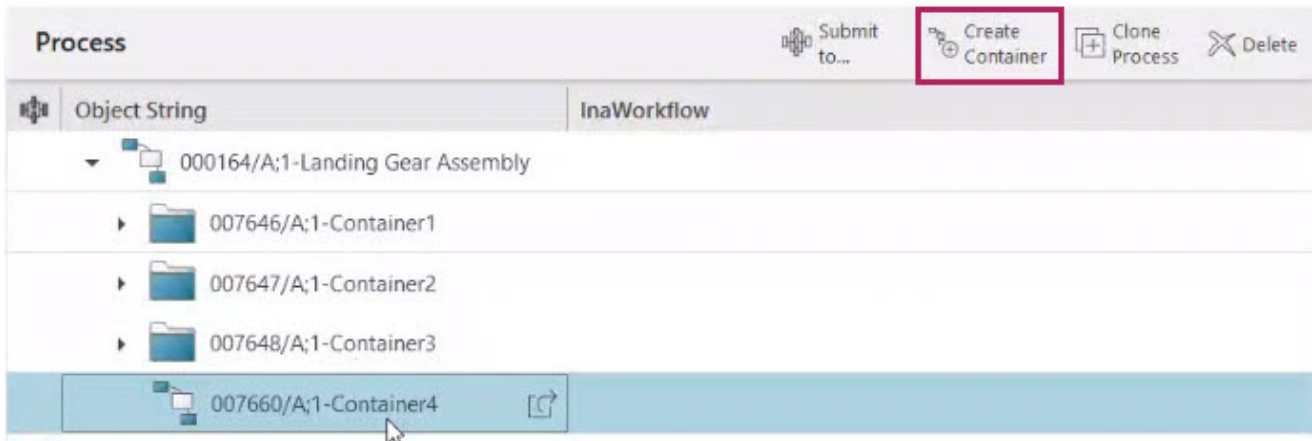
Author a container in the product BOP

You can create a container to hold high-level structures within the product bill of process (BOP).

Procedure

1. Open a work package that contains processes and parts.
2. Navigate to the assembly in which you want to author a process and expand the assembly.
3. In the **Process** panel, select the object under which you want to add the container and click **Create Container**

Container 

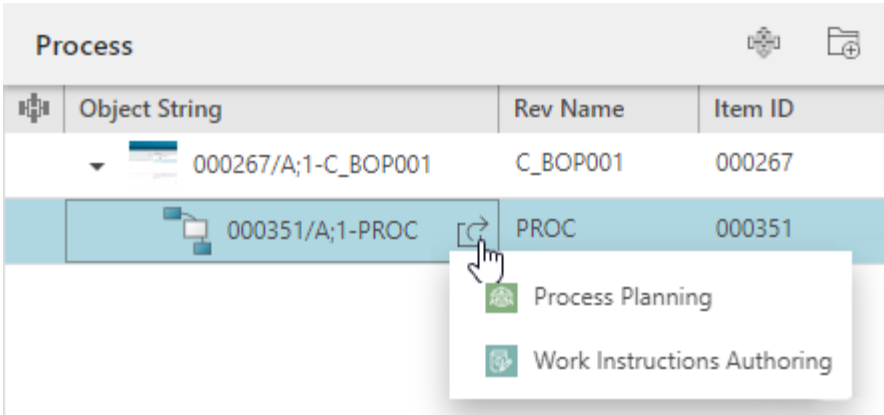


4. Type in a **Name** and click **Create**.
Teamcenter Easy Plan creates the new container.

Note

Teamcenter Easy Plan adds the new child as the last object in the substructure under which you added it.

5. (Optional) Select an object from the **Assembly** or the **Process** panel and click **Open**  , then select a page from the menu.



Teamcenter Easy Plan opens the planning page to the same scope level in which you are working.

What to do next

Generate reports for processes or operations

While you are authoring process planning or work instructions, you can generate reports for processes or operations. These reports give you information about security, ergonomic risks, quality control, cycle time, and other such details, depending on your work package and configuration.

You can generate a wide variety of reports based on object selections, including a process, operation, or compound operation, station, area, or line. You can generate these reports in the background. Note that the reports are available for process planning or line balancing stages.

Procedure

1. If you have not done so already, **search for and open** an existing work package and **navigate** to the **Process Planning** or **Work Instructions Authoring** page.
2. On the **Process** tab, select the object you want.

To generate a	Select
Material report	Process station, area, line, or process.
Operation report	Operation, process, compound operation, or execution step.
Station report	Process station, process area, or process line.
Work instructions report	Operation, process, or station.

3. In the **Process** toolbar, select ... → **Reports**.
4. In the **Create Report** dialog box, select the type of report you want to generate.
5. (Optional) Select the **Create in background** ☐ check box.
6. Click **Create**.

Results

Based on your selections, the report is generated. You receive a notification after the report is generated successfully.

Author a process without work instructions

If you do not author work instructions, perform this task to create a process.

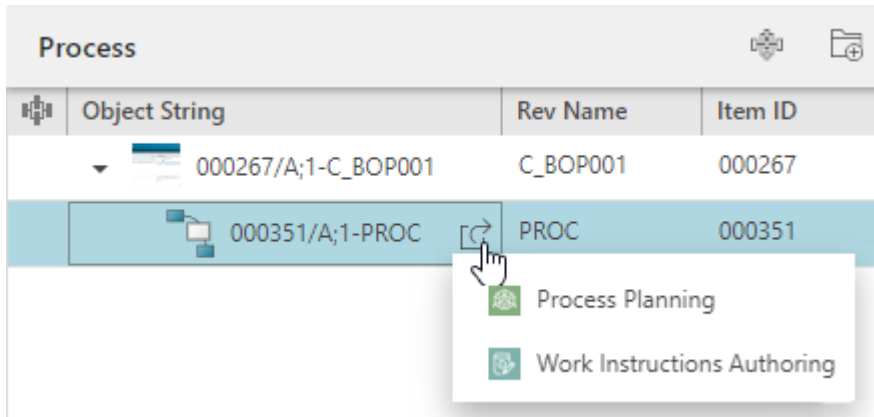
Procedure

1. Open a work package that contains processes and parts.
2. Navigate to the assembly in which you want to author a process and expand the assembly.
3. In the **Process** panel, select the object under which you want to add the process.
4. In the process toolbar, click **More** *** → **Create** ⊕.
5. Type in a **Name** and click **Create**.
Teamcenter Easy Plan creates the new process and associates the process to the assembly to which you navigated.

Note

Teamcenter Easy Plan adds the new child as the last object in the substructure under which you added it.

6. (Optional) Select an object from the **Assembly** or the **Process** panel and click **Open** , then select a page from the menu.



Teamcenter Easy Plan opens the structure at the same scope level in which you are working.

What to do next

Tip

To delete a process or an operation, select the object you want to delete, and click **More *** → Delete** ✕. When the confirmation dialog is displayed, click **Delete** again.

Author an operation without work instructions

If you do not author work instructions, perform this task to create an operation.

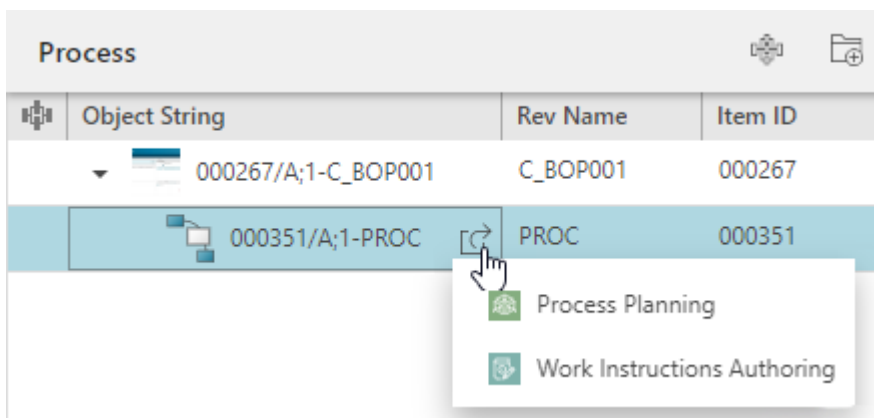
Procedure

1. Open a work package that contains processes and parts.
2. Navigate to the assembly in which you want to author an operation and expand the assembly.
3. In the **Process** panel, select the object under which you want to add the operation.
4. In the process toolbar, click **More *** → Create** ⊕.
5. In the **Create Operation** dialog box, select the type of operation to be created.
6. Type in a **Name** and click **Create**.
Teamcenter Easy Plan creates the new operation and associates the operation to the assembly to which you navigated.

Note

Teamcenter Easy Plan adds the new child as the last object in the substructure under which you added it.

7. (Optional) Select an object from the **Assembly** or the **Process** panel and click **Open** ↗, then select a page from the menu.



Teamcenter Easy Plan opens the structure at the same scope level in which you are working.

What to do next

Tip

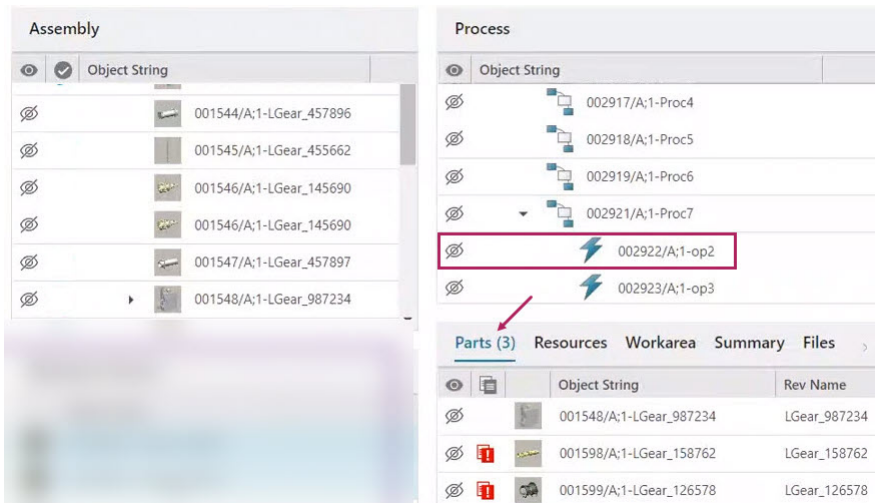
To delete a process or an operation, select the object you want to delete, and click **More** *** → **Delete** ✕. When the confirmation dialog is displayed, click **Delete** again.

Assign parts to an operation without work instructions

If you do not author work instructions, perform this task to create a assign parts to an operation.

Procedure

1. Open a work package that contains processes and parts.
2. Navigate to the assembly in which you want to assign parts to an operation.
3. In the **Process** panel expand the structure and select the operation.



4. In the **Assembly** panel select one part or several parts and drag them to the **Parts** tab below the **Process** panel.

What to do next

Tip

To remove an assigned part from an operation, select the operation in the **Process** panel. In the **Parts** tab select the part and click **Remove** .

Clone a process without work instructions

If you do not author work instructions, perform this task to clone a process.

Procedure

1. Open a work package that contains processes and parts.
2. Navigate to the assembly in which you want to clone a process and expand the assembly.
3. In the **Process** panel, select the process that you want to clone.

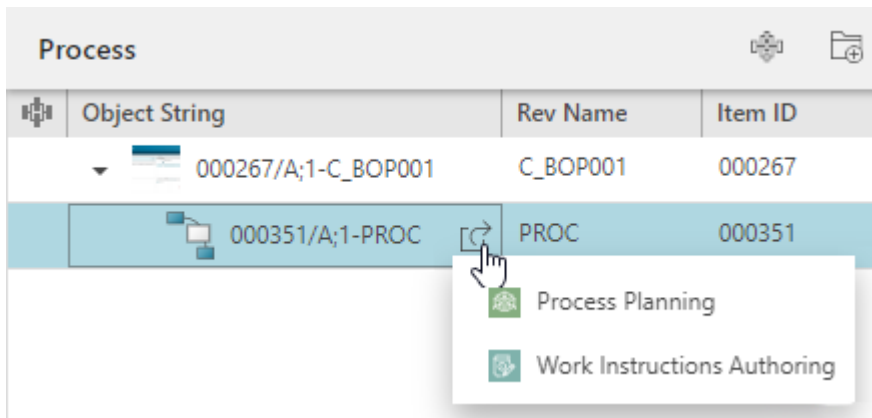
Note

You must select a process and an assembly to enable clone feature. If you select a different object, for example, a container, the clone feature is disabled.

4. In the **Assembly** panel, select an assembly to associate to the cloned process and click **Clone**. Teamcenter Easy Plan displays a confirmation dialog box to verify that you selected the correct target assembly and process.
5. Click **Continue** to clone the process. Teamcenter Easy Plan clones the selected process.

The cloned process is added to the structure as a sibling of the original process, and the cloned process is associated to the selected target assembly.

6. (Optional) Select the target assembly and click **Open** , and then select **Process Planning**.

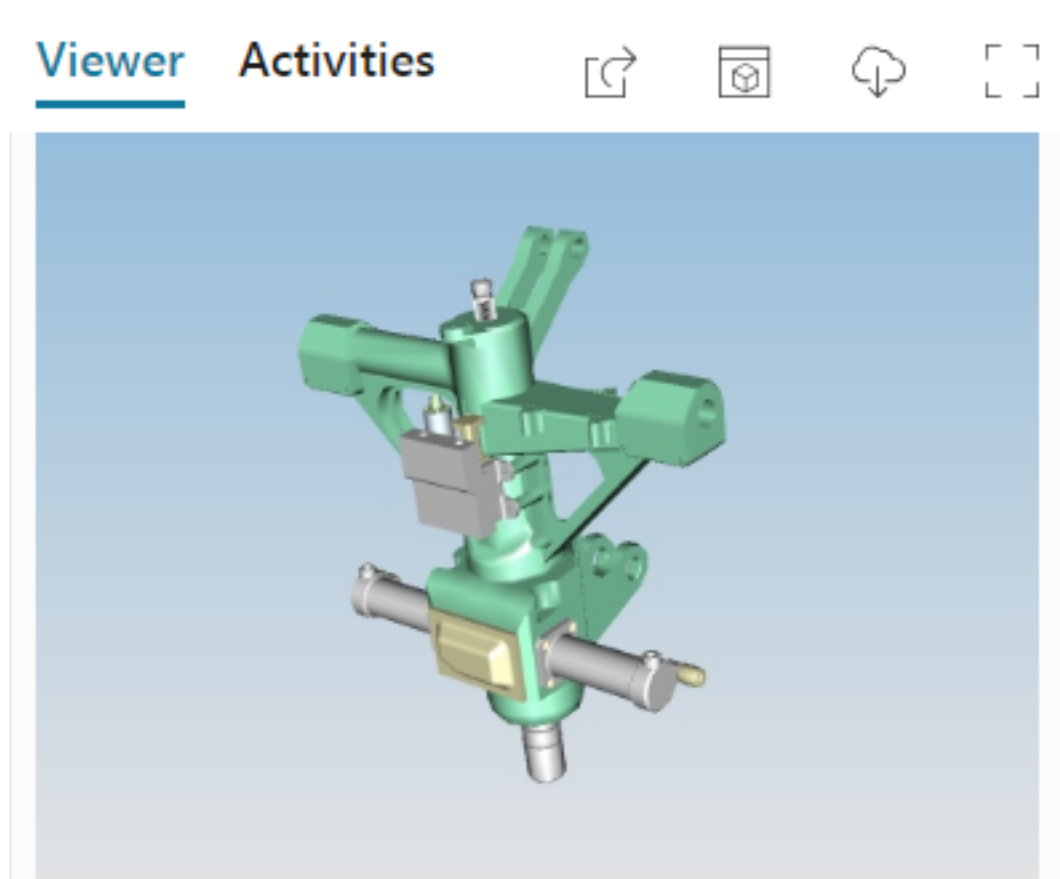


Teamcenter Easy Plan opens the **Process Planning** page for the target assembly that is associated to the cloned operation.

13. Using the 3D panel viewer

Displaying content in the gallery viewer

By default, the gallery occupies the right half of the screen. You can display a variety of objects that are associated with the step. The gallery is composed of tabs that display specific types of content. If a step does not contain any content of that type, no tab is shown for it.



You can see the following types of data:

- Images and 3D snapshots in the **Viewer** pane.
Learn more about [View 3D models](#).
- Microsoft Office 2013 and 2016 files, PDFs, and Teamcenter CME Reports attached to the step in the **Documents** pane.
- For a given step, referenced Microsoft Office files, PDFs, Teamcenter CME Reports, and URLs attached to the document item under the step, or under the top line of the BOP in Teamcenter, displayed in the **References** pane.
- Animations in the **Animations** pane. The following video files are supported:
 - AVI (the Windows Media Player plugin must be installed on the browser).
 - MP4 (played using HTML5 browser video capabilities; check your browser's video support)

- Cortona animations (the Cortona3D player must be installed on the client system).

Clicking on the thumbnail images at the bottom of the gallery opens each of the objects. You can additionally open an object in an external viewer by clicking **Download** .

Your administrator can modify the layout of the gallery using the following preferences:

- EWI_Layout
- EWI_SinglePanelLayout
- EWI_TwoPanelLayout
- EWI_ThreePanelLayout

View 3D models

In the **Viewer** pane of the gallery, you can view any 3D snapshots attached to a step. A 2D image of the snapshot is initially displayed at the bottom of the viewer. Since 3D snapshots take longer to load, a 2D image is usually displayed first when you switch between images. When you switch between snapshots, you lose any changes you made to the 3D snapshot, for example by rotating or zooming.

Note

If your administrator has set the value of the preference **EWI_AutoLoad3D** to **true**, 3D automatically loads when you move between steps or click a snapshot.

Procedure

- Click on a 2D snapshot at the bottom of the viewer pane. If it has 3D information available, the **3D View** button is displayed in the **Viewer** toolbar.



- Click **3D View**  to view the 3D snapshot.
You can manipulate the model in the following ways:

- Click **Orient View**  and choose a predefined model orientation.

View orientation	Perspective or alignment
Trimetric	A 3/4 perspective, looking up (-Isometric)
Isometric	A 3/4 perspective, looking down (+Isometric)
Top	Aligned to the Z-axis, looking in the -Z direction
Front	Aligned to the Y-axis, looking in the +Y direction
Right	Aligned to the X-axis, looking in the -X direction
Back	Aligned to the Y-axis, looking in the -Y direction

Bottom	Aligned to the Z-axis, looking in the +Z direction
Left	Aligned to the X-axis, looking in the +X direction

- Click **Fit**  to change the size of the model so it most effectively fills the viewing area.
- Click **Rotate**  to rotate the model.

You can rotate freely or constrain the rotation. The initial cursor location determines the rotation axis.

To rotate freely around the model, in the center of the viewer, click and drag the cursor.

Constrain the rotation axis in the viewer

To constrain rotation this way	Before you drag, place the cursor
Rotate around a horizontal axis	Near the left or right edge of the viewer.
Rotate around a vertical axis	Near the bottom of the viewer.
Rotate around an axis that is perpendicular to the view	Near the top edge of the viewer.
Rotate around a selected point of the model (set a rotation point)	On the point around which you want to rotate the model and click the middle mouse button (or wheel).

3. To return to the 2D image, click **2D view** .

View image captures and thumbnails

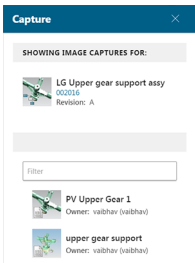
You can view 2D image captures and thumbnails associated with 3D models.

Note

By default, thumbnails are displayed based on preview information in Teamcenter. Such information may be a rich client preview, a snapshot, or an image dataset attached to a step. If no preview, snapshot, or image dataset is attached to a step, then the step icon is displayed instead.

Procedure

1. Open an object with a JT model and one or more associated image captures or thumbnails.
2. Click the **Viewer** tab to display the model in the viewer.
3. Click **Capture** to open the **Image Capture** panel.
The image captures associated with the 3D model are displayed in the **Images** list.



4. Do any of the following:

To	Do this
Filter the list of image captures	Type a search keyword in the Filter box.
View an image capture in the Active Workspace viewer	Click the image capture thumbnail. To return to viewing the 3D model, click the thumbnail again.
View the image in its own viewer	Select or hover over the image, click Open  , and then click Viewer .
Delete the image	Select or hover over the image and click Delete  . Delete appears only if you are the image owner.
Zoom in or out on the image, pan across the image, or fit the image to the screen	If you want to zoom in or out on the image, use the scroll wheel on your mouse. When you are zoomed in, you can pan across the image using the scroll bars.
Add freehand markups , such as arrows, ellipses, and rectangles	Open the markup panel  and click Freehand  .

View part or assembly summary properties

Using the engineering bill of materials (EBOM) or manufacturing bill of materials (MBOM) toolbars in the **EBOM-MBOM Alignment page**, you can view a selected part or assembly in the 3D **Viewer** panel, or view summary overview details of that part or assembly. When the **Viewer** panel is visible, you can show the panels to the right of the associated EBOM and MBOM and then extend the display across two monitors to better review EBOM and MBOM viewer details.

Procedure

1. If you have not done so already, **search for and open** an existing work package and then open the **EBOM-MBOM Alignment page**.
2. If necessary, in the EBOM or MBOM toolbar, click **Show Summary** .
By default, the 3D viewer panel opens with an **Overview** tab available.
3. (Optional) To show the panel:

- Below the EBOM or MBOM, click **Bottom Panel** .
- To the right of the MBOM or EBOM, click **Side Panel** .

The next time you open your work package, select a part or assembly in the EBOM or MBOM panel, and click **Show Summary** . The last EBOM or MBOM summary is automatically loaded. To view 3D images, click the **3D** tab.

4. (Optional) Select the **Overview** tab.
Detailed properties for the selected part or assembly are displayed.
5. (Optional) To close the panel, click **Hide Summary** .

Select multiple objects in the Viewer panel

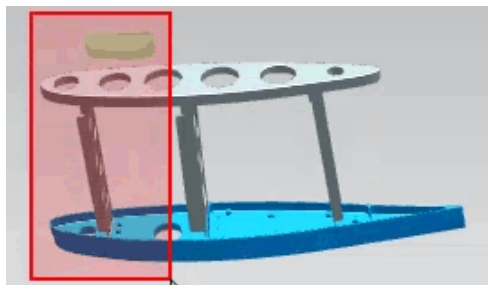
By drawing a rectangle around multiple objects in the 3D **Viewer** panel, you can highlight those objects as well as select them in related panels. Related panels include the **Assembly** panel or tab in the **Process Planning** or **Work Instructions Authoring** page, as well as the engineering bill of materials (EBOM) or manufacturing bill of materials (MBOM) panels on the **EBOM-MBOM Alignment page**.

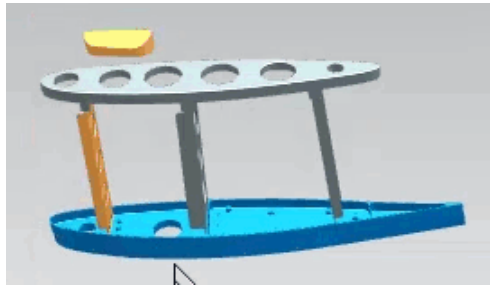
Note

Any packed objects in the **Viewer** panel must be unpacked to be selectable.

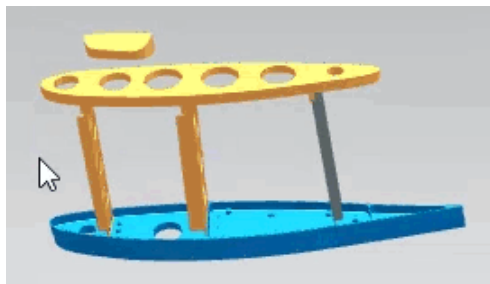
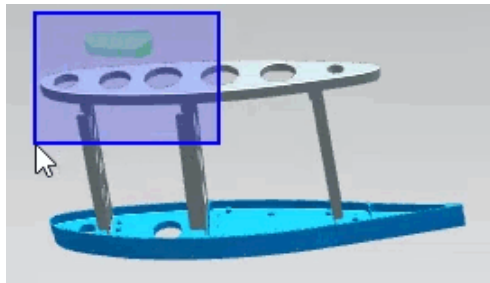
Procedure

1. If you have not done so already, **search for and open** an existing work package that contains processes and parts and then open the **EBOM-MBOM Alignment** page or **navigate** to the **Process Planning** or **Work Instructions Authoring** page.
2. If the **Viewer** panel is not visible in the **EBOM-MBOM Alignment** page, in the **EBOM** or **MBOM** panels, click **Show Summary** .
The **Viewer** panel is displayed.
3. In the **Viewer** panel toolbar, click **Select by a rectangle**  and do one of the following.
 - To select objects that are contained completely within a rectangle, click and drag your mouse from left to right to encompass all objects within that rectangle.





- To select objects that are contained completely and partially within a rectangle, click and drag your mouse from right to left to select or touch all objects that lie in any way within that rectangle.



Results

The objects are selected within the 3D viewer panel and the assembly or element list of the related panel.

Note

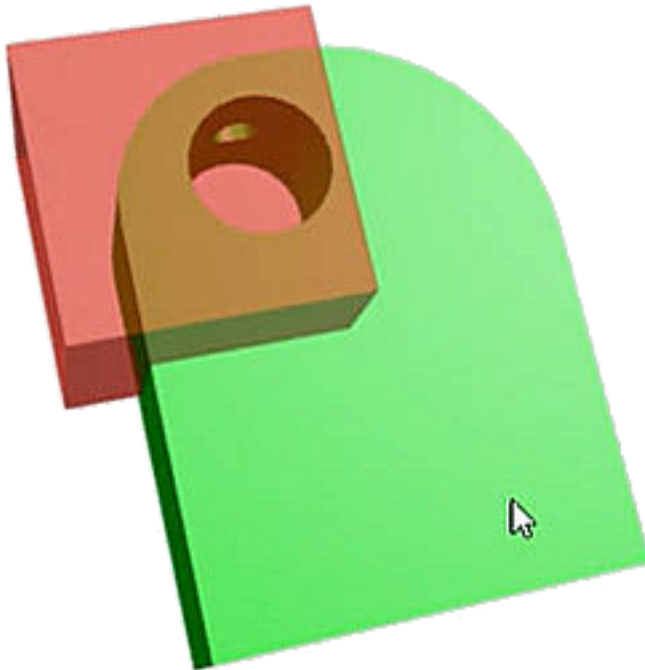
You can click anywhere outside the selected objects to deselect them.

Select objects by volume

You can select objects in the **Viewer** panel by 3D volume. Volumetric selection lets you select parts that are partially or fully covered by other parts in the viewer, based on the selected 3D area.

Procedure

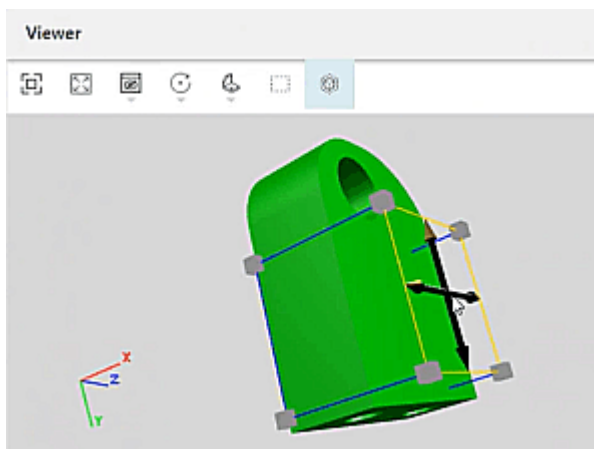
1. If you have not done so already, **search for and open** an existing work package that contains processes and parts and then **navigate** to the **Process Planning** or **Work Instructions Authoring** page.
2. In the **Viewer** panel, show the part to be selected, and in the **Process** panel, select an operation associated with the part.
3. In the **Viewer** panel toolbar, click **Select by volume** , and do one of the following.
 - To select only objects that are fully covered by other objects, click and drag the cursor from left to right to draw a red 3D cube around the preferred area.



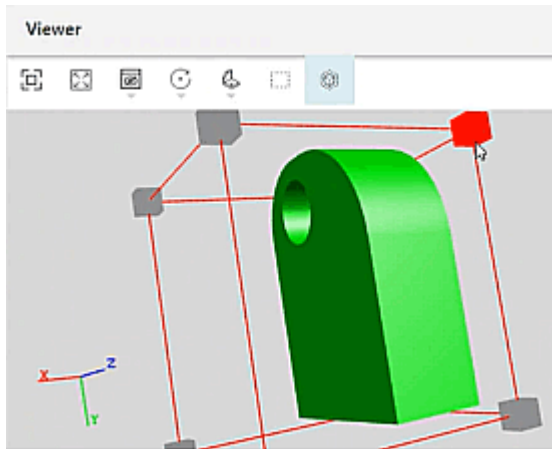
- To select objects that are partially covered, click and drag the cursor from right to left to draw a blue 3D cube around the preferred area.



4. Release the mouse and do either of the following.
 - To adjust the location of the 3D volume selection, click inside the selected area and drag the selection.



- To adjust the height, width, or depth of the selection, pause your mouse over the appropriate handle and drag it in the **Viewer** panel.



5. In the **Viewer** panel toolbar, click **Select by volume**

 , and do one of the following.

.

Results

The object is selected within the **Viewer** panel and in the **Process** panel.

Note

You can click anywhere outside the selected objects to deselect them.

Show or hide multiple assembly, part, or process lines in the Viewer panel

You can show or hide multiple assembly, part, or process lines in the 3D **Viewer** panel.

Procedure

1. If you have not done so already, **search for and open** an existing work package that contains processes and parts and then **navigate** to the **Process Planning** or **Work Instructions Authoring** page.
2. If you are working in the **Assembly**, **Process**, or **Parts** tab or panel of the **Work Instructions Authoring** page, do one of the following to select the lines that you want to show or hide in the **Viewer** panel.
 - To select all lines consecutively, hold your Shift key and select the first and last lines.
 - To select nonconsecutive lines, hold your Ctrl key and select each of the lines.

Note

You can select lines that are currently displayed or hidden in the **Viewer** panel. When you show them, displayed items remain displayed, and hidden items become displayed. When you hide them, hidden items remain hidden, and displayed items become hidden.

3. If you are working on the **Process Planning** page, in the **Process** tab, do one of the following to select the lines that you want to show or hide in the **Viewer** panel.
 - To select all lines consecutively, hold your Shift key and select the first and last lines.
 - To select nonconsecutive lines, hold your Ctrl key and select each of the lines.
4. In the panel toolbar, click **Show Selected**  or **Hide Selected** .

Verify MBOM consumption of many parts

To reassign all or some parts to another operation, you can quickly validate where the parts were originally consumed, select the parts to be reassigned using the 3D viewer, and reassign them to another operation.

You may sometimes be responsible for assigning a large quantity of parts, such as hundreds of rivets, to an operation. You can also assign previously unassigned parts to an operation at the same time.

Procedure

1. If you have not done so already, **search for and open** an existing work package and **navigate** to the **Process Planning** or **Work Instructions Authoring** page.
2. In the **Assembly** tab or panel, click **Show**  to display the parts to be reviewed.

Tip

Click  next to an assembly to view all parts in that assembly.

The parts are displayed in the 3D viewer.

3. In the upper-left corner of the page, select **Show Consumption and Impact State**.
In the **Assembly** tab or panel, in the **Assignment State** column, an **assignment status icon** is displayed next to each part that is assigned to one or more operations.
4. Click the assignment icon next to each part to determine the operations to which each part is assigned.
If you are working on the **Work Instructions Authoring** page, in the **Editor** panel, each operation you select is highlighted, and in the **Parts** tab on the information panel beneath the editor, the part you selected is highlighted.

If you are working on the **Process Planning** page, in the **Process** panel, each operation you select is highlighted, and in the **Parts** tab on the information panel beneath the process panel, the part you selected is highlighted.

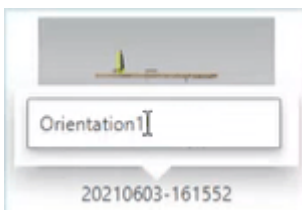
5. In the 3D viewer, click **Select by Rectangle**  and **select the multiple parts** that you want to assign or reassign to another operation.
The parts selected in the 3D viewer are also selected in the **Assembly** tab or panel.
6. In the **Assembly** toolbar, select **More**  → **Manage Consumption** .
In the **Assembly** tab or panel, the selected parts are displayed in a filtered list. Any operations in which the parts are assigned are displayed in the **Consumed In** column, with commas separating each operation to which the parts are assigned.
7. From the list, select any parts you want to assign to an operation, and in the **Editor** tab or **Process** panel, select the operation to which you want to assign or reassign them.
8. In the **Assembly** toolbar, select **More**  → **Assign Selection** .
The parts are assigned to the selected operation and appear in the **Parts** panel beneath the **Editor** tab or **Process** panel.

Rename graphic 3D screen shot visuals

In the **Visuals** panel, you can rename 2D screen shots and product views captured in Teamcenter Lifecycle Visualization.

Procedure

1. In the **Visuals** panel beneath the **Viewer** panel in the **Process Planning** and **Work Instructions Authoring** pages, click **Start Edit** .
2. Select the screen shot whose name you want to change and in the pop-up text box, type a new name.



You can change the name but not the extension (for example, .jpg, .png).

3. (Optional) Select and rename other screen shots, and then click **Save Edits** .

The screen shot names are saved, and if applicable, re-sorted in the **Visuals** panel in alphanumeric order.

4. To update renamed screen shot datasets, do the following.
 - a. Click **Manage Product Views in Teamcenter Visualization** .

- b. When prompted to either update or review the image:
 - i. Click **Review** to load the existing revision and continue without revising the dataset.
 - ii. Click **Update** to open Teamcenter Lifecycle Visualization and create a new product view.
- 5. To delete 2D images and product views in the **Visuals** panel, select them, and then click **Delete** ✕.

Caution

If you **submit** and release an operation with associated renamed screen shots to a workflow, when you attempt to update the image dataset in Teamcenter Lifecycle Visualization, an invalid assembly state is reported and you cannot create a new revision. You should always update image datasets before releasing an operation with associated renamed screen shots to a workflow.

14. Managing effectivities

Delete occurrence effectivities on operations and processes

You can delete occurrence effectivities for one or more operations or processes in one step. In this procedure, effectivities are deleted for an operation, but you can use the same steps to delete effectivities for a process.

Procedure

1. If you have not done so already, search for and open an existing work package that contains processes and parts and navigate to the **Process Planning** or **Work Instructions Authoring** page.
2. In the **Assembly** tab or panel, expand the structure.
3. In the **Process** tab or panel, select one or more operations.
4. Perform one of the following steps.
 - If you are working on the **Process Planning** page, in the **Process** panel, click **More** → **Set Effectivity**.
 - If you are working on the **Work Instructions Authoring** page, in the **Editor** tab, click **More** → **Set Effectivity**.
5. Click **Remove** , and then click **Remove** in the confirmation box.

Validate occurrence effectivity for an operation

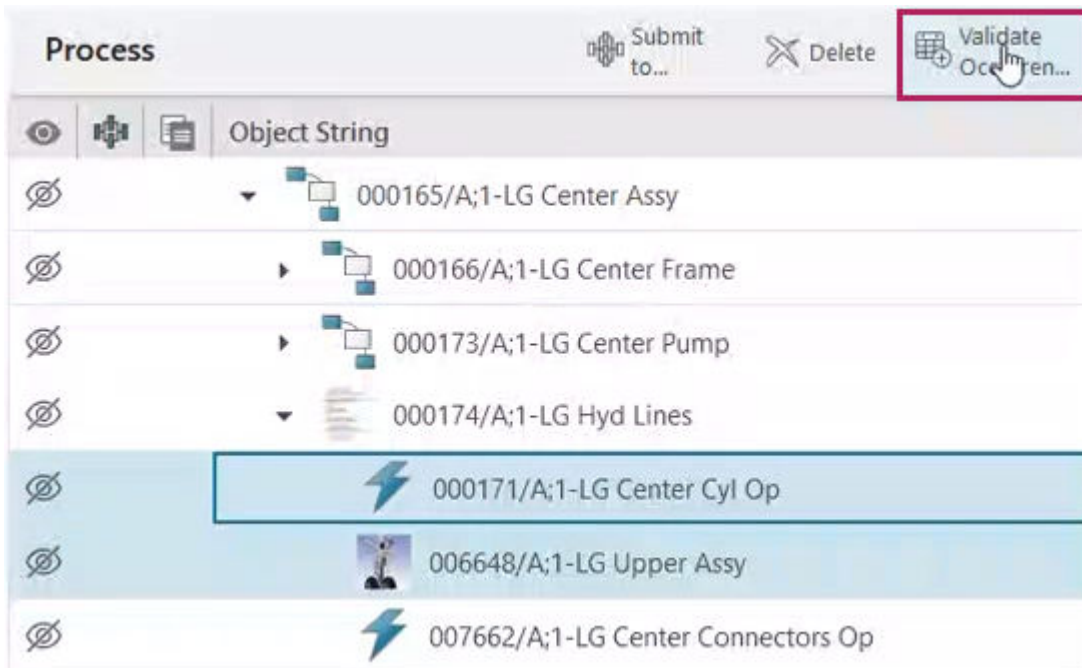
Note

Before you begin, verify that your data meets the following requirements:

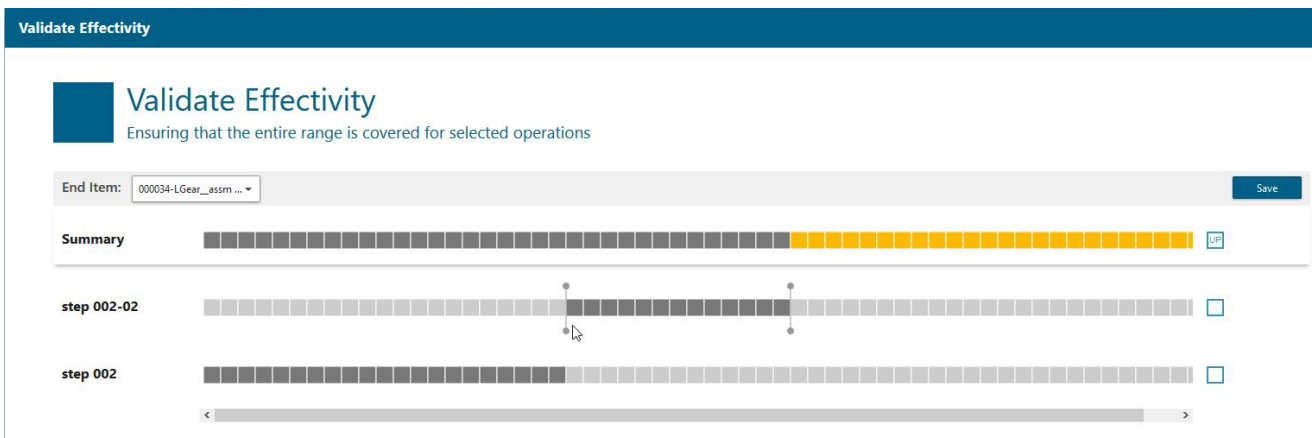
- Operations are created within a process.
- Effectivity is set on the operations for which you will validate occurrence effectivity.

Procedure

1. Open a work package that contains processes and operations.
2. Navigate to the assembly.
3. In the **Process** panel expand the structure and select the operation for which you want to validate occurrence effectivity.
4. Click **Validate Occurrence**.



5. Analyze the **Validate Effectivity** dialog box and take action as needed:



- **End Item**—Lists the end item currently being used for occurrence effectivity. If more than one end item is available, click the drop-down arrow to select a different end item for occurrence validation.
 - **Summary**—Displays an overview of the occurrence effectivity validation for all operations listed for the selected end item. Hover over a square to display its unit number and information about that unit, for example, if there is an overlap at that unit.
 - Yellow squares indicate a gap in effectivity occurrence.
 - Red squares indicate an overlap in effectivity occurrence.
 - **Operation**—Displays an overview of effectivity occurrence for the operation. Hover on an operation to activate handles. You can drag the handles to adjust effectivity for the operation.
6. (Optional) Click **End Item**, and select a different end item for occurrence effectivity validation.

Validate and correct occurrence effectivity for the end item.

Note

When you select a different **End Item**, Process Planning for ETO prompts you to save any changes you made to the current end item before you leave its page.

7. (Optional) To switch the effectivity of a single unit, click on that unit.

Use this when you need to:

- Set a new effectivity on a unit that is not adjusted to an existing range.
- Split effectivity on an existing range.

8. (Optional) To switch the effectivity for a range of units, grab and move a handle to increase or decrease effectivity for a range of units.
9. Click **Save**.

Note

The **Save** button is active only after you make a change on the **Validate Effectivity** dialog box.

Add occurrence effectivities to MBOM container elements

Procedure

1. You can add one or multiple occurrence effectivities to manufacturing bill of materials (MBOM) container elements to elaborate on your revision rules. *Occurrence effectivities* specify that part element revisions in an element container element are valid for a date range (for example, October 2, 2024 to November 1, 2025), a range of units (for example, 8-10 and 12-13 for part unit numbers 8, 9, 10, 12, and 13), or for a combination of both. You can also **edit and delete** occurrence effectivities.
2. On the **EBOM-MBOM Alignment page**, in the MBOM panel, select one or more container element, and in the MBOM toolbar, click **Manage**  **→Element Effectivity** .
3. In the **Element Effectivity** group, click **Add Effectivities** .
4. To set an effectivity by date, do the following.
 - a. On the **New** tab, accept the default **Date** option.
 - b. To share the effectivity with other manufacturing planners, select the **Share** ☒ check box.
 - c. Type a name, and from the **Start** calendar, select an effective start date.
 - d. From the **End** calendar, select an effective end date, which must be later than the start date.

Note

From the **End** list, you can also select either **UP - All Future Dates** or **SO - Stock Out**.

5. To set an effectivity by unit, do the following.
 - a. In the **Element Effectivity** panel, on the **New** tab, click **Add Effectivities**  and select **Unit**.
 - b. To share the effectivity with other manufacturing planners, select the **Share** ☒ check box.
 - c. Type a name, and in **Unit** text box, type one or more ranges of units (for example, **10-20** or **10-20, 25-30**).
By default, below the **Unit** text box, **End Item** is displayed to indicate that the MBOM root node will serve as the effectivity end item. You can later **edit** the unit end date.
 - d. (Optional) To select a different end item, click **Replace**  and either use the **Search** tab to locate a different item, or use the **Palette** tab to copy an item from the clipboard or select it from your favorites or list of recently accessed items.
6. Click **Add**.
The effectivity date is displayed in the **Element Effectivities** group, and a  icon displays next to the MBOM container element in the MBOM panel of the **EBOM-MBOM Alignment** page. To view effectivities for the MBOM container element, hover your mouse over the icon.
7. Add additional effectivities to the container element selected in the **EBOM-MBOM Alignment** page, or on another container element using the search option, as directed in step 3.
8. To search for and add a previously defined effectivity, click **Add Effectivities**  and do the following.
 - a. In the **Element Effectivity** panel, click the **Search** tab.
By default, all effectivities for elements in the MBOM not already added to the selected MBOM element are displayed.
 - b. Type a text string in the **Search** text box to filter the results, and in the **Element Effectivity** panel, click **Add Effectivities** .
 - c. In the **Add Effectivities** panel, select a search element and click **Add**.
The effectivity date is displayed in the **Element Effectivities** group and the effectivity icon  displays in the MBOM. Hover your mouse over the icon to review the details.

Edit and delete occurrence effectivities from MBOM container elements

Procedure

1. You can edit and delete one or multiple previously **added** occurrence effectivities from manufacturing bill of materials (MBOM) container elements, including unit end items (see step 5).
2. On the **EBOM-MBOM Align** page, in the MBOM panel, select one or more container elements that contain elements to be edited, and in the MBOM toolbar, click **Manage**  → **Element Effectivity** .

3. In the **Element Effectivity** panel, select the preferred effectivity and click **Edit** .
4. In the **EDIT** group, modify the effectivity properties such as names, date and unit range as necessary.
5. If the effectivity is a unit activity and you want to change its default MBOM root end item, do the following.
 - a. In the **Element Effectivity** panel, click **Replace** .
 - b. In the **End Item** panel, on the default **Palette** tab, select a different end item from the **Clipboard**, **Favorites**, or **Recent** groups.

Note

You can also use the **Search** tab to locate a specific end item, and then select that item.

6. Click **Save**.
The effectivity date is displayed in the **Element Effectivities** group, and a  icon displays next to the MBOM container element in the MBOM panel of the **EBOM-MBOM Align** page. To view effectivities for the MBOM container element, hover your mouse over the icon.
7. To remove an effectivity from an element, in the **Element Effectivities** panel, select the effectivity, and click **Remove** .

Set effectivity for released MBOM elements

You can set the effectivity of a released revision of a manufacturing bill of materials (MBOM) element to indicate when a revision will be valid.

Prerequisites

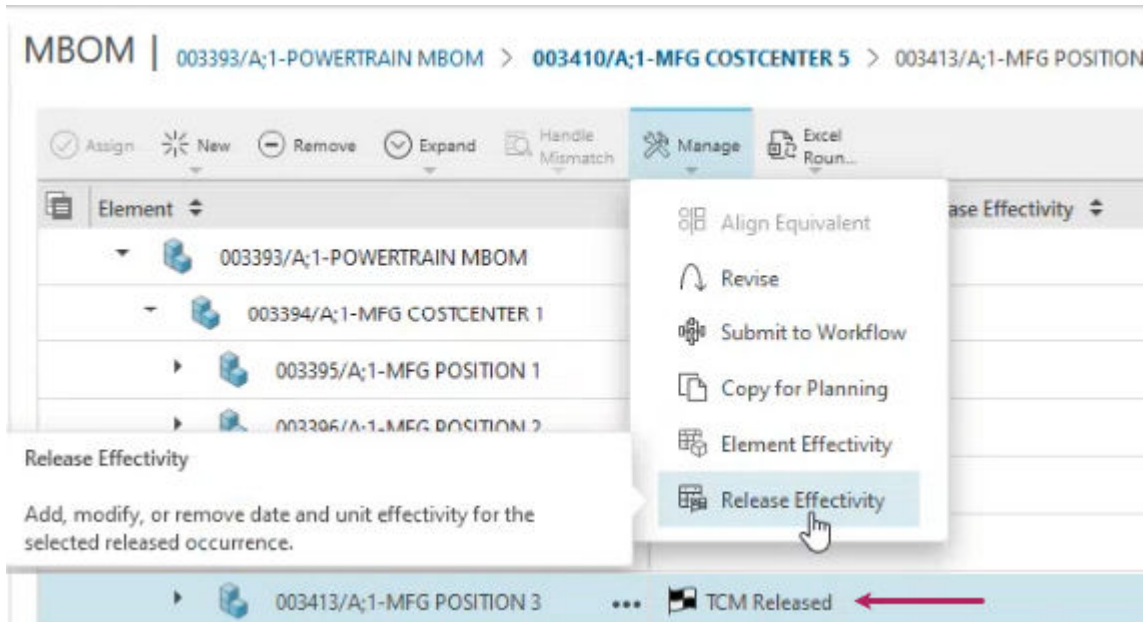
The MBOM element for which you want to set release effectivity must have a released status. If the object has not been released, you cannot set its release effectivity.

Procedure

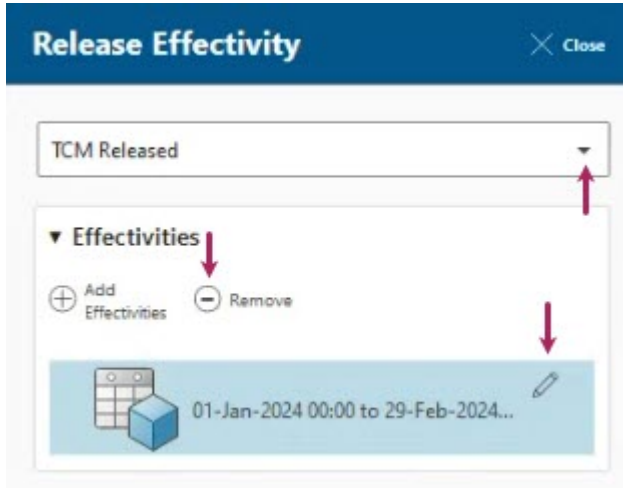
1. Navigate to the **EBOM-MBOM Alignment page** and in the MBOM panel, select an element with a released status.
2. In the MBOM toolbar, click **Manage** → **Release Effectivity**.

Note

This command is available only when you select a single item, and that item has a released status. If the item does not meet both conditions, the command is hidden.



3. In the **Release Effectivity** panel, select the release effectivity and click **Add Effectivities**.
4. In the **Release Effectivity** panel, modify the effectivity properties such as **Date** or **Unit** and ranges as necessary.
5. (Optional) If the object has a release effectivity set, you can hover on the effectivity and click **Edit**, then change effectivity properties.



6. (Optional) Click the release status list and select a different effectivity status.
7. (Optional) Click **Remove** to delete an existing effectivity on an object.
8. Click **Save**.
The release effectivity properties you set are displayed in the **Release Effectivity** column in the MBOM panel.

Set effectivity for released BOP line revisions

You can set the effectivity of a released bill of process (BOP) line revision to indicate when a revision will be valid.

Prerequisites

The BOP line revision item on which you want to set effectivity must have a released status. If the process or operation is not released, you cannot set its release effectivity.

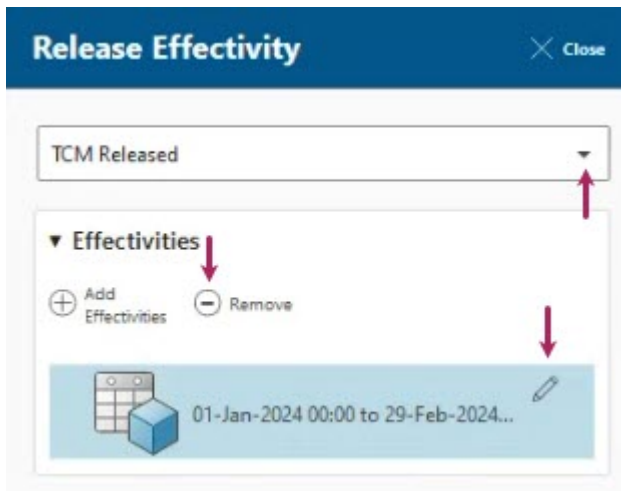
Procedure

1. If you have not done so already, **search for and open an existing work package** that contains processes and operations, and **navigate to the task page in which you want to work**.
2. Perform one of the following steps.
 - In the **Process Planning** page, in the **Process** panel, select a line.
 - In the **Work Instructions Authoring** page, in the **Process** tab, select a line.
 - In the **High Level Planning** page, in the **BOP** panel, select a line.
 - In the **Product BOP Authoring** page, in the **Product BOP** panel, select a line.
3. Click **Release Effectivity**.

Note

This command is available only when you select a single item, and that item has a released status. If the item does not meet both conditions, the command is hidden.

4. In the **Release Effectivity** panel, select the release effectivity and click **Add Effectivities**.
5. In the **Release Effectivity** panel, modify the effectivity properties such as **Date** or **Unit** and ranges as necessary.
6. (Optional) If the object has a release effectivity set, you can hover on the effectivity and click **Edit**, then change effectivity properties.



7. (Optional) Click the release status list and select a different effectivity status.
8. (Optional) Click **Remove** to delete an existing effectivity on an object.
9. Click **Save**.

The release effectivity properties you set are displayed in the **Release Effectivity** column in the panel.

Understanding effectivity, equivalent assignment scope, and validation preferences

Overview

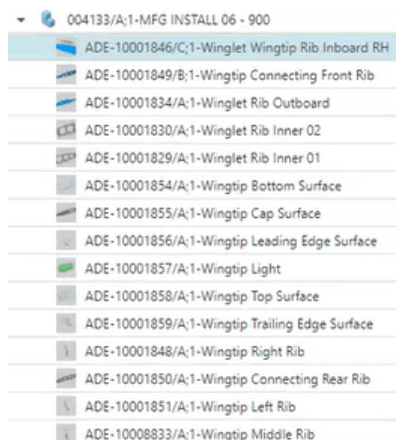
Occurrence effectivity lets you configure different revisions of a product part, assembly, or other element based on time or unit number. **Validation** in Manufacturing-BOM Manager applies only to unit effectivity, especially in cases where it is affected by equivalent engineering assignment scope. When the form, fit, or function of a part or assembly changes, design engineers sometimes use an equivalent assignment scope from an engineering bill of materials (EBOM) to a manufacturing bill of materials (MBOM) to essentially create a new part or assembly while retaining the base part name. The equivalently assigned part or assembly is added to the engineering bill of materials (EBOM) with a limited occurrence effectivity.

Net effectivity calculates the intersection of effectivities set on the path from the EBOM line to be assigned up the parent chain. Starting from the selected EBOM line, and including the EBOM line itself, net effectivity traverses up the parent chain until it finds the first parent with an explicitly defined occurrence effectivity. If an effectivity is defined in the BOM window's revision rule, the computation intersects the parent's occurrence effectivity with that defined in the revision rule. The result of the intersection is the final net effectivity. The occurrence effectivity defined on that parent becomes the net effectivity of any instance of the part or assembly assigned to the manufacturing bill of materials (MBOM).

In this example, an equivalent assignment scope has been applied to an EBOM subassembly named **ADE-10008933/A;1-Wing End Assembly RH-001**. The equivalently assigned subassembly appears as a separate subassembly with an updated number, **ADE-10008933/A;1-Wing End Assembly RH-002**.



All parts in **ADE-10008933/A;1-Wing End Assembly RH-001** have been assigned to the MBOM under a different subassembly name, **004133/A;1-MFG INSTALL 06 - 900**, that indicates a unit effectivity of 06-900 parts.



The equivalent assignment scope change is reported in the **Change Summary** panel as a series of unassigned parts because the EBOM assembly **ADE-10008933/A;1-Wing End Assembly RH-002** has not been assigned to the MBOM.

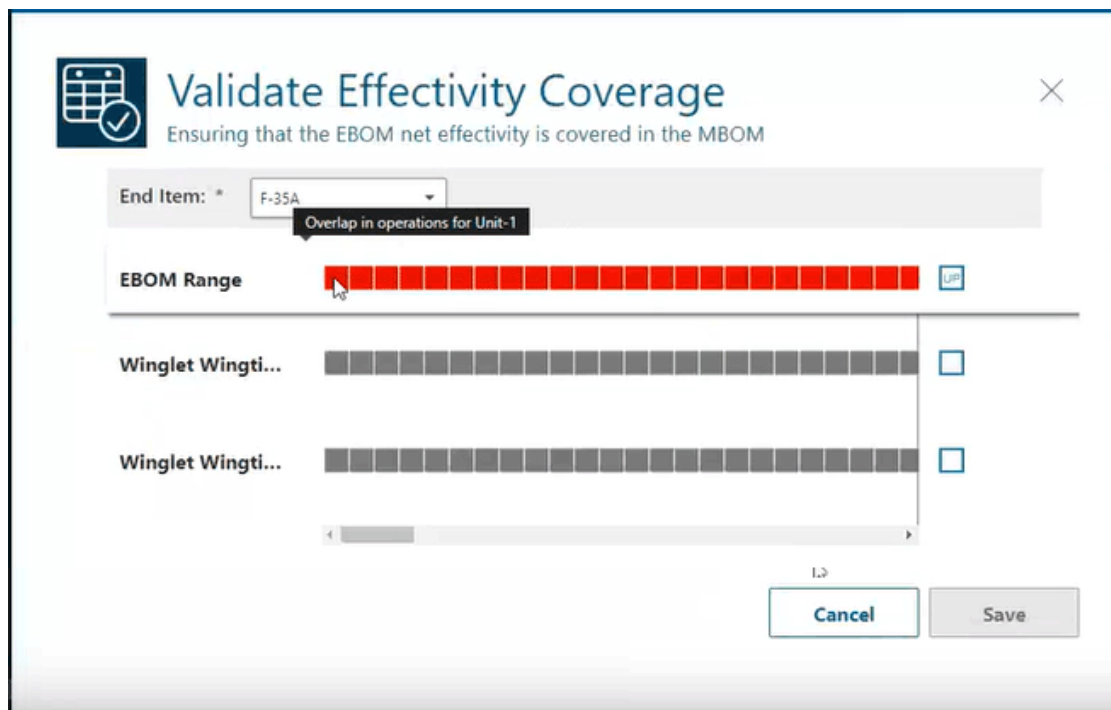
To address the equivalent assignment scope change, the manufacturing engineer can select the MBOM assembly that contains subassembly **004133/A;1-MFG INSTALL 06 - 900**, which contains the unmodified parts from **ADE-10008933/A;1-Wing End Assembly RH-001** and create a new manufacturing container subassembly named **MFG INSTALL 06 - 901** to be used to assign the equivalently assigned parts from the EBOM subassembly **ADE-10008933/A;1-Wing End Assembly RH-002**.

The engineer next assigns the changed parts from the EBOM subassembly **ADE-10008933/A;1-Wing End Assembly RH-002** to **MFG INSTALL 06 - 901**. If there is no effectivity definition for the parts, any parts commonly reused across EBOM subassemblies inherit occurrence effectivities based upon net effectivity. The same applies to parts in the MBOM.

To collect all equivalents of a part in the EBOM and MBOM and verify that all units for those equivalents have a single valid assignment in the MBOM, the engineer clicks **Validate Effectivity Coverage**



A bar chart in the **Validate Effectivity Coverage** dialog box is displayed. **EBOM Range** shows the total effectivity for a specific part in the EBOM by unit. The lower bars display the effectivity for each occurrence in the MBOM.



The engineer can then drag the start and end points of each MBOM occurrence to modify its unit effectivity range.

Validate Effectivity Coverage ✕

Ensuring that the EBOM net effectivity is covered in the MBOM

End Item: * F-35A

EBOM Range Up

Winglet Wingti...

Winglet Wingti...

Cancel Save

Effectivity validation preferences

Preference	Definition
MBMEnableEffectivityValidation	Set this preference to true to compare the net effectivity of a part in an engineering bill of materials (EBOM) and manufacturing bill of materials (MBOM). If a part does not have effectivity defined for it, net effectivity is effectivity defined on the nearest parent.
MBMPropertiesForDashRollEquivalence	Defines the list of BOM line properties considered for finding the equivalent occurrences of parts after an equivalent assignment in the EBOM. The default values are bl_item_item_id and bl_plmxml_abs_xform .
MBMRegexForDashRollIdentification	Defines the regular expression for the value of the property defined by the preference MBM_PropertyForDashRollIdentification below.

The part of the property that should be compared to find an equivalent assignment scope should be enclosed in parentheses (). The default expression **([^\-]+) - \d+** matches all strings having any sequence of characters except - followed by -, followed by digits. The string matching the expression enclosed in parenthesis **[^\-]+** is compared to identify equivalent assignment scope assemblies.

Example

For the given assembly names **Engg_Assembly - 001**, **Engg Assembly - 002**, and **Engg Install - 003**, the names that match the default regular expression are **Engg_Assembly - 001**, **Engg**

Assembly - 002, and **Engg Install - 003**. Therefore the part matching the expression **[^~]+** would be **Engg_Assembly**, **Engg_Assembly**, and **Engg Install**. As this value is same for the assemblies **Engg_Assembly - 001** and **Engg Assembly - 002**, they are considered the equivalent assignment of each other.

MBMPropertyForDashRollIdentification	Defines the property to identify assemblies with equivalent assignment scopes. The default value is bl_item_object_name .

Manage equivalent assignment scopes across EBOMs and MBOMs

Many manufacturing facilities create assemblies with a variety of subassemblies, such as an automotive roof with one sunroof and another with two sunroofs. Engineers sometimes create equivalent assignment scopes for units to create a modified part or assembly while retaining the base part. A part or assembly in an engineering bill of materials (EBOM) might start out with a limited occurrence effectivity (for example, 80 units). You could then reference a different instance with an additional assignment scope of 20 units with one subassembly, and 60 units with a different subassembly.

This example shows how to apply and modify unit effectivity in the EBOM and manufacturing bill of materials (MBOM), as well as how to assign parts across equivalent assignment scopes and align those parts between EBOM and MBOM. The process starts with a base airplane wing that includes 80 wing end assembly units to be manufactured. In the image below, **LH Wing End Assembly - 00** has an element effectivity value of 1-80.

Element	Element Eff...	ID	Revisi
000601/A;1-SA500-LH_WING		000601	A
000602/A;1-57 RH Aileron		000602	A
000641/A;1-57 RH Wing Ribs - 00		000641	A
000843/A;1-57 RH Wing Skins		000843	A
000871/A;1-57 RH Wing Eng Assembly 35B		000871	A
000900/A;1-57 RH Wing Ribs - 01		000900	A
001367/A;1-MODEL		001367	A
000759/A;1-57 RH Wing Landing Gear Closure		000759	A
000774/A;1-57 RH Flap		000774	A
000815/A;1-57 RH Wing Landing Gear		000815	A
001420/A;1-57 LH Wing End Assembly 35A		001420	A
001391/A;1-57 LH Wing End Assembly - 00	1-80 (001368)	001391	A
001404/A;1-57 LH Wing End Assembly - 01		001404	A

You can assign equivalent scopes from multiple EBOM assemblies to a single MBOM installation assembly, or assign scopes from multiple EBOM assemblies to similar MBOM installation assemblies. This new capability builds upon other alignment commands in Teamcenter Manufacturing Process Planner EBOM-MBOM management.

Assign equivalent scopes from multiple EBOM assemblies to a single MBOM install assembly

Procedure

1. In the EBOM, select **LH Wing End Assembly - 00**, and in the MBOM, select an assembly to which you want to install its parts (in this example, **INSTALL - 10029/A;1-WING**), and then click **Focus** .

Note

If you have enabled manufacturing check in and checkout, click **Check Out and Focus**.

The EBOM and MBOM area that you can work in is temporarily reduced to the selected assemblies.



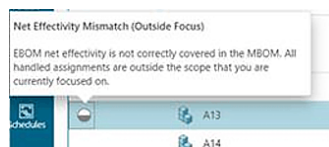
2. In the EBOM, select the parts in the assembly to be assigned to the MBOM, and in the MBOM, click **Assign** . The parts in **LH Wing End Assembly - 00** are assigned to **INSTALL - 10029/A;1-WING**, but the EBOM displays mismatches  to indicate that the MBOM does not share the same effectivity as the EBOM.

Element	Element Eff...	ID	Revision
000001/A;1-SA-300-LH_WING		000001	A
001420/A;1-57 LH Wing End Assembly 35A		001420	A
001391/A;1-57 LH Wing End Assembly - 00	1-80 (001368)	001391	A
001392/A;1-Wingtip Middle Rib		001392	A
001393/A;1-Wingtip Bottom Surface		001393	A
001394/A;1-Wingtip Left Rib		001394	A
001395/A;1-Wingtip Cap Surface		001395	A
001396/A;1-Wingtip Leading Edge Surface		001396	A
001397/A;1-Wingtip Light		001397	A
001398/A;1-Wingtip Top Surface		001398	A
001399/A;1-Wingtip Right Rib		001399	A
001400/A;1-Wingtip Trailing Edge Surface		001400	A
001401/A;1-Wingtip Connecting Rear Rib		001401	A
001402/A;1-Winglet Wingtip Rib Inboard RH		001402	A
001403/A;1-Winglet Wingtip Rib Outboard		001403	A
001404/A;1-57 LH Wing End Assembly - 01		001404	A

Element	Element Eff...	ID	Revision
001086/A;1-SA-300-LH_WING_MBOM		001086	A
MFG-10025/A;2-LH-WINGEND		MFG-10025	A
INSTALL-10029/A;1-WING		INSTALL-10029	A
001392/A;1-Wingtip Middle Rib		001392	A
001393/A;1-Wingtip Bottom Surface		001393	A
001394/A;1-Wingtip Left Rib		001394	A
001395/A;1-Wingtip Cap Surface		001395	A
001396/A;1-Wingtip Leading Edge Surface		001396	A
001397/A;1-Wingtip Light		001397	A
001398/A;1-Wingtip Top Surface		001398	A
001399/A;1-Wingtip Right Rib		001399	A
001400/A;1-Wingtip Trailing Edge Surface		001400	A
001401/A;1-Wingtip Connecting Rear Rib		001401	A
001402/A;1-Winglet Wingtip Rib Inboard RH		001402	A
001403/A;1-Winglet Wingtip Rib Outboard		001403	A

Tip

If a **Net Effectivity Mismatch (Outside Focus)** icon  is displayed in the EBOM, the icon indicates that an object is assigned outside the current focus in the **EBOM-MBOM Alignment** page. Click the icon to confirm the external location:



The **Net Effectivity Mismatch (Outside Focus)** feature is displayed only if you or your administrator have set the value of the preference **MBM_HideOutOfScopeIndications** to **false**.

- In the MBOM, select **Manage** → **Element Effectivity**, and in the **Element Effectivity** dialog box, search for and select the same effectivity as that applied to **LH Wing End Assembly - 00** in the EBOM.
- Click **Add**, and in the confirmation prompt, click **Update Assignment Indication**. Assignment indications in the EBOM update to indicate a full match.

Element	Element Eff...	ID	Revision
000601/A:1-SA-500-LH_WING		000601	A
001420/A:1-57 LH Wing End Assembly 35A		001420	A
001391/A:1-57 LH Wing End Assembly - 00	1-80 (001368)	001391	A
001392/A:1-Wingtip Middle Rib		001392	A
001393/A:1-Wingtip Bottom Surface		001393	A
001394/A:1-Wingtip Left Rib		001394	A
001395/A:1-Wingtip Cap Surface		001395	A
001396/A:1-Wingtip Leading Edge Surface		001396	A
001397/A:1-Wingtip Light		001397	A
001398/A:1-Wingtip Top Surface		001398	A
001399/A:1-Wingtip Right Rib		001399	A
001400/A:1-Wingtip Trailing Edge Surface		001400	A
001401/A:1-Wingtip Connecting Rear Rib		001401	A
001402/A:1-Winglet Wingtip Rib Inboard RH		001402	A
001403/A:1-Winglet Wingtip Rib Outboard		001403	A
001404/A:1-57 LH Wing End Assembly - 01		001404	A

Element	Element Eff...	ID	Revision
001086/A:1-SA-500-LH-WING_MBOM		001086	A
MFG-10025/A:2-LH-WINGEND		MFG-10025	A
INSTALL-10029/A:1-WING	1-80 (001368)	INSTALL-10029	A
001392/A:1-Wingtip Middle Rib		001392	A
001393/A:1-Wingtip Bottom Surface		001393	A
001394/A:1-Wingtip Left Rib		001394	A
001395/A:1-Wingtip Cap Surface		001395	A
001396/A:1-Wingtip Leading Edge Surface		001396	A
001397/A:1-Wingtip Light		001397	A
001398/A:1-Wingtip Top Surface		001398	A
001399/A:1-Wingtip Right Rib		001399	A
001400/A:1-Wingtip Trailing Edge Surface		001400	A
001401/A:1-Wingtip Connecting Rear Rib		001401	A
001402/A:1-Winglet Wingtip Rib Inboard RH		001402	A
001403/A:1-Winglet Wingtip Rib Outboard		001403	A

The manufacturer determines that the wings should include two different wing ends, and wants to reduce the effectivity of **LH Wing End Assembly - 00** to 20 and **LH Wing End Assembly - 01** to 60.

- In the EBOM, select **LH Wing End Assembly - 00**, in the MBOM toolbar, choose **Assign** → **Element Effectivity**, and in the **Element Effectivity** dialog box, delete the existing effectivity and either search and locate, or add an effectivity with values of 1 to 20.
- Select **LH Wing End Assembly - 01** and either search and locate, or add an effectivity of 21-80. The parts in **LH Wing End Assembly - 00** are mismatched again, as indicated by the assembly level partial match icon. This is because the effectivity of that assembly is 1-20, and that of the MBOM assembly **INSTALL - 10029/A:1-WING** is still 1-80.

Element	Element Eff...	ID	Revision
000601/A:1-SA-500-LH_WING		000601	A
001420/A:1-57 LH Wing End Assembly 35A		001420	A
001391/A:1-57 LH Wing End Assembly - 00	1-20 (001368)	001391	A
001404/A:1-57 LH Wing End Assembly - 01	21-80 (001368)	001404	A

Element	Element Eff...	ID	Revision
001086/A:1-SA-500-LH-WING_MBOM		001086	A
MFG-10025/A:2-LH-WINGEND		MFG-10025	A
INSTALL-10029/A:1-WING	1-80 (001368)	INSTALL-10029	A

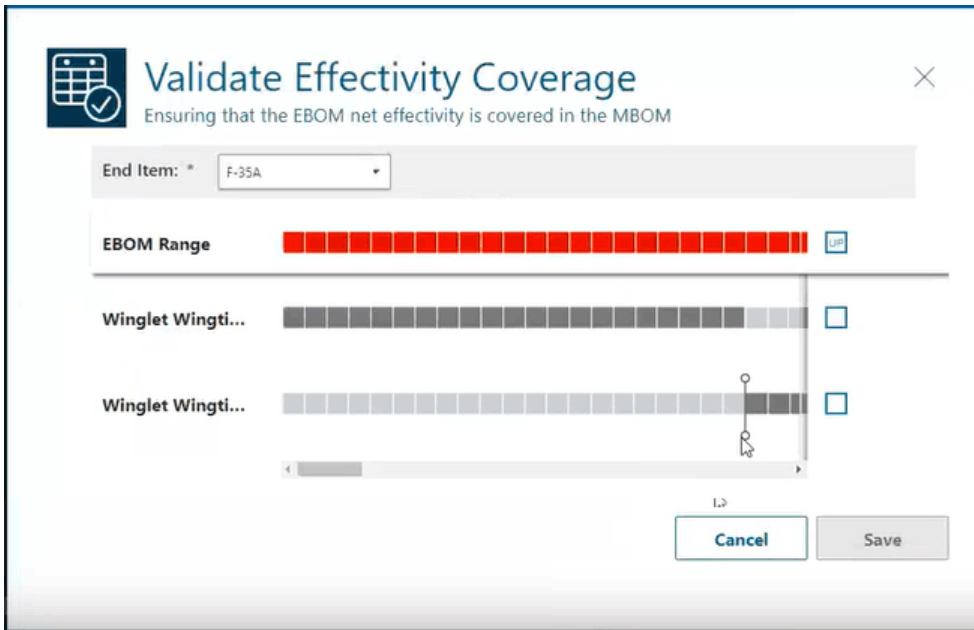
Some parts in **LH Wing End Assembly - 00** are commonly used in **LH Wing End Assembly - 01**. The two assemblies share the same root IDIC, but Manufacturing-BOM Manager is unable to communicate the net effectivity between these common parts without matching part IDICs.

- In the EBOM, select **LH Wing End Assembly - 01**, and in the MBOM, select **INSTALL - 10029/A:1-WING**.
- Select **Manage** → **Align Equivalent**.
- In the confirmation prompt, click **Align**, and in the second confirmation prompt stating that the two assemblies are now aligned, click **Update Assignment Indication**. The IDICs are now stamped to the common parts in **LH Wing End Assembly - 01**, on the basis of each part's item ID and position (in Teamcenter Manufacturing Process Planner, absolute transformation

matrix value). Aligned parts are considered the same part when the system confirms the assignment state. The EBOM displays full matches  because net activity computes for all parts common to **LH Wing End Assembly - 00** and **LH Wing End Assembly - 01**.

Element	Element Eff...	ID	Revision	Revision Name
000601/A;1-SA500-LH_WING		000601	A	SA500-LH_WING
001420/A;1-57 LH Wing End Assembly 35A		001420	A	57 LH Wing End Assembly 35A
001391/A;1-57 LH Wing End Assembly - 00	1-20 (001368)	001391	A	57 LH Wing End Assembly - 00
 001392/A;1-Wingtip Middle Rib		001392	A	Wingtip Middle Rib
 001393/A;1-Wingtip Bottom Surface		001393	A	Wingtip Bottom Surface
 001394/A;1-Wingtip Left Rib		001394	A	Wingtip Left Rib
 001395/A;1-Wingtip Cap Surface		001395	A	Wingtip Cap Surface
 001396/A;1-Wingtip Leading Edge Surface		001396	A	Wingtip Leading Edge Surface
 001397/A;1-Wingtip Light		001397	A	Wingtip Light
 001398/A;1-Wingtip Top Surface		001398	A	Wingtip Top Surface
 001399/A;1-Wingtip Right Rib		001399	A	Wingtip Right Rib
 001400/A;1-Wingtip Trailing Edge Surface		001400	A	Wingtip Trailing Edge Surface
 001401/A;1-Wingtip Connecting Rear Rib		001401	A	Wingtip Connecting Rear Rib
 001402/A;1-Winglet Wingtip Rib Inboard RH		001402	A	Winglet Wingtip Rib Inboard RH
 001403/A;1-Winglet Wingtip Rib Outboard		001403	A	Winglet Wingtip Rib Outboard
 001404/A;1-57 LH Wing End Assembly - 01	21-80 (001368)	001404	A	57 LH Wing End Assembly - 01
 001392/A;1-Wingtip Middle Rib		001392	A	Wingtip Middle Rib
 001393/A;1-Wingtip Bottom Surface		001393	A	Wingtip Bottom Surface
 001394/A;1-Wingtip Left Rib		001394	A	Wingtip Left Rib
 001402/A;1-Winglet Wingtip Rib Inboard RH		001402	A	Winglet Wingtip Rib Inboard RH
 001403/A;1-Winglet Wingtip Rib Outboard		001403	A	Winglet Wingtip Rib Outboard
 001407/A;1-Winglet Rib Outer 01		001407	A	Winglet Rib Outer 01
 001408/A;1-Winglet Spar Aft		001408	A	Winglet Spar Aft
 001409/A;1-Winglet Top Surface		001409	A	Winglet Top Surface

- In the EBOM, select the remaining unassigned parts in **LH Wing End Assembly - 01** with blank status icons, and in the MBOM, select **INSTALL - 10029/A;1-WING**, and then click **Assign** . The parts are assigned, but mismatch icons for non-common parts are still visible in the EBOM assemblies **LH Wing End Assembly - 00** and **LH Wing End Assembly - 01**, because effectivity in these EBOM assemblies is set to 1-20 and 21-80, respectively, and **INSTALL - 10029/A;1-WING** in the MBOM is set to 1-80.
- In the EBOM, click **Validate Effectivity Coverage** , and in the **Validate Effectivity Coverage** dialog box, drag the start and end points of each MBOM occurrence to modify its unit effectivity range, and click **Save**.



Assign equivalent scopes from multiple EBOM assemblies to similar MBOM installation assemblies

The process for assigning equivalent scopes from multiple EBOM assemblies to multiple MBOM installation assemblies is in many ways the same as assigning equivalent scopes from multiple EBOM assemblies to a single MBOM installation assembly, but involves creating another installation MBOM assembly to separately define the two scenarios. This example builds on the example shown above in *Assign equivalent scopes from multiple EBOM assemblies to a single MBOM install assembly*.

Procedure

1. In the EBOM, select **LH Wing End Assembly - 01**, and in the MBOM, select **INSTALL - 10029/A;1-WING**.
2. Click **New**  **→ Create Based On**  to create a new manufacturing element based on the selected element. The root element is duplicated, while the structure under it is reused (referenced). In the **Create Based On** dialog box, the ID of the selected element is displayed in the **ID** text box.
3. To create a new assembly with the ID as the name, leave the **Name** text box blank; to append additional text to it, type the text to be appended in the **Name** text box, and click **Create**.

Example

ID = INSTALL - 10052, Name = WING 2; assembly name = INSTALL - 10052 WING 2.

The new assembly is created beneath **LH Wing End Assembly - 01** and references the same parts, with the same IDs and revisions, but does not duplicate the source assembly's element effectivity.

4. (Optional) Change the source and copy the effectivities of assemblies, assign any required additional parts, and use other commands, such as **Align Equivalent** and **Update Assignment Indications**, to align the EBOM and the MBOM as appropriate.

Calculating net effectivity settings from Manufacturing Process Planner

Manufacturing Process Planner and Easy Plan support several options for calculating net effectivity for nodes assigned from an engineering BOM (EBOM) to a manufacturing BOM (MBOM).

Parts and other elements in an EBOM or MBOM can have multiple end items and group effectivities. When an EBOM node is assigned to an MBOM, that node is assigned with calculated effectivity. Net unit effectivity is either calculated on the EBOM side and then assigned to MBOM, or is calculated on both the EBOM and MBOM and then assigned to the MBOM.

The preference **MEEffectivityAssignmentMode** in Manufacturing Process Planner defines the assignment behavior from an engineering BOM (EBOM) to a manufacturing BOM (MBOM), for the **BOMLine** property **bl_occ_effectivity**. The following values are available.

- **0** (default value). If the source EBOM line has an occurrence effectivity defined, the occurrence effectivity of the source line is assigned to the target line. Otherwise, an empty occurrence effectivity is assigned to the target.
- **1**. If the source EBOM line has an occurrence effectivity defined, the occurrence effectivity of the source line is assigned to the target line. Otherwise, the system finds the source line's closest parent that contains an occurrence effectivity and assigns that effectivity to the target line.
- **2**. The net effectivity of the source EBOM line is computed using a custom extension on the operation **BMF_BOMLINE_compute_net_effectivity** and assigned to the target MBOM line.
- **3**. The unit net effectivity **fnd0UnitNetEffectivity** property of the source EBOM line is computed and assigned to the target MBOM line.

Example

If **MEEffectivityAssignmentMode** = **3**, you system computes the net effectivity on the selected EBOM node by intersecting it with the unit effectivities in its upper hierarchy, then assigning this computed effectivity to the assigned node from EBOM to MBOM.

- **4**. The unit net effectivity **fnd0UnitNetEffectivity** property of the source EBOM line and MBOM parent line is intersected and assigned to the target MBOM line.

Example

If **MEEffectivityAssignmentMode** = **4**, the system computes the net effectivity on the selected EBOM node by intersecting it with the unit effectivities in its upper hierarchy. While assigning this node in MBOM, it computes the unit net effectivity for the MBOM assembly under which the selected EBOM node is being assigned. The system then intersects both these effectivities from EBOM and MBOM and assigns this computed effectivity to the assigned node from EBOM to MBOM.

Note

If the preference **MEEffectivityAssignmentMode** is set to anything other than **0**, the source line and target line may not have the same occurrence effectivity. An alignment check or accountability check may detect differences between the two lines for property **bl_occ_effectivity**.

Update equivalent assignment scopes

Update equivalent assignment scopes to link equivalent MBOM assemblies, connected as assignment scopes to previous EBOM assemblies, to a newly created EBOM equivalent assembly.

Sometimes an engineering bill of materials (EBOM) assembly is created for a source EBOM assembly by adjusting the effectivity for new and existing EBOM assemblies. The source EBOM assembly might have one or more assignment scopes defined in the manufacturing bill of materials (MBOM), and the new, equivalent EBOM assembly must also be connected to the same MBOM's assignment scopes. Assignment connections ensure that the accountability check (assignment indications) between EBOM and MBOM show the correct results by considering the net effectivity for the nodes assigned from EBOM to MBOM.

Note

Equivalent assignment scopes were previously termed *equivalent assignment domains* in Teamcenter Easy Plan and Manufacturing-BOM Manager 6.1.3, and *dash rolls* prior to that release.

Procedure

1. If you have not done so already, **search for and open** an existing work package and **navigate** to the **EBOM-MBOM Alignment page**.

In this example, the EBOM has two equivalent scopes with different effectivities .

EBOM | EBOM1 > 0123-002 >

Revision: Latest Working ▾ Date: Today ▾ Units: None ▾ (041289-EBOM1) Variant: No Variant Rule ▾ (041289/A:1-EBOM1)

Element ▾	ID ▾	Revision ▾	Revision Name ▾
EBOM1	041289	A	EBOM1
S2	041294	A	S2
0123-001	0123-001	A	0123-001
0123-002	0123-002	A	0123-002

The MBOM has a manufacturing assembly that was created from EBOM assembly **0123-001**. Because it was assigned to the MBOM from the EBOM, in the **Assignment** column, it displays the equivalent scopes from the EBOM assembly.

MBOM | MfgASM >

Revision: Latest Working Date: Today Units: None (041307-MfgASM) Variant: No Variant Rule (041307/A;1-MfgASM)

Element	Element Eff...	ID	Revision Name	Assignment
MfgASM		041307	MfgASM	
MfgASM-001	1-UP (041289)	MfgASM-001	MfgASM-001	0123-001-0123-0123-002-0123-

2. In the MBOM, create a referenced assembly with a different effectivity by doing the following.
 - a. Select the source assembly, and in the MBOM toolbar, click **New**  → **Create Based On** .
 - b. Define a different effectivity.

In this example, a new assembly is created from **MfgASM-001**, named **MfgASM-002**, and a different effectivity is defined: **6-UP (041289)**. In the **Assignment** column, **MfgASM-002** is no longer linked to the second EBOM scope associated to **MfgASM-001**.

MBOM | MfgASM >

Revision: Latest Working Date: Today Units: None (041307-MfgASM) Variant: No Variant Rule (041307/A;1-MfgASM)

Element	Element Eff...	ID	Revision Name	Assignment
MfgASM		041307	MfgASM	
MfgASM-001	1-UP (041289)	MfgASM-001	MfgASM-001	0123-001-0123-0123-002-0123-
MfgASM-002	6-UP (041289)	MfgASM-002	MfgASM-002	0123-001-0123-

3. Select the equivalent EBOM and MBOM assemblies, and choose **Manage**  → **Align Equivalent** .

In this example, from the EBOM, you would select **0123-002**, and in the MBOM, you would select **MfgASM-001**.

4. In the EBOM, locate the second EBOM scope assembly to which the duplicate MBOM assembly is no longer associated.

In the EBOM, the second EBOM assembly shows a partially assigned status icon , indicating that it is not associated with all equivalent MBOM assignment scopes.

5. In the **EBOM** panel, right-click the new assembly and select **Update Equivalent Assignment Scopes** .

The system:

- Searches in the EBOM for any earlier assemblies that are equivalent to the selected assembly.

- Searches the MBOM assignment scopes that are associated to EBOM assemblies, and associates all equivalent EBOM and MBOM assemblies.

Note

The system locates equivalent assemblies by verifying that they have identical absolute transformation matrices. If an assembly does not have a matching absolute transformation matrix, it is not compared.

- Associates each equivalent EBOM assembly with each of the MBOM targets.

In the EBOM, the second EBOM assembly, which previously displayed a partially assigned status icon , now shows a fully assigned status icon , indicating that it is now associated to all equivalent assignment scopes.

In this example, in the MBOM, **MfgASM-002** is now linked to the same EBOM scopes as **MfgASM-001**.

MBOM | MfgASM >

Revision: Latest Working ▾ Date: Today ▾ Units: None ▾ (041307-MfgASM) Variant: No Variant Rule ▾ (041307/A;1-MfgASM)

Element ▾	Element Eff... ▾	ID ▾	Revision Name ▾	Assignment ⚙
▾  MfgASM		041307	MfgASM	
▸  MfgASM-001	1-UP (041289)	MfgASM-001	MfgASM-001	0123-001-0123-0123-002-0123-
▾  MfgASM-002	6-UP (041289)	MfgASM-002	MfgASM-002	0123-001-0123-001, 0123-002-0123-002

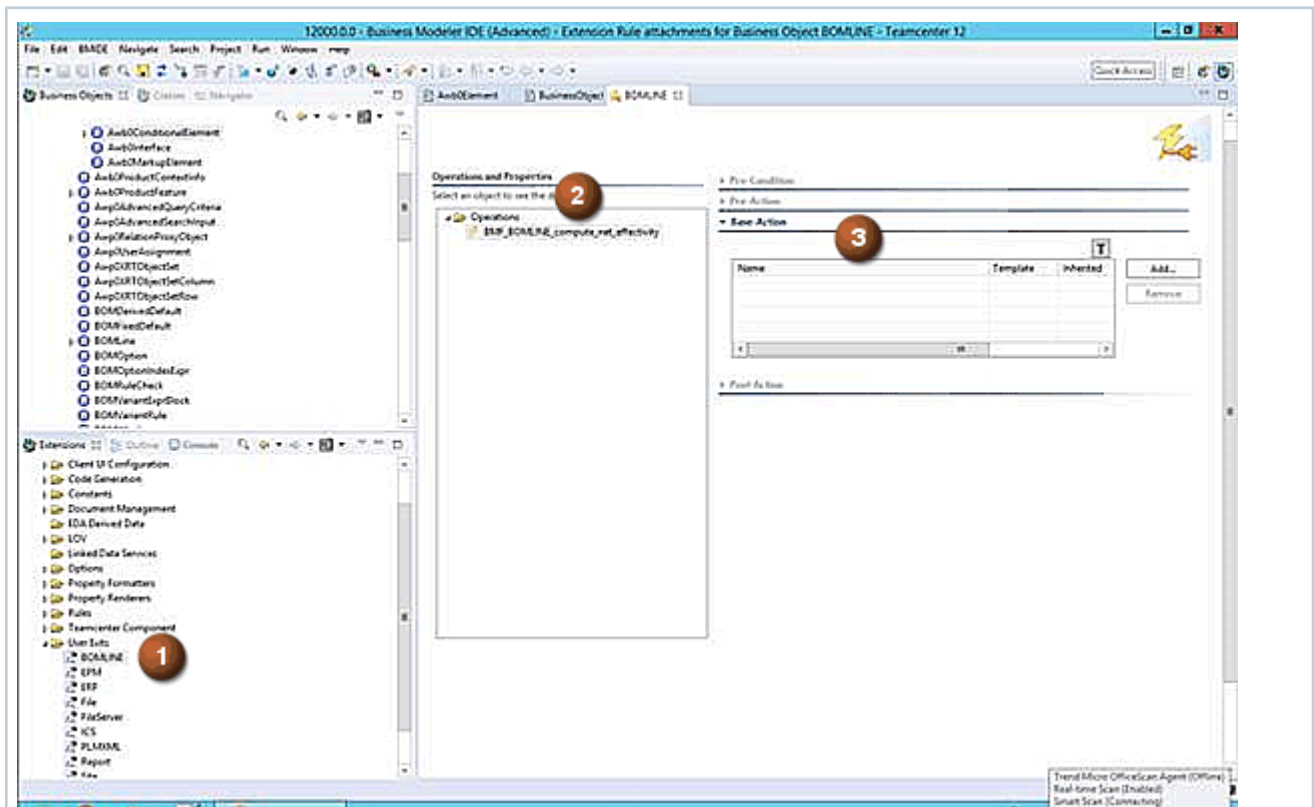
Enable net effectivity

To enable net effectivity in Manufacturing-BOM Manager, you must create a business modeler integrated development environment (BMIDE) extension and configure accountability check settings. For more information, see *Configure your business data model in BMIDE* in the Teamcenter help.

Create a BMIDE extension

Procedure

- In the Teamcenter Rich Client, create a new BMIDE project using the body in white foundation template by doing the following.



1	In the Extensions pane, open the User Exits tab and select BOMLINE .
2	On the BOMLINE tab, in the Operations and Properties group, expand the Operations node and select BMF_BOMLINE_compute_net_effectivity .
3	Expand the Base-Action group and click Add .

2. In the **Add Extension Rule** dialog box, next to the **Extension** text box, click **Browse**, select **FndBOMLINE_ask_effectivity**, and click **Add**.
3. Click **Browse** again, select **FndBOMLINE_ask_effectivity_by_parent**, and click **Add** again.
4. Click **OK**.
5. Save and deploy the BMIDE project template to the database.

Configure accountability check settings

Procedure

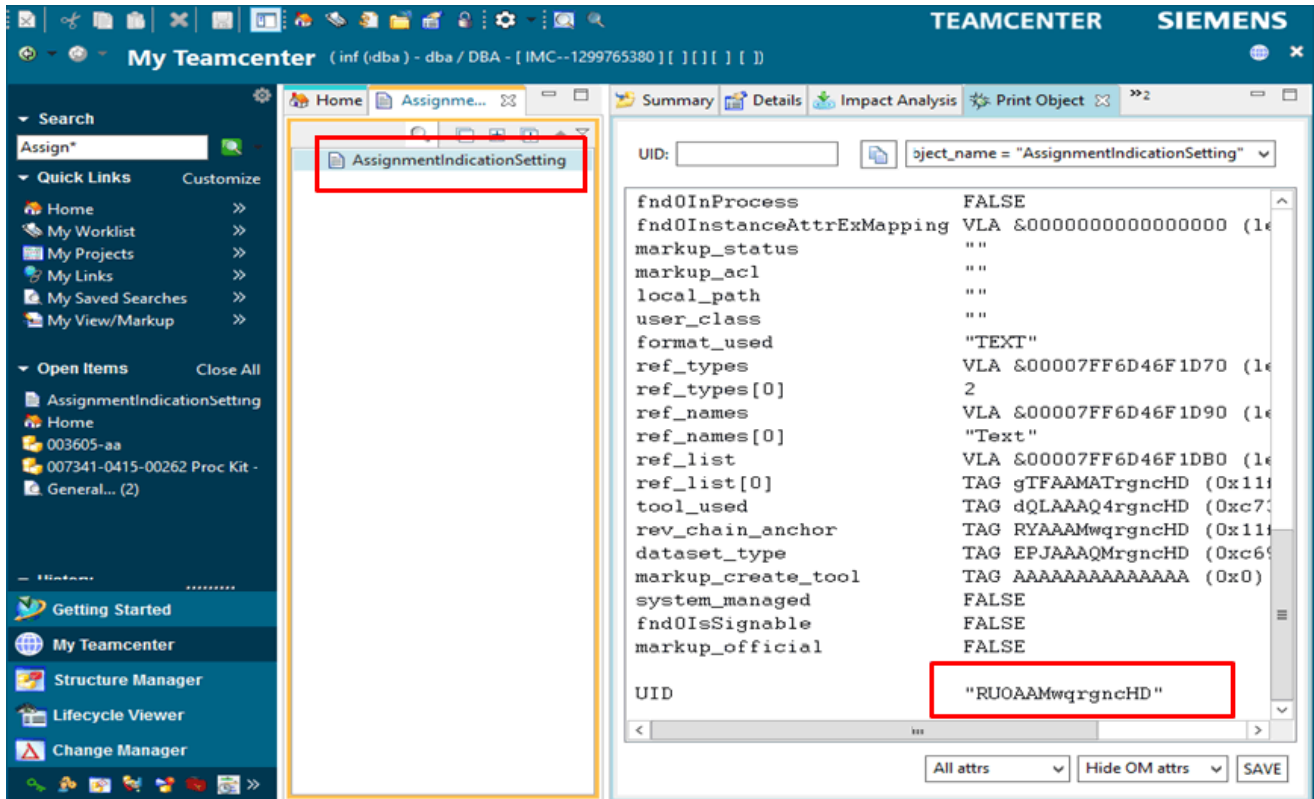
1. Set the preference **MEAccountabilityCheckEnableNetEffectivity** to **true**.
2. In Manufacturing Process Planner:
 - a. Open the structure you want to configure for use in Manufacturing-BOM Manager.

- b. Select source engineering bill of materials (EBOM) and manufacturing bill of materials (MBOM) target objects in the structure views.
 - c. Open the **Advanced Accountability Check** dialog box by choosing **Tools→Accountability Check→Advanced Accountability Check**.
3. For closure rules, set **Source** and **Target** to **AccountabilityLinkedAssmOrLeaves**.

Note

You can use custom rules but they should derive from **AccountabilityLinkedAssmOrLeaves**.

4. On the **Reporting** tab, set the following display options.
 - a. Choose **Report the selected check criteria** and select the **Color the compared objects** ☒ check box.
 - b. In the **Display Options** list, select the **Full match**, **Partial match**, **Missing target**, **Missing source**, and **Partial Effectivity mismatch** ☒ check boxes.
 - c. Select the **Consider quantity rollup for multiple match** ☒ check box.
5. On the **Equivalence** tab, change no settings.
By default, ID in Context (IDIC) will serve as equivalence criteria.
6. (Optional) On the **Partial Match** tab, select any properties you want to compare and propagate from EBOM to MBOM.
7. When you have defined all the settings, click  at the bottom of the **Accountability Check** dialog box.
8. Add a name for your accountability check settings and click **OK**.
9. Navigate to My Teamcenter, search for the settings dataset you saved, and note the **UID** of the dataset in the **Print Object** view.



Note

The setting used by Manufacturing-BOM Manager is based on the preference **MEAccountabilityCheckSettings**. If this preference does not exist, create a new site level preference in which:

- **Category = Easy Plan**
- **Type = String**
- **Multiple = Multiple**
- **Values = dataset/setting UID**

Caution

Ensure there are no user-level instances of this preference available in the system. User-level preference instances take precedence over site-level instances.

Validate effectivity of modified EBOM elements in MBOM

You can collect all equivalents of a part in the EBOM that is reused or assigned multiple times in an MBOM, and thereby verify that all units for those equivalents have a single valid effectivity assignment in the MBOM.

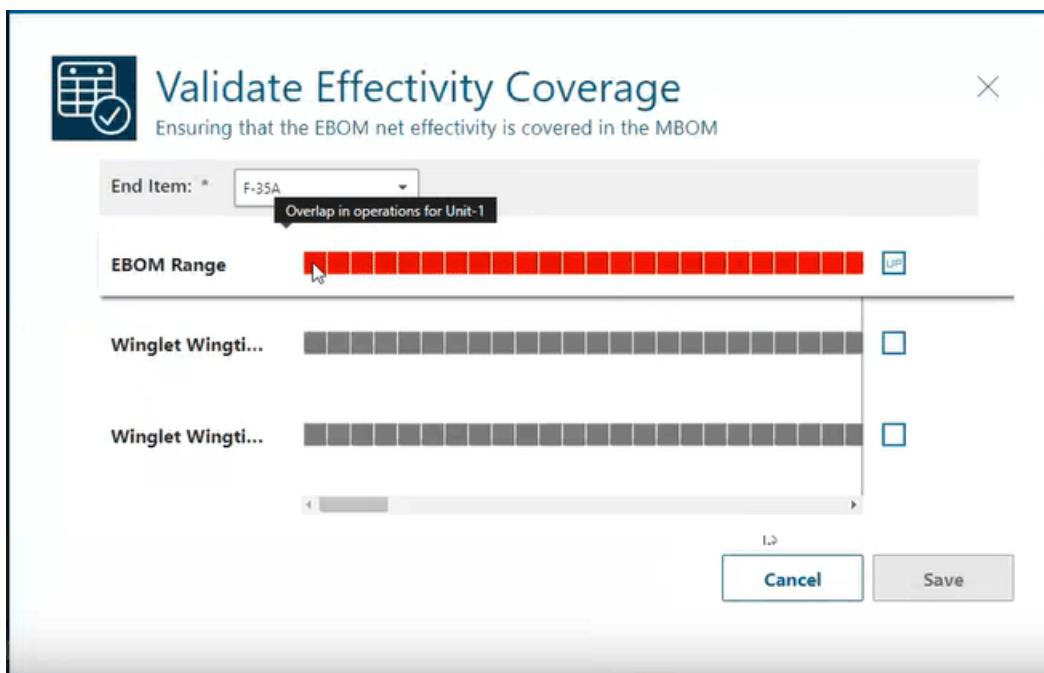
Example

A part or assembly on the left side of an aircraft might have a part identifier such as **FRAME1-1** that includes the base part name **FRAME** and number **FRAME1-1**. When a design change occurs, engineering might then use an equivalent assignment scope to change the identifier to **FRAME1-2**. This can also apply to assemblies of parts.

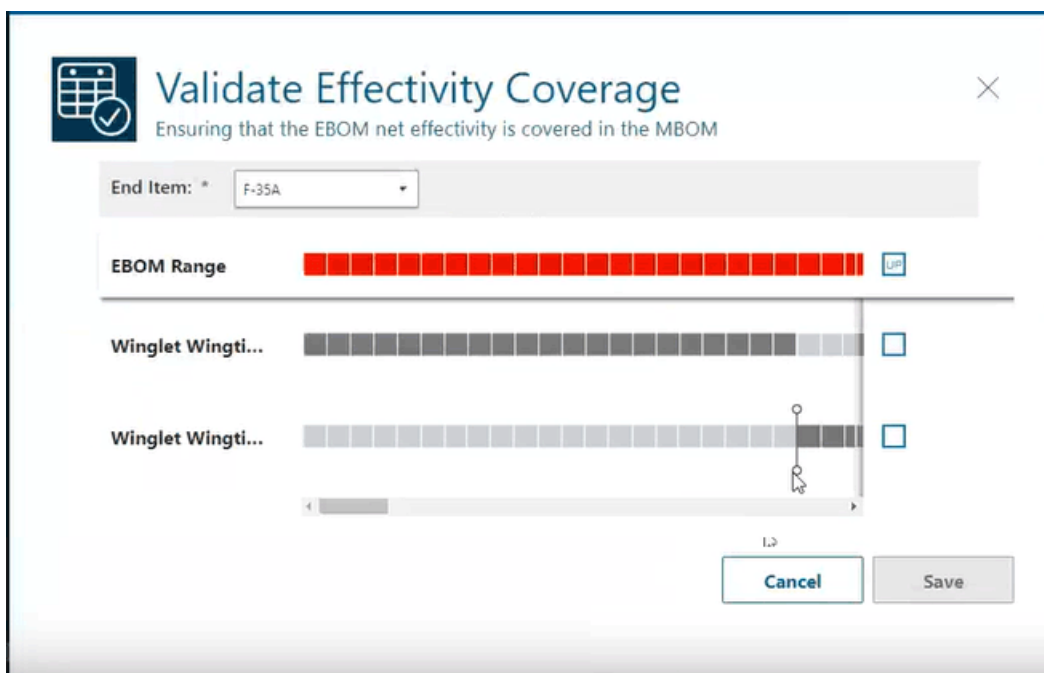
Procedure

1. Open a work package that contains an EBOM with modified parts or assemblies and a manufacturing bill of materials (MBOM) that uses those modified elements from that MBOM.
2. In the EBOM, select a modified part or assembly assigned to the MBOM.
3. Select the MBOM assembly to which you want to assign the modified part or assembly subassembly, click **Add Manufacturing Element** , and create a new manufacturing container subassembly to be used to assign the equivalently assigned part or assembly from the EBOM.
4. From the EBOM, select the equivalently assigned part or assembly, and from the MBOM, select the new manufacturing container subassembly, and then click **Assign** .
If there is no effectivity definition for the parts, any parts commonly reused across EBOM subassemblies inherit occurrence effectivities based upon net effectivity; the effectivity for the parts in the lowest subassembly inherits the effectivity of the next highest, and upward through the chain to the highest parent with defined effectivity. The same applies to parts in the MBOM.
5. To collect all equivalents of a part in the EBOM and MBOM and verify that all units for those equivalents have a single valid assignment in the MBOM, in the EBOM toolbar, the engineer clicks **Validate Effectivity Coverage** .

A bar chart in the **Validate Effectivity Coverage** dialog box is displayed. **EBOM Range** shows the total effectivity for a specific part in the EBOM per unit. The lower bars display the effectivity for each occurrence in the MBOM. To change the end item, from the **End Item** list, select a preferred end item.



6. Drag the start and end points of each MBOM occurrence to modify its unit effectivity range, and then click **Save**.



Manage occurrence effectivities on operations and processes

You can set the occurrence effectivities on processes and operations for several different units. In this topic effectivity is set for an operation, but you can use the same steps to set effectivity for a process.

Procedure

1. If you have not done so already, search for and open an existing work package that contains processes and parts and navigate to the **Process Planning** or **Work Instructions Authoring** page.
2. In the **Assembly** tab or panel, expand the structure.
3. In the **Process** tab or panel, select one or more operations.
4. Perform one of the following steps.
 - If you are working on the **Process Planning** page, in the **Process** panel, click **More** → **Set Effectivity**.
 - If you are working on the **Work Instructions Authoring** page, in the **Editor** tab, click **More** → **Set Effectivity**.
5. In the **Set Occurrence Effectivity** dialog box, select an existing effectivity or click **Create Effectivity**.
6. In the **Units** box, type start and end unit numbers for the operation.

When you assign units to the last operation in a series, assign an ending unit value or type UP. If you do not assign an ending unit value to an operation, you cannot properly validate occurrence effectivity, because the operation has an infinite ending value.
7. In the **Select End Item** box, type a full or partial end item value and press **Enter** to search for it.
8. Select an item from the results list and click **Done**.

Note

If an object or parent object has a status of Released and you change its effectivity, a message lists objects that must be revised. Click **Revise** or **Cancel**.

Run process data validation checks

You can use the data validation feature with processes in Teamcenter Easy Plan to verify whether manufacturing processes and operations are ready to be released. You can also filter the test results to focus on the most important results.

Note

Your Teamcenter implementation team creates and maintains validation check tests that are specific to your environment. The tests shown in this topic are for example purposes only.

Procedure

- 1. If you have not done so already, **search for and open** an existing work package and **navigate** to the **Process Planning** or **Work Instructions Authoring** page.
- 2. In the **Process** tab or **Process** panel, select a process or operation.
The process or operation you selected is the *scope* for the validation check.
- 3. In the page's top toolbar, click **Show Validation Checks** .
The **Validation Checks** panel opens in place of the **Viewer** panel.
- 4. Click **Run Validation Checks**.

Easy Plan displays the **Validation Results** table. By default, results are filtered to display errors only.

Note

When you select a BOM line in the **Validation Results** table, additional information is provided in the **Details** section. In addition, Easy Plan synchronizes the BOM line selection in the **Validation Results** table, and highlights the corresponding BOM line in the **Process** table or panel.

Validation Results		Run Validation...
Filter Results	Error Warning Pass	Clear
BOM Line	Overall Result	
001341/A;1-Turning	Error	
001340/A;1-Shaping	Error	
001326/B;1-Shakeout	Warning	
001339/A;1-Drilling	Error	
001325/B;1-Cavity Ejection	Warning	
001320/A;1-Machine tool shop	Error	
Details: 001339/A;1-Drilling		
Validation Name	Result	Validation Message
Has Release Status	Error	Object 001339/A;1-Drilling does not have release status.
Find Number Size	Warning	Operation 001339/A;1-Drilling has incorrect find number size = .

- 5. (Optional) Click **Warning** or **Pass** to display those test results in the **Validation Results** panel.

Tip

Click **Clear** to remove all applied filters from the validation results.

- 6. Resolve the failed validation checks.

Tip

Easy Plan synchronizes data for the selected BOM line in the **Process** tab or panel of the assembly. If you are using validation in the **Work Instructions Authoring** page, the **Editor** panel and the tabs below the **Editor** panel are also synchronized.

Most validation checks are in one of the following categories.

- **Object-specific**—For example, if an object is not released, the check fails. You can submit the object to a workflow to resolve this error.
 - **Attribute-specific**—These failures indicate that an object does not have required data. For example, the checks might fail if an operation does not have a find number, or a required document is not attached to an object. You can use the tabs below the **Editor** to resolve these errors.
7. (Optional) Select another BOM line in the **Validation Results** table to review and resolve problems.
 8. (Optional) In the **Process** tab or panel select the scope and run another validation check to confirm that you have resolved all failed tests for the scope.

When all validation checks pass, the assembly is ready for release.

15. Work with change notices

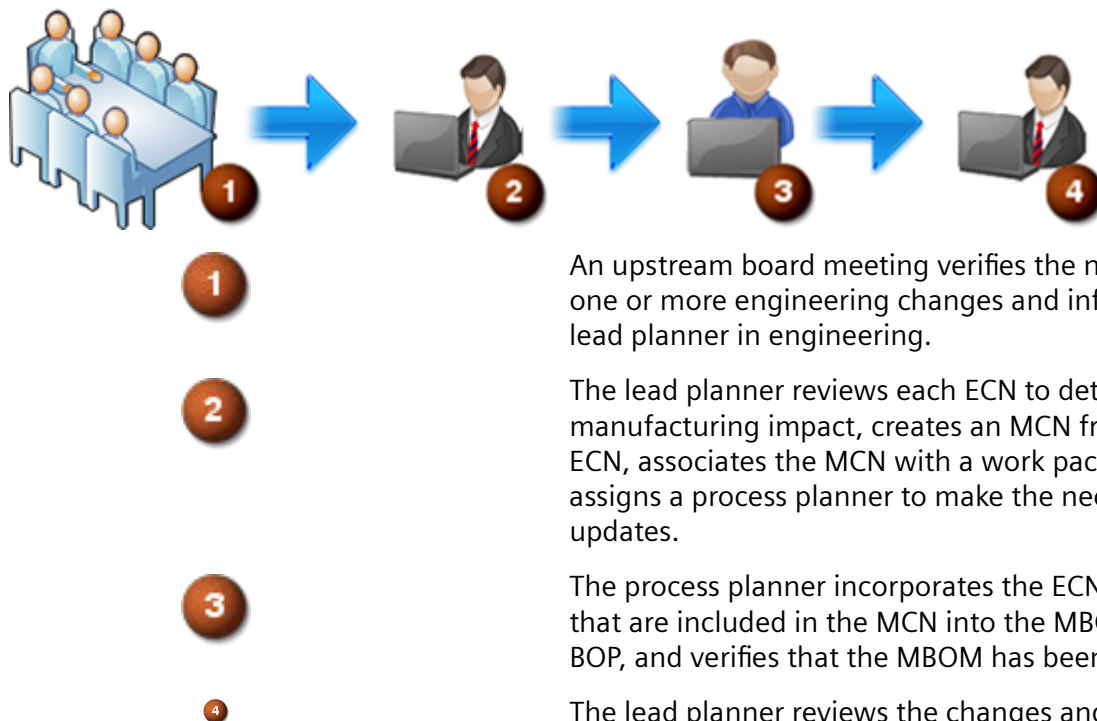
ECNs, MCNs, CRs, and ECNs

Change requests and change notices are used to suggest and deploy modifications in manufacturing planning.

An engineering change notice (ECN), which is typically assigned due to an approved change request (CR) or engineering change request (ECR), records engineering design changes to a product. An ECN identifies objects affected by a change to parts and authorizes actions that address that change. A manufacturing change notice (MCN) is intended for capturing actions that are required to incorporate changes in manufacturing planning.

You can **create an MCN from an ECN** and use that MCN to manage the ECN's impact on manufacturing. Use an MCN to update changes in a manufacturing bill of materials (MBOM), a classic bill of process (BOP), or a plant BOP. You can also **create an MCN** from a proposed change notice, **connect changes** from multiple ECNs into one MCN, and **divide changes** from a single ECN to multiple MCNs.

A minimal workflow may include the following.



An upstream board meeting verifies the need for one or more engineering changes and informs a lead planner in engineering.

The lead planner reviews each ECN to determine manufacturing impact, creates an MCN from the ECN, associates the MCN with a work package, and assigns a process planner to make the necessary updates.

The process planner incorporates the ECN changes that are included in the MCN into the MBOM and BOP, and verifies that the MBOM has been updated.

The lead planner reviews the changes and releases the MCN and package.

Create an MCN based on an ECN

Resolving changes to a complex bill of materials (BOM) or bill of process (BOP) can be a time-consuming process. You can use a manufacturing change notice (MCN) to make it easier to track an engineering change notice (ECN).

Procedure

1. Open the work package that contains the ECN and on the **Manage Work Package** page, click **Changes** .
2. On the **Changes** page, on the **Open** tab, in the **Change Summary** panel, select the ECN for which you want to create an MCN.
3. In the **Change Summary** panel, select an object and click **Manufacturing Impact** .
4. On the **Manufacturing Impact of Change** page, in the **Impacted by the Change** list, select a work package impacted by the change notice, as indicated by a warning indicator , and then click **Create Manufacturing Change Notice** .

Note

You can only create one MCN per work package. If a work package is associated to an MCN, Teamcenter Easy Plan will display an error message, and will prevent you from associating another MCN to the work package.

5. In the **Create Manufacturing Change Notice** dialog box, in the **Synopsis** and optional **Description** text boxes, type the preferred text.
6. If you are working with an **integrated MBOM work package**, from the **Workflow** list, select a workflow.
7. Click **Create and Submit** to create the MCN.
The work package no longer shows a warning indicator , indicating that the MCN was created and is now linked with the ECN and associated with the work package.
8. Hover over the affected work package and click **Open** .
- The **Manage Work Package** page opens, with work package details such as structures and tasks.
9. In the **Tasks** panel, click the appropriate task.
10. In the **Track Your Work** dialog box, do one of the following:
 - To set the MCN, accept the default selection, **Track with this change notice**, and select the MCN you created.
 - To skip MCN tracking, select **Work without tracking changes**.
11. Click **Continue**.
The preferred page opens, with the MCN name displayed as an active change notice above the **Change Summary** panel, and the affected ECN name displayed below the **Change Summary** header. Parts or processes affected by the change notices included within the scope of the work package that appear in the ECN are listed below it.

12. Review notices in the panel and apply any necessary changes to your structure.
13. In the structure to be changed, select the assembly or subassembly that contains the change and click **Revise** .

Note

Revise is not available when working with an **integrated MBOM work package**.

The revision updates to reflect the change (for example, revision A changes to B, and B changes to C). If you reopen the MCN in the **Open** tab of the **Changes** page, the **Elaborating** section of the **Progress** panel displays the effect of the change notice modification.

CHANGE SUMMARY			
ID	Name	Action	Revision
 002280	ENGINE	Modify	B 
 002171	V8 ENGINE_DC2	Modify	B 

Create an MCN from a proposed change request

If you receive manufacturing-specific changes that are proposed in a change request (CR), you can push the change process to the next phase by creating a new manufacturing change notice (MCN) derived from that CR.

On the **EBOM-MBOM Alignment** task page, you can then evaluate the proposed change through the change request and take necessary actions to perform manufacturing-specific change. Any modifications are tracked under the active MCN.

Procedure

1. From your Home page, click **Changes** .
2. On the **Changes** page, locate and select the CR in which manufacturing-specific changes are proposed.
For more information on how to create and manage change requests, see the *Change Management on Active Workspace — Usage* online help.
3. Click the **Affected Items** tab and review any problem items or impacted items for the manufacturing-specific change.
4. In the page toolbar, click **New**  → **Derive Change** .
5. In the **Derive Change** dialog box, in the **Type** list, select **Manufacturing Change Notice**,

6. In the **Synopsis** and **Description** text boxes, type a name and optional description for the new manufacturing change notice (MCN), and click **Derive and Submit**.
7. Click the **Reference Items** tab.

In the **Implemented by** list, the new MCN is displayed with a value of "Approved" in the **Disposition** column and "Executing" in the **Change Maturity** column.
8. Select the new manufacturing change notice revision and click **Open** .

The MCN opens with tasks to perform and impacted items listed.

9. In the new MCN page, click the **Affected Items** tab and review the **Impacted Items** and **Problem Items** lists.

These items are carried over from the CR.
10. Click the **Reference Items** tab and add the work package .

Note that the original CR is referenced.
11. Open the work package referenced by the new MCN, open the **EBOM-MBOM Alignment** task page, and in the **Track Your Work** dialog box, select **MCN** and click **Continue**.

On the task page, in the **Change Summary** panel, the **Connected Changes** list displays the name of the CR from which the MCN is derived. The MCN is visible in the header as an active change notice.
12. From the **Connected Changes** list, select additional change requests connected by the MCN, and evaluate any impacted or problem items.

Connect changes from multiple ECNs into one MCN

To more efficiently address changes to a manufacturing bill of materials (MBOM), you can connect multiple engineering change notices (ECNs) to a single manufacturing change notice (MCN).

While working on change consolidation from EBOM to MBOM, you can review the changes from each of the associated ECNs in the **Change Summary** panel.

Prerequisites

Set the following preference values.

- **EP_SplitChangeNotice** = *MBOM* (default = *MBOM*).
- **EP_Merge_Multiple_ECN_to_MCN** = *MBOM* (default = blank).
- **EP_ReleaseStatusOnECNToAllowMergeOrSplit** = a valid value, such as *TCM Released*.

Note

If **EP_ReleaseStatusOnECNToAllowMergeOrSplit** is set to a valid value, the effectivity for the merging ECNs must be identical.

Procedure

1. From the Home page, click **Changes** .
2. On the **Changes** page, locate and select an ECN, such as **ECN1**, for which you want to locate impacted work packages.
3. In the header toolbar, click **Manufacturing Impact** .
4. On the **Manufacturing Impact of Change** page, select a single work package and click **Create a Manufacturing Change Notice** .
5. In the **Synopsis** text box, type a name for the new MCN and click **Create and Submit**.
6. If another ECN, such as **ECN2**, impacts the same work package, do the following.
 - a. Click **Manufacturing Impact** .
 - b. On the **Manufacturing Impact of Change** page, select a single work package and click **Connect to MCN** .
 - c. At the confirmation prompt, click **Connect**.

On the **Changes** page, the ECN is merged with the MCN, as indicated in the **Active Change Notice** column.



Work Package	Owner	EBOM	MBOM	Active Change Notice
WP2_crosskart	mibm_user26_merge (mibm_user26_merge)	D_CROSSKART_DC/A:1-CROSSKART_DC	032918/A:1-D_Crosskart_MBOM	MCN-000003/A:1-SEAT COVER.MFG - MCN
WP3_Crosskart	mibm_user (mibm_user)	D_POWERTRAIN DC/A:1-POWERTRAIN DC	032926/A:1-D_POWERTRAIN_MBOM	

7. (Optional) Assign additional ECNs to the MCN by repeating step 6.
 8. In the **Work Package** column, open the work package by clicking **Open** , and then in the work package page, click the **EBOM-MBOM Alignment** task button.
 9. In the **Track Your Work** dialog box, select **Track with this change notice**, select the MCN referenced in the **Active Change Notice** column, and click **Continue**.
 10. On the **EBOM-MBOM Alignment** task page, enable the **Show Assignment State comparison control** .
- In the **Change Summary** panel, the **Connected Changes** list displays an ECN previously associated with the work package. The **Change Summary** panel displays changes related to that specific ECN.
11. Disable **Show Assignment State** and from the **Connected Changes** list, select a different ECN, and re-enable **Show Assignment State**.

12. Propagate the changes from EBOM to MBOM using the **Change Summary** panel for the selected ECN from the **Connected Changes** list.
13. For any other connected ECNs, repeat this process.

Divide changes from a single ECN to multiple MCNs

If you receive an engineering change notice (ECN) with multiple changes tracked under an EBOM, you can divide those changes into multiple manufacturing change notices (MCNs) while consolidating them in a manufacturing bill of materials (MBOM).

From the **Change Summary** panel in the **EBOM-MBOM Alignment** task page, you can link changes to other MCNs either by creating a new MCN or by linking to an existing MCN. Multiple MCNs allow multiple users to work at the same time when all changes cannot be immediately addressed.

Prerequisites

Set the following preference values.

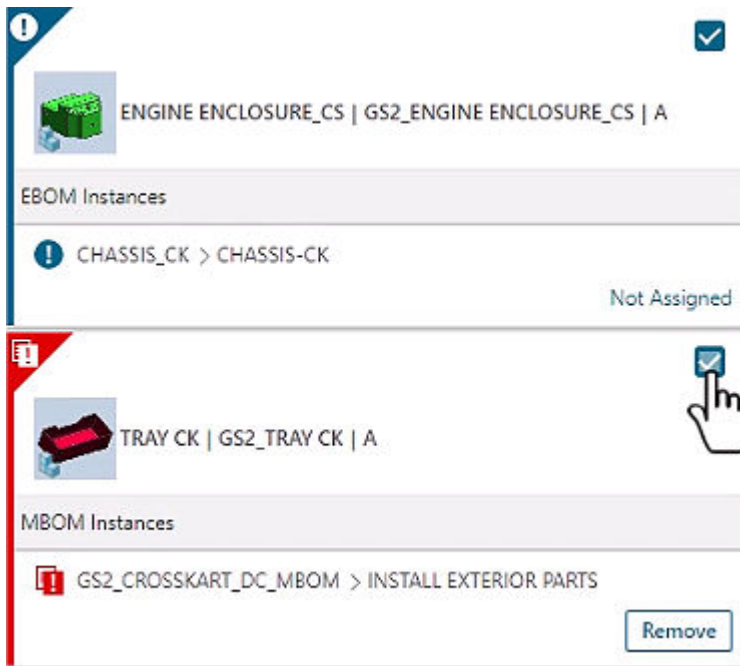
- **EP_SplitChangeNotice** = *MBOM* (default = *MBOM*).
- **EP_Merge_Multiple_ECN_to_MCN** = *MBOM* (default = blank).
- **EP_ReleaseStatusOnECNToAllowMergeOrSplit** = a valid value, such as *TCM Released*.

Note

If **EP_ReleaseStatusOnECNToAllowMergeOrSplit** is set to a valid value, the effectivity for the splitting ECNs must be identical.

Procedure

1. **Navigate** to the **EBOM-MBOM Alignment** task page from a work package that contains an active MCN that is connected to an ECN.
2. Enable the **Show Assignment State comparison control** .
The **Change Summary** panel displays mismatch indications and change types (**Removed**, **Added**, **Changed**) for the connected ECN.
3. In the **Change Summary** toolbar, click **Selection Mode** .
4. Select the tiles for the changes that you want to move to a new or existing MCN.



5. In the **Change Summary** toolbar, do either of the following.
 - Click **Link to MCN** , and select an available MCN.
 - Click **Create MCN**  and do the following.
 - a. In the **Create Manufacturing Change Notice** dialog box, in the **Synopsis** and optional **Description** text boxes, type the preferred text.
 - b. Click **Create and Submit**.

The selected changes are removed from the panel for the currently active MCN, and the **Selection Mode** command is disabled in the **Change Summary** panel. This MCN will now be associated with the work package and the ECN.
 6. Open a work package in the context of the new MCN by doing the following.
 - a. Open a work package with an active MCN that is tracking changes from the source ECN, and on the **Manage Work Package** page, click **EBOM-MBOM Alignment**.
 - b. In the **Track Your Work** dialog box, select the MCN that you created or linked in step 5 and click **Continue**.
 7. On the **EBOM-MBOM Alignment** task page, enable the **Show Assignment State** panel **comparison control** .
- The changes you moved from the previously active MCN to the new active MCN are visible in the **Change Summary** panel.
8. (Optional) Return to the previously active MCN and assign any remaining changes to one or more additional MCNs by repeating this procedure.

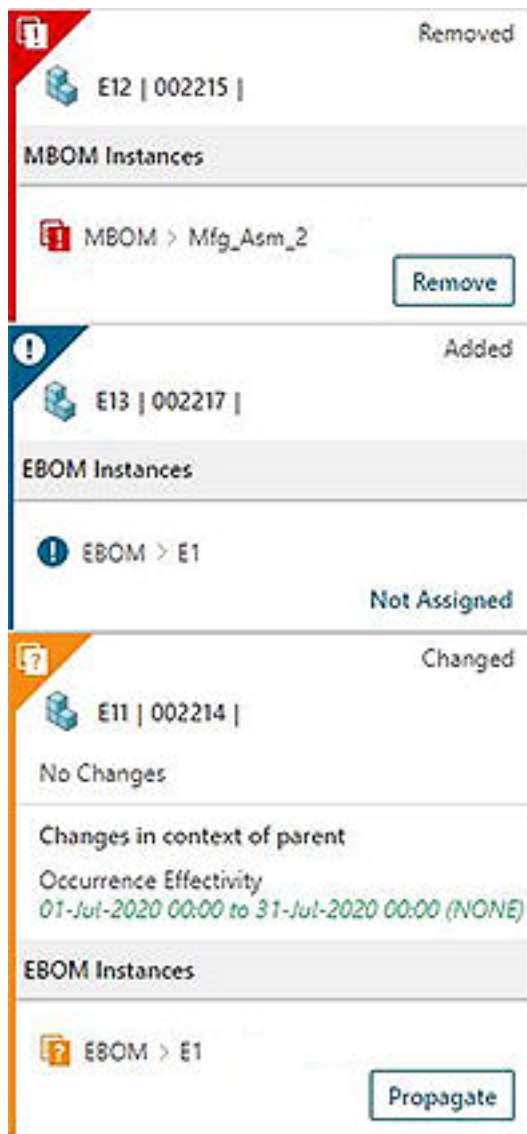
Changes propagated from the EBOM to the MBOM are now tracked under active MCN.

Using the Change Summary panel

The **Change Summary** panel can help you decide which changes are updated from an engineering bill of materials (EBOM) to a manufacturing bill of materials (MBOM), from a product BOP to a plant bill of process (BOP), and from a BOM to a bill of process (BOP).

Below are examples of ways you can use the **Change Summary** panel for EBOM-MBOM alignment.

When you locate a work package that contains change notices, added, removed, and replaced elements, and other differences, and then open the structure on a task page, the **Change Summary** panel reports mismatch indications and change types (**Removed**, **Added**, **Changed**) as separate tiles.



Red tiles indicate elements removed from the MBOM. Blue tiles indicate elements not yet assigned to the MBOM. Orange tiles indicate a mismatch change. If additional tiles related to the change appear in green

below the mismatch (for example, an **Ancestor already assigned** tie), the part was already added in the update and you do not need to take action.

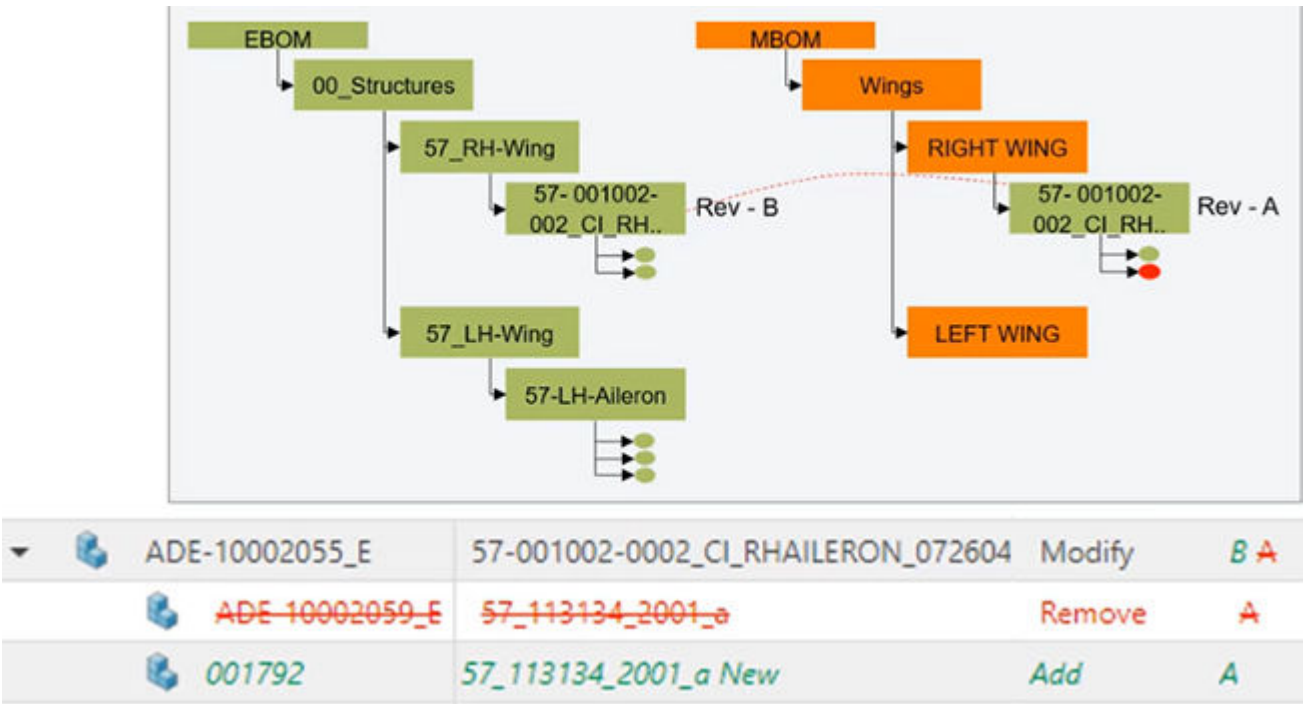
Note

You can select a manufacturing install from the **Focus on** list to view only those tiles that apply to a specific scope of elements in the structure.

Below are some examples of how to use the **Change Summary** panel on the **EBOM-MBOM Alignment** task page.

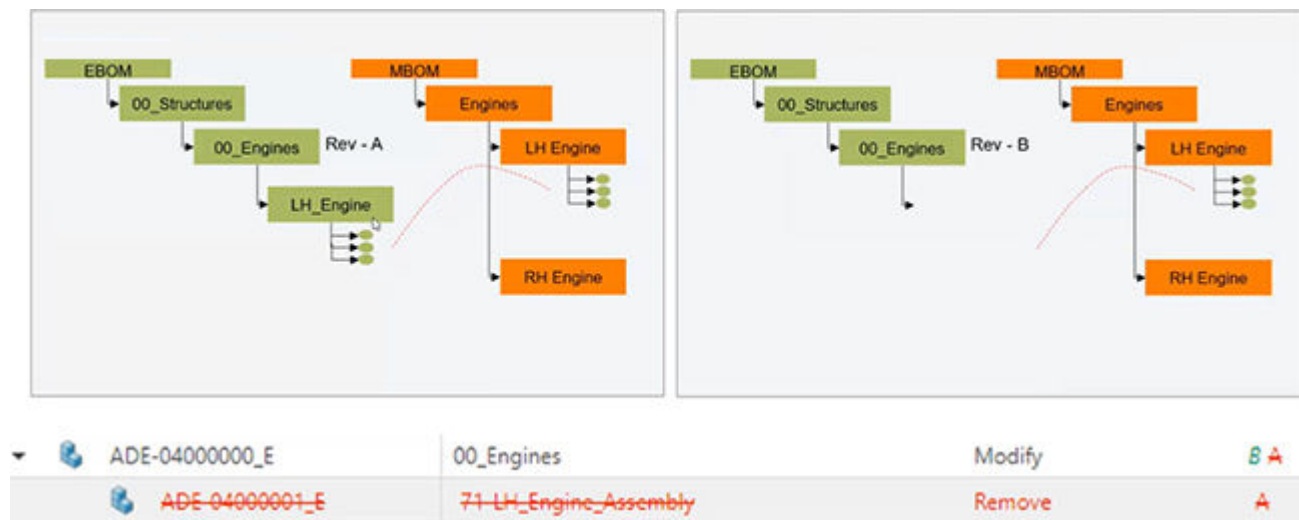
Assembly in EBOM is assigned to an MBOM with different revisions

In this example, one part is to be deleted from the MBOM and one added. The results are those that were displayed in the **Change Summary** panel of the **Changes** page.



When you click **Propagate** in the orange change notice, the notice is displayed as green in the **Changes to Be Handled** panel, the partial match is removed from EBOM and MBOM, and the add and remove commands and revisions are applied.

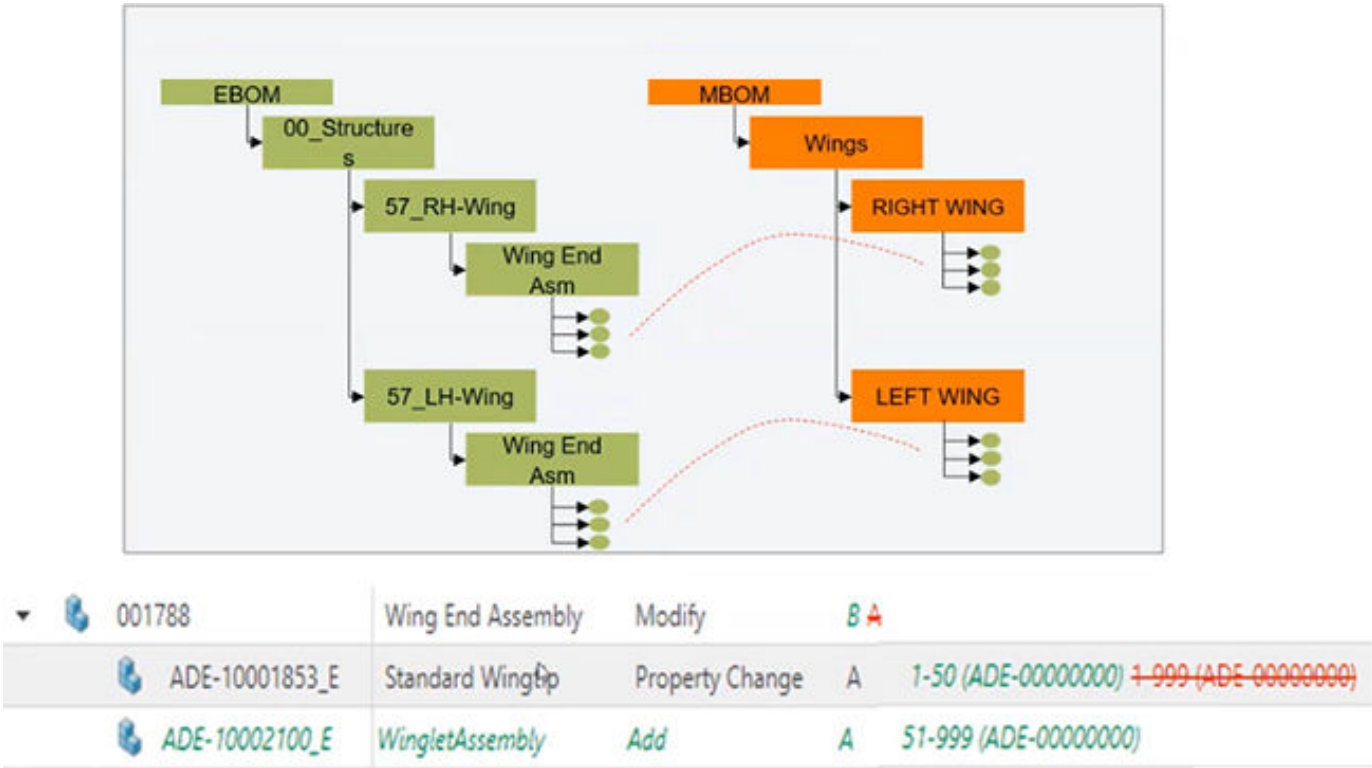
Children of EBOM assembly are assigned to MBOM and EBOM assembly is removed



Many tiles in the **Changes to Be Handled** panel are displayed at the top of the list in red . The old assembly was removed but the new one not yet assigned, and the children of that assembly below it are also displayed in red. Because of the change, you must remove all children. You can remove individual parts by clicking **Remove** on each tile, or by clicking **Remove All** to remove all children of the old assembly.

Children in two EBOM assemblies are assigned to different MBOM assemblies

Occurrence effectivity changes are reflected in the unit change from 1-999 to 1-50.



Selecting a part in the **Standard Wingtip** assembly lets you compare effectivity by hovering your mouse over the **Element Effectivity** icons  available in both EBOM and MBOM columns.

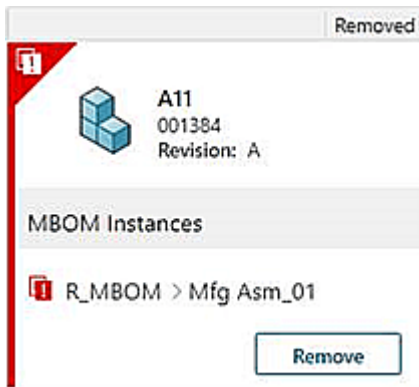
You can click any parts reported as **Not Assigned** in the **Changes to Be Handled** panel to review them in the EBOM and MBOM. When you locate a target assembly in the MBOM and click , verification is updated and the affected tiles are displayed in green.

Verify EBOM-MBOM notices in the Change Summary panel

Use the **Change Summary** panel to verify and compare elements between an engineering bill of materials (EBOM) and manufacturing bill of materials (MBOM), or between a usage EBOM and integrated MBOM.

Procedure

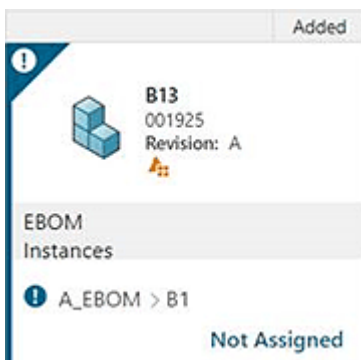
1. In a work package associated with one or more change notices, navigate to the **EBOM-MBOM Alignment** or **Manage Plant BOM View** page with a **Change Summary** panel.
2. Click a tile in the **Change Summary** panel to review it in the BOM and MBOM and apply changes as applicable.



If the tile is red with a missing in EBOM icon  in the upper-left corner and the indicator **Removed** in the upper-right corner to report that the element was removed from the EBOM:

1. Click below **MBOM Instances** to highlight it in the MBOM.
2. Click **Remove** to take it out of the MBOM.

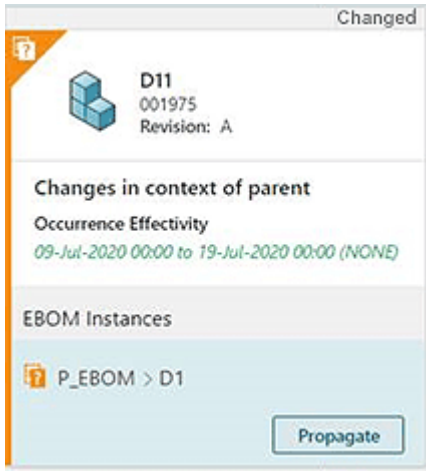
The tile color changes to green and the **MBOM Instances** section is removed to report that the problem is resolved.



If the tile is blue with an unassigned in EBOM icon  in the upper-left corner and the indicator **Added** in the upper-right corner to report that the element was added to the EBOM but not yet assigned to the MBOM:

1. Click below **EBOM Instances** to highlight it in the EBOM.
2. Assign it  to the MBOM.

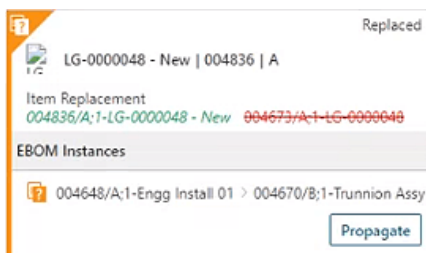
The tile color changes to green and the **EBOM Instances** section is removed to report that the element is assigned.



If the tile is orange with a revision change in EBOM icon  in the upper-left corner and the indicator **Changed** in the upper-right corner to report that an occurrence effectivity change was added to the element in the EBOM but not yet updated in the MBOM:

1. Click below **EBOM Instances** to highlight it in the EBOM.
2. Click **Propagate** to apply the change to the MBOM.

The tile color changes to green and the **EBOM Instances** section is removed to report that the MBOM element is updated.



If the tile is orange with a revision change in EBOM icon  in the upper-left corner and the indicator **Replaced** in the upper-right corner to report that an element in the EBOM has been replaced with a different element but not yet updated in the MBOM:

1. Click below **EBOM Instances** to highlight the new part in the EBOM (**004836/A;1-LG-000048** in this example), as well as the old part (**004673/A;1-LG-000048**) in the MBOM.
2. Click **Propagate** to replace the part in the MBOM.

The tile color changes to green and the **EBOM Instances** section reports that the EBOM and MBOM elements are aligned. The names in the **Elements** column of the EBOM and MBOM are appended with the text **New**.



If the tile is green, no action is required. If you prefer, you can click it to review the element in the EBOM and perform an action, such as assign a part to the MBOM. In this example, the indicator **Changed** in the upper-right corner reports that the element revision has changed but requires no change because it is unassigned to the MBOM.

Note

A green tile with the "Part not assigned yet" statement in the **EBOM Instances** section can also display a change in occurrence effectivity that requires no change because it is unassigned to the MBOM.

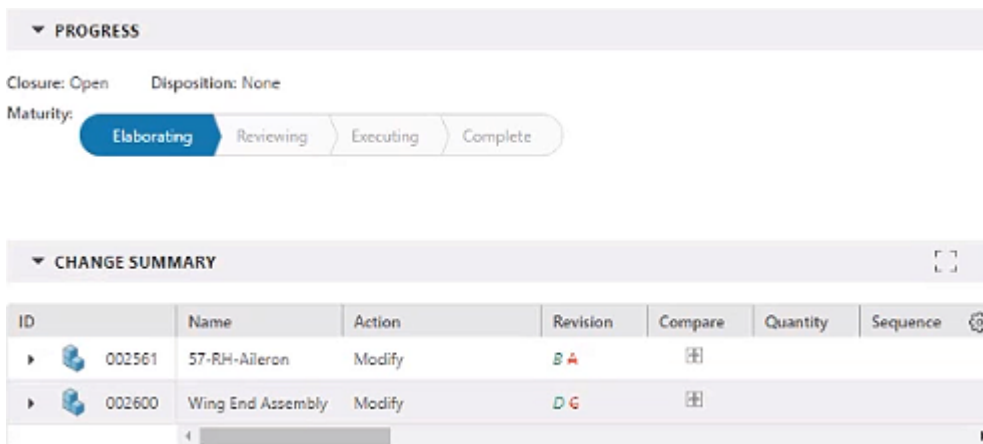
Associate a work package with a change notice

To incorporate changes into a manufacturing bill of materials (MBOM), an integrated MBOM, or a bill of process (BOP), and to ensure that new changes are tracked using a change notice, you must associate each

change notice with the work package that contains the affected engineering bill of materials (EBOM) and other relevant structures. The **Manufacturing Impact of Change** page lists work packages associated with a selected change notice that are impacted by EBOM changes.

Procedure

1. In your **Favorites**, **Folders**, or other location where you store your assignments, select a work package and click **Changes** .
 2. On the **Changes** page, select a change notice and click **Open** .
- The **Changes** page displays a variety of panels and provides a **Progress** bar that details the selected change's progress (**Elaborating**, **Reviewing**, **Executing**, or **Complete**). The **Change Summary** panel tracks the effect of change notices, and shows changes to revision ID, properties, and actions that caused it. Under **Revision** and editable column properties, added and deleted elements are displayed in green and red.



3. To locate elements impacted by changes in the **Change Summary** panel, in the right toolbar, click **Manufacturing Impact** .

On the **Manufacturing Impact of Change** page, a list of work packages is displayed. The work packages contain structures affected by the changes. A warning  next to the work package indicates that it is not yet associated with the active work notice.

4. From the **Impacted by the Change** list, select the preferred work package and in the toolbar, click **Associate with Change Notice** .

The change notice is associated with the work package and its name is displayed in the **Active Change Notice** column of the **Impacted by the Change** list. The  icon is no longer visible.

5. In the **Manufacturing Impact of Change** page, select the work package and click **Open** .

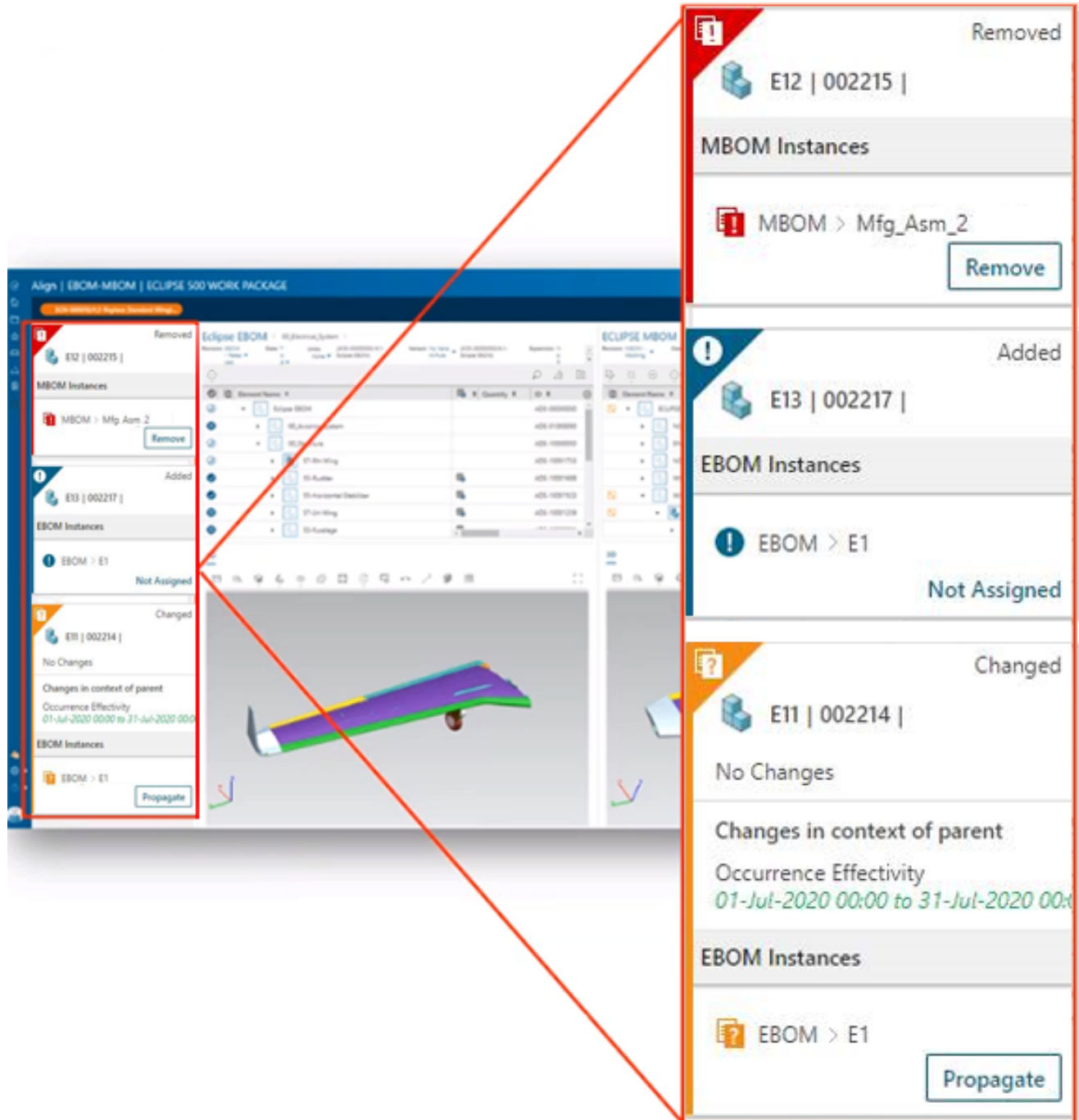
Note

If you did not associate the work package with a change notice in **step 4**, a message reports that changes will not be tracked without an association and prompts you to click:

- **Continue Without Tracking** to open the package without tracking in the **EBOM-MBOM Alignment** page.

- **Associate and Continue** to apply step 4 and to open the work package in the **Align** page below.

The change notice is set to active and the **Align** page opens with a **Change Summary** panel showing individual changes in tiles to the left, and the affected structure to the right. In this example, the tiles contain more detail on changes in the context of the parent assembly, including the impact, if any, on an EBOM and MBOM at the bottom of each tile.

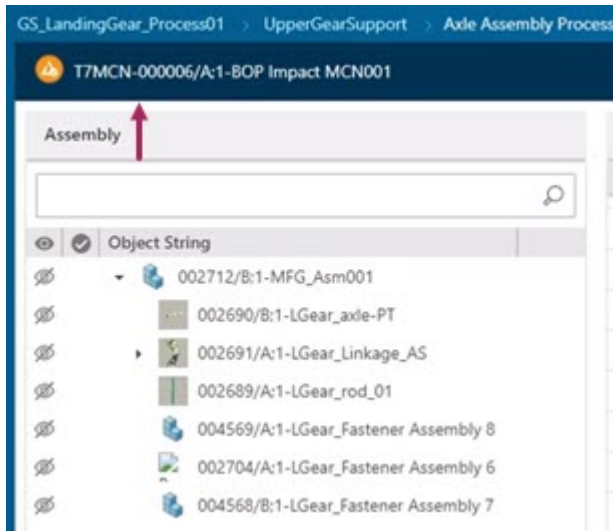


Track manufacturing structure changes associated with change notices

As a manufacturing engineer or a process planner, you can associate an engineering change notice (ECN) or manufacturing change notice (MCN) only with manufacturing structures for which you are planning. Teamcenter Easy Plan uses change notices to locally track manufacturing structure changes, because any changes that happen outside of your work package are ignored.

Procedure

1. Search for a work package, and select it from the list.
2. Click a task tile to navigate to a planning task.
Teamcenter Easy Plan displays the **Track Your Work** dialog box, which gives you the option to associate the work package with an ECN.
3. Select **Track with change notice**, select an ECN to make it active, and click **Continue**.
Teamcenter Easy Plan attaches the ECN to the work package and opens the planning task page.



Teamcenter Easy Plan lists the ECN that you applied at the top of each task planning page, and tracks changes that you make in any of the task planning pages.

Using assignment comparison controls

Use assignment comparison controls to review the impact of part and process assignments from an engineering bill of materials (EBOM) to a manufacturing bill of materials (MBOM), or from a bill of materials (BOM) to a bill of process (BOP).

Show Assignment State

Use **Show Assignment State** to run a **complete** or **partial** assignment comparison between an EBOM and an MBOM in the **EBOM-MBOM Alignment** task page, or between an integrated BOM and an integrated MBOM in the **Manage Plant BOM View** task page.



Show Allocation Indication

Use **Show Allocation Indication** to **run an assignment comparison** between a product BOP and a plant BOP in the **Process Planning** and **Line Balancing** task pages.



Show Allocation Indication controls include the following.



When **Show Allocation Indication** is active, allocation indication is on. Teamcenter Easy Plan displays BOM to BOP change status icons to show the relationship between the source and target structure.

Click the icon once more to deactivate the consumption indication mode.



Indicates the number of over assigned parts in the structure.



Indicates the number of parts consumed in processes that are not in the plant BOP. The number indicates how many missing-in-source errors you must resolve in the structure.



Indicates the number of mismatched parts.

Show Consumption and Impact State

Use the consumption indication and impact state dashboard to compare assignment statuses of a BOM source and a BOP target.



When enabled, **Show Consumption and Impact State** compares BOM and BOP alignment in the following task pages.

Show Consumption and Impact State controls include the following.



When **Show Consumption and Impact State** is active, the consumption indication mode is on. Teamcenter Easy Plan displays assignment statuses for the structure you are viewing.

Click the icon once more to deactivate the consumption indication mode.



Indicates that there are over consumed parts in the target structure. The number indicates how many over consumed parts are in the structure.



Indicates that parts are consumed in processes, but they are not in the assembly. The number indicates how many missing-in-source errors you must resolve in the structure.



Indicates the number of mismatched parts.



Indicates that parts are added to the source structure. The number indicates how many parts are added.

Compare & Show Differences

Use the compare & show differences dashboard to **compare assignment statuses** between a plant BOP master source and a plant BOP target in the **Compare Alternatives** task page.



Compare & Show Differences controls include the following.



When **Compare & Show Differences** is active, comparison mode is on. Teamcenter Easy Plan displays differences between the structures you are viewing.



Click the icon once more to deactivate comparison mode.



Indicates that there are over consumed parts in the target structure. The number indicates how many over consumed parts are in the structure.



Indicates the of missing-in-source errors you must resolve in the structure.



Indicates the number of mismatched parts.

Indicates that parts are added to the source structure. The number indicates how many parts are added.

Run an EBOM to MBOM accountability check

When working with an engineering bill of materials (EBOM) and a manufacturing bill of materials (MBOM) in either standard or focus mode on the **EBOM-MBOM Alignment** page, you can run a complete assignment comparison.

When you run a complete accountability check, all **assignment statuses** are shown in both the EBOM and MBOM, across all engineering and manufacturing assignment domains. When you run a complete comparison with focus mode set to a manufacturing assembly that is not associated with a specific EBOM assignment domain, this approach lets you identify parts that are out of focus, overassigned, and so on. For more details on assignment domains, see **Update equivalent assignment scopes**.

Note

You can also **run a partial** accountability check that displays assignment indications in either the EBOM or the MBOM, but not both.

Procedure

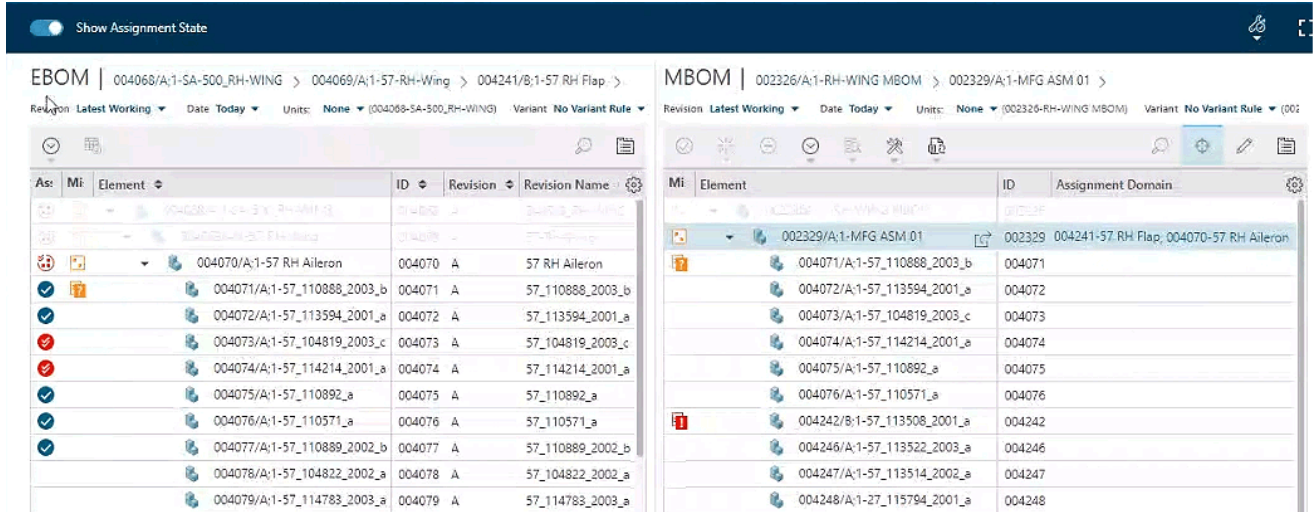
- 1.
2. With the **MBMOnDemandCompare** preference set to `<true>` in Teamcenter, **search for and open** a work package and navigate to the **EBOM-MBOM Alignment page**.
3. From the **Compare** list, select a comparison criteria.

Saved setting descriptions derive from the **Advanced Accountability Check** settings in Manufacturing Process Planner (**Scope** tab → **Available Settings** group).

4. Select **Show Assignment State**.



The **assignment comparison control** is enabled. **Assignment status icons** are now displayed in the **Assignment State** column of the EBOM and MBOM panels.



5. (Optional) Filter the scope of EBOM and MBOM alignments.
 - a. In the EBOM, select an EBOM assembly.
 - b. In the MBOM, select an MBOM assembly to which parts in the EBOM assembly are assigned.
 - c. In the MBOM toolbar, click **Focus** .

All elements outside the selected EBOM and MBOM assembly and subassembly become unavailable.
6. To improve performance when assigning elements from the EBOM to the MBOM, temporarily disable **Show Assignment State**.
7. On the **EBOM-MBOM Alignment** page, make any assignments or other adjustments between the EBOM and MBOM, and then disable **Show Assignment State**.

Assignment indications are not displayed in the **Assignment State** columns of the EBOM and MBOM panels.

8. To finish the comparison, disable **Show Assignment State**.



Assignment status icons are no longer visible in the **Assignment State** column of the EBOM and MBOM panels, and the **Change Summary** panel is closed.

Run a partial EBOM to MBOM accountability check

You can partially compare a part or assembly in an engineering bill of materials (EBOM) to review its assignment inside or outside a selected scope in a manufacturing bill of materials (MBOM).

When you run a partial accountability check, **assignment statuses** are shown in either the EBOM or the MBOM, but not both. Since you are comparing specific manufacturing or engineering assemblies and assignment domains, this approach results in much less content and in faster results.

Note

- Partial comparison is available only in focus mode.
- You can also **run a complete** accountability check to display assignment statuses for both the EBOM and MBOM.
- The values of the preferences **MBMEnableBOMFiltering** and **MBMOnDemandCompare** must be set to **true**.
- If the value of the preference **MBM_HideOutOfScopeIndications** = **false**, you can only partially compare EBOM or MBOM elements with associated assignment domains. If **MBM_HideOutOfScopeIndications** = **false**, you can partially compare any EBOM or MBOM element.

Procedure

1. **Search for and open** a work package and navigate to the **EBOM-MBOM Alignment page**.
2. Filter the scope of EBOM and MBOM alignments.
 - a. In the EBOM, select an EBOM assembly.
 - b. In the MBOM, select an MBOM assembly to which parts in the EBOM assembly are assigned.
 - c. In the MBOM toolbar, click **Focus** .All elements outside the selected EBOM and MBOM assemblies become unavailable.
3. Ensure that **Show Assignment State** is not enabled.



Tip

Use **Show Assignment State** to compare the *whole* structure. When **Show Assignment State** is enabled at the top of the page, the **Show Assignment State** right-click command, which allows you to *partially* compare EBOM and MBOM structures, is not available.

4. In the **EBOM** panel, right-click the element that you want to partially compare to the MBOM, and select **Show Assignment State**.

The EBOM displays **assignment status icons** for the selected element and its associated elements, except for parts or assemblies unassigned to the MBOM, which display no status icon. A message reports the assembly for which the assignment state is displayed.

Assignment state shown for "SUB1". Refresh Dismiss

EBOM | Latest Working MBOM | Latest Working

EBOM | EBOM > SUB1 >

Expand	Element	ID	Revision	Revision Name
	EBOM	FL_001219	A	EBOM
	SUB1	FL_001215	A	SUB1
	P1	FL_001220	A	P1
	Parent_Assembly	FL_001221	A	Parent_Assembly
	P5 x3	FL_001234	A	P5
	P2	FL_001235	A	P2
	P6 x4	FL_001236	A	P6
	P7 x3	FL_001241	A	P7
	P4	FL_001240	A	P4
	SUB2	FL_001216	A	SUB2
	P4	FL_001240	A	P4
	P7 x3	FL_001241	A	P7

- To view assignment statuses in the MBOM, reselect the MBOM assembly you selected in step 2, right-click the EBOM assembly you selected in step 2, and then choose **Show Assignment State**. The MBOM displays all assignment status indications except fully assigned  and assigned to the MBOM multiple times .
- On the **EBOM-MBOM Alignment** page, make any assignments or other adjustments between the EBOM and MBOM, and then select **Show Assignment State**.
- In the EBOM or MBOM, resolve assignment mismatches, and in the **Assignment state shown for** message above the EBOM, click **Refresh**.

Updated changes, as they relate to the BOM, are reflected in the assignment status icons.

- To finish and turn off the partial comparison, in the message at the top of the MBOM panel, click **Cancel**.

Run an EBOM to integrated MBOM accountability check

When working with an engineering bill of materials (EBOM) and an integrated manufacturing BOM (MBOM) in the **Manage Plant BOM View** task page, you can run a complete accountability check.

When you run a comparison, all **assignment statuses icons** are shown in both EBOM and **integrated MBOM** across all engineering and manufacturing assignment domains.

Prerequisites

You must:

- Have a product BOP configured in your work package and use the **Smart Discovery Index** to store the structure hierarchy.
- Set your accountability Check dataset in the preference **MEAccountabilityCheckSettings.BOM.BOM**. The dataset criteria name must be **AC_USAGEBOM**.

Example

```
<CriteriaNames>
  <CriteriaNames>AC_USAGEBOM</CriteriaNames>
</CriteriaNames>
<Mfg0connected_parts>
  <RelationName>Mfg0connected_parts</RelationName>
</Mfg0connected_parts>
<Mfg0properties>

  <propNames>fnd0OccRevThreadId,bl_sequence_no,mfg0realRevision,bl_formula,bl_quantity
  <propNames>
</Mfg0properties>
```

Procedure

1. **Create** or **search for and open** an existing work package that contains an EBOM and integrated MBOM.
2. On the **Manage Work Package** page, click **Manage Plant BOM View**.
The **Track Your Work** dialog box is displayed.
3. In the **Track Your Work** dialog box, select a manufacturing change notice (**MCN**) and click **Continue**. **MCN tracking** is required to track assignment changes in an integrated MBOM.
4. In the **Manage Plant BOM View** page, if it is not already visible, enable the **Change Summary** panel by clicking **Show Change Summary** .
5. Enable the **Assignment Indication control** and identify mismatches using integrated MBOM assembly indications to navigate through the MBOM assembly until they are visible.

If the MCN implements an ECN, the **Change Summary** panel is displayed, and assignment status icons are displayed in the MBOM panel.

The screenshot displays the 'Manage Plant BOM View' interface for a 'DEMO CAR MBOM'. The top bar shows the title and a toggle for 'Assignment Indication'. Below this, two tabs are visible: 'EBOM' (Any Status; No Working (Modified) 01-Aug-2024 SVR1-M1_STD_Green) and 'MBOM' (Working; Any Status; Global/Mbom (Modified) 01-Sep-2024).

The left pane, titled 'Change Summary', lists items included in the 'ECN-000021/A;1-DEMO CAR EBOM CHANGE' Change. It shows three items:

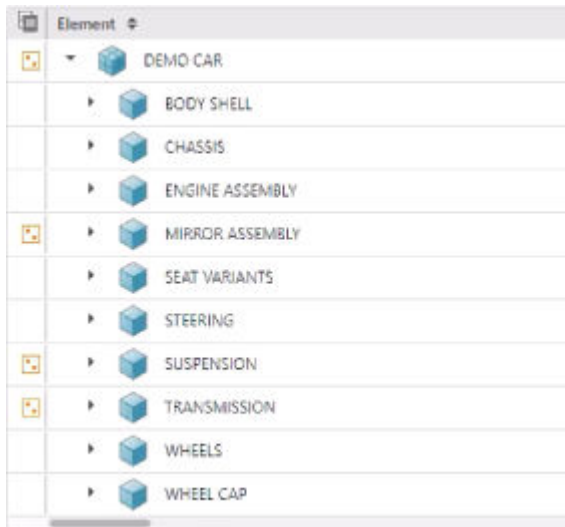
- Removed:** Washer_Light | P_881764_UB_BETA | A. Global MBOM Instances: DEMO CAR > SUSPENSION. A 'Remove' button is present.
- Replaced:** Housing_LH_Plastic | 029475 | A. Item Replacement: 029475/A;1-Housing_LH_Plastic x 1 P_601037_UB_BETA/A;1-Housing_LH x 1. Global MBOM Instances: MIRROR ASSEMBLY > MIRROR_ASM_LH. A 'Propagate' button is present.
- Added:** Tow Hook | 029476 | A. Assignment Options: DEMO CAR > CHASSIS. An 'Assign' button is present.
- Replaced:** Housing_RH_Plastic | 029474 | A. Item Replacement: 029474/A;1-Housing_RH_Plastic x 1 P_60965_UB_BETA/A;1-Housing_RH x 1. Global MBOM Instances: (empty). A 'Propagate' button is present.

The right pane shows a tree view of the BOM structure. The root is 'DEMO CAR', which includes the following elements:

- BODY SHELL
- CHASSIS
- ENGINE ASSEMBLY
- MIRROR ASSEMBLY
- SEAT VARIANTS
- STEERING
- SUSPENSION
- TRANSMISSION
- WHEELS
- WHEEL CAP

- To view EBOM elements that are not visible in the **Manage Plant BOM View** task page, click **Add Elements from EBOM View**.

The EBOM view opens with **Assignment Status** and **Mismatch Status** columns. The **Assignment Status** column displays **assignment status icons**. The icons indicate parts and assemblies currently assigned to the integrated MBOM.



Note

- Only the fully assigned  and children partially assigned  icons are employed in the **Assignment Status** column.
- If you add a part that is not in the MBOM panel, selecting the assignment notice in the **Change Summary** panel highlights the missing part's parent in the MBOM. When you assign that part, the part is added.

7. Close the MBOM view and then **use** the **Change Summary** panel and **EBOM to MBOM assignment status icons** to **verify and compare** assignment notices, making any assignments or other adjustments between the EBOM and MBOM.
8. Disable **Show Assignment State**.

Corrected assignment indications are no longer displayed in the **Assignment State** column of the MBOM panels, and the **Change Summary** panel is closed.

Run a product BOP to plant BOP accountability check

When working with a product bill of process (BOP) and a plant BOP, you can run an accountability check to compare the source and target BOP, and then review and reconcile the resulting mismatches.

An accountability check provides a quick analysis of the impact that changes to a product BOP have on a plant BOP by reporting mismatch indications based on accountability check comparison settings in the **Process Planning** and **Line Balancing** task pages. Use the **Change Summary** panel to review changes as separate tiles, and to propagate any preferred changes to the plant BOP. Many changes focus on operations that are missing in source and in target, as well as operation property changes and referenced elements such as activities and attachments.

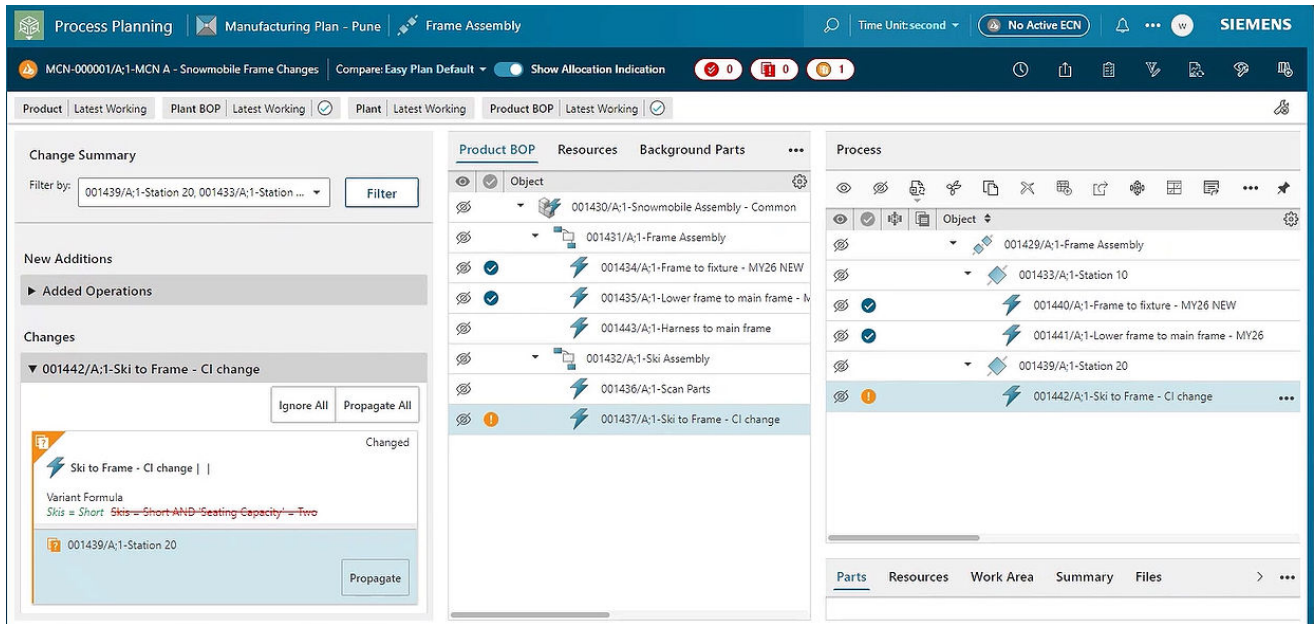
Prerequisites

You must:

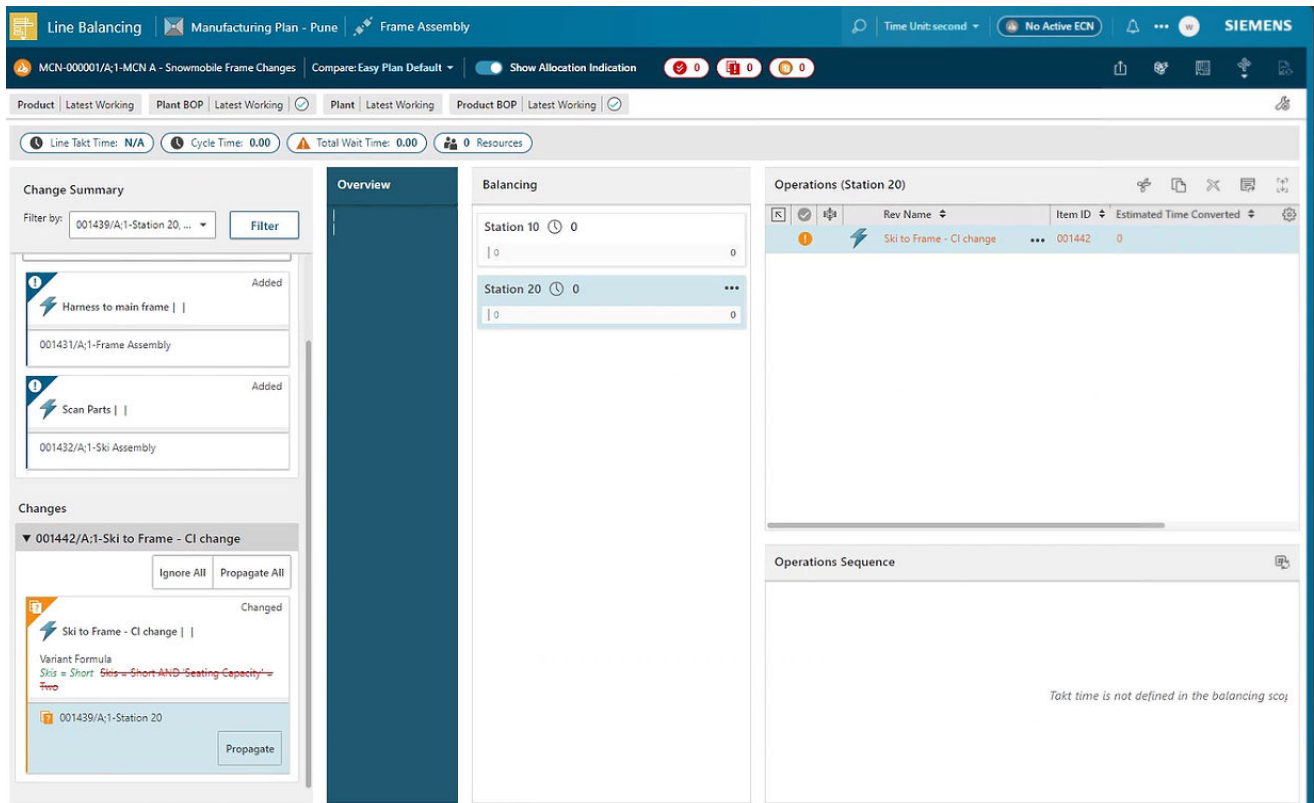
- Have a product BOP configured in your work package and use the **Smart Discovery Index** to store the structure hierarchy.
- Verify that the preference **EP_ShowProductBOPInProcessPlanning** is set to *true* in your startup preferences. If not, the product BOP is not available and you can only assign changes from the **Line Balancing** page.
- Add the preference name **EP_ShowProductBOPInProcessPlanning** to **AWC_StartupPreferences**.

Procedure

- 1.
2. **Search for and open** a work package and **navigate to the Process Planning** or **Line Balancing** task page.
If a manufacturing change notice is linked to your work package, the **Track Your Work** dialog box is displayed.
3. In the **Track Your Work** dialog box, select a manufacturing change notice (**MCN**) and click **Continue**. **MCN tracking** is required to track assignment changes if you want to use the **Ignore** command in the **Change Summary** panel. If MCN tracking is not enabled, only the **Propagate** command is available.
4. From the **Compare** list, select a criteria for comparison.
Saved setting descriptions are populated from the **Advanced Accountability Check** settings in Manufacturing Process Planner. You can find the saved settings in **Scope** tab → **Available Settings** group.
5. On the preferred task page, enable **Show Allocation Indication**.
The **assignment comparison control** is enabled.
6. If it is not already visible, enable the **Change Summary** panel by clicking **Show Change Summary** .
On the **Process Planning** page, change indication icons are displayed in the **Product BOP** and **Process** panels.



On the **Line Balancing** page, change indication icons are displayed in the target **Operations** panel. The product BOP source is not visible.



7. (Optional) In the **Change Summary** panel, filter the scope of change target locations by selecting one or more elements and clicking **Filter**.
8. Scroll through the tiles to review changes to the product BOP not currently present in the target plant BOP.

Changes are displayed as separate tile notices for each plant BOP operation and its location, for example, a line or station. When you click the operation's parent location in the tile, it synchronizes the selection to the other panels.

Mismatches reported include operations missing on source or target, assignments such as parts and resources, time activities, attachments such as files and documents, predecessors, and properties. Partial match properties such as revision name and variant formula are defined in the **Advanced Accountability Check** dialog box in Manufacturing Process Planner. You can find partial match properties in **Partial Match** tab → **BOM Properties** group.

9. From the **Change Summary** panel tiles, **verify** your change notices.

- Click **Propagate** to apply changes from the product BOP to the plant BOP.
- Click **Propagate All** to apply all changes to all tiles.
- Click **Ignore All** to disable all remaining changes in the list.

Icons for ignored changes are removed from the panels and changes marked as **Ignored** are now green. Click **Restore All** to reclaim ignored change notices.

Tip

If you want to disregard some changes but not all, fix your preferred changes using the **Propagate** command, and then click **Ignore All** to ignore the remainder.

Note

If you choose to ignore a tile while using an active MCN, and then return to the same work package without the active MCN, that tile shows up again in accountability checks.

If you change your task page configurations, change summary details may be changed as well.

10. To finish the comparison, disable **Show Allocation Indication**.
Change indication icons are no longer visible in the panels, and the **Change Summary** panel is closed.
11. (Optional) From the **Compare** list, select a different comparison criteria, re-enable **Show Allocation Indication**, and run another product BOP to plant BOP assignment comparison.

Run an MBOM to BOP accountability check

When working with a manufacturing bill of materials (MBOM) and a bill of process (BOP), you can use a change notice to run an accountability check to compare the source MBOM to a target classic, plant, or product BOP, then review and reconcile the resulting mismatches.

An accountability check provides a quick analysis of the impact that changes to a product BOP have on a plant BOP by reporting mismatch indications based on accountability check comparison settings in the **Process Planning**, **Work Instructions Authoring**, and **Product BOP Authoring** task pages. Use the **Change Summary** panel to review changes as separate tiles, and to propagate any preferred changes to the BOP.

Prerequisites

Define partial match properties in the preference **CM_bomline_tracked_properties**. To include the BOMLine property for:

- A classic BOP, use the value `MEAccountabilityCheckSettings.BOM.Process`.
- A product BOP, use the value `MEAccountabilityCheckSettings.BOM.BOP`.
- A plant BOP, use the value `MEAccountabilityCheckSettings.BOM.PBOP`.

Procedure

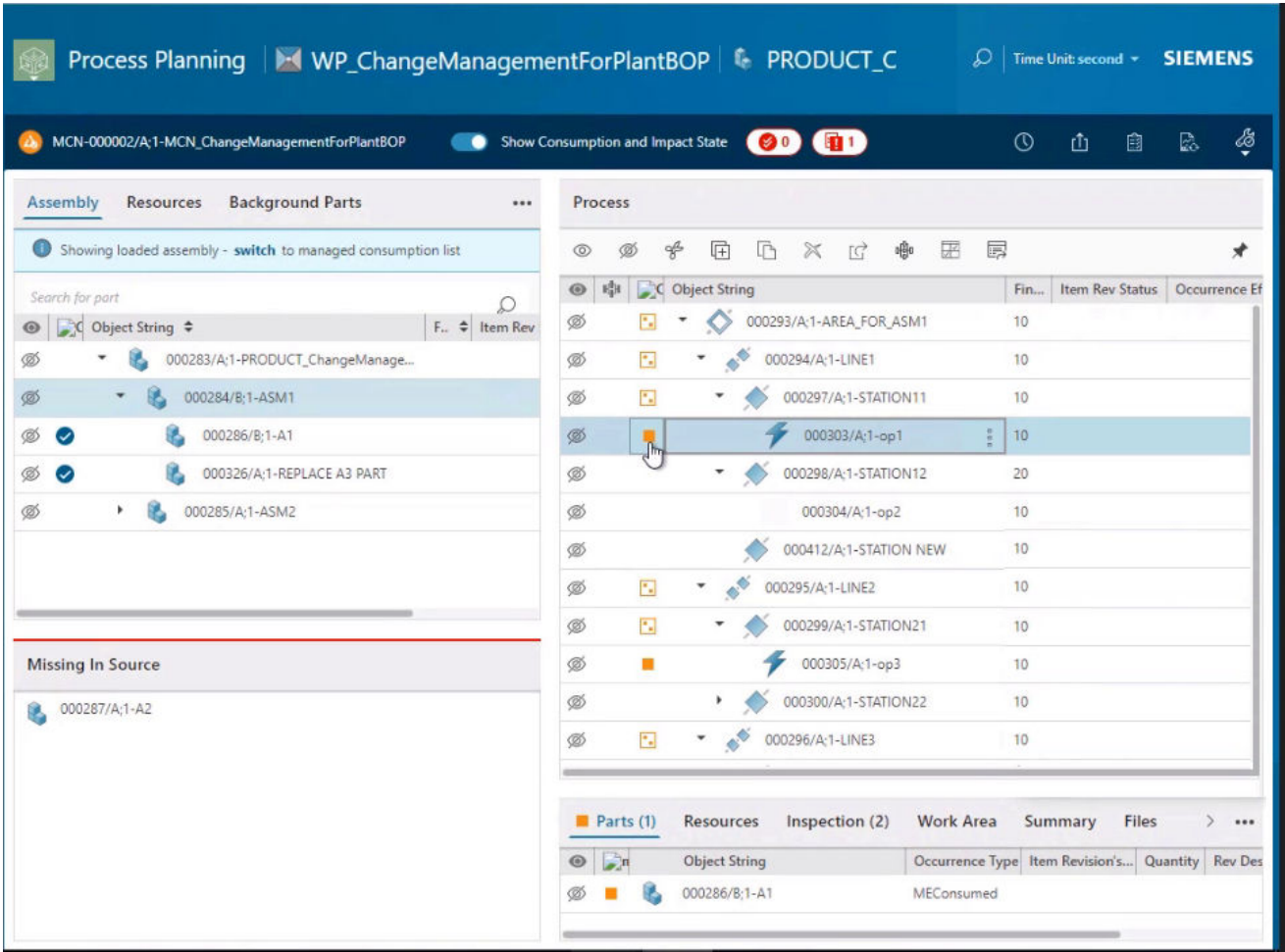
- 1.
2. **Search for and open** a work package and **navigate to the Process Planning, Work Instructions Authoring**, or **Product BOP Authoring** page.

If a manufacturing change notice is linked to your work package, the **Track Your Work** dialog box is displayed.
3. In the **Track Your Work** dialog box, select a manufacturing change notice (**MCN**) and click **Continue**. **MCN tracking** is required to track assignment changes.
4. From the **Compare** list, select a criteria for comparison.

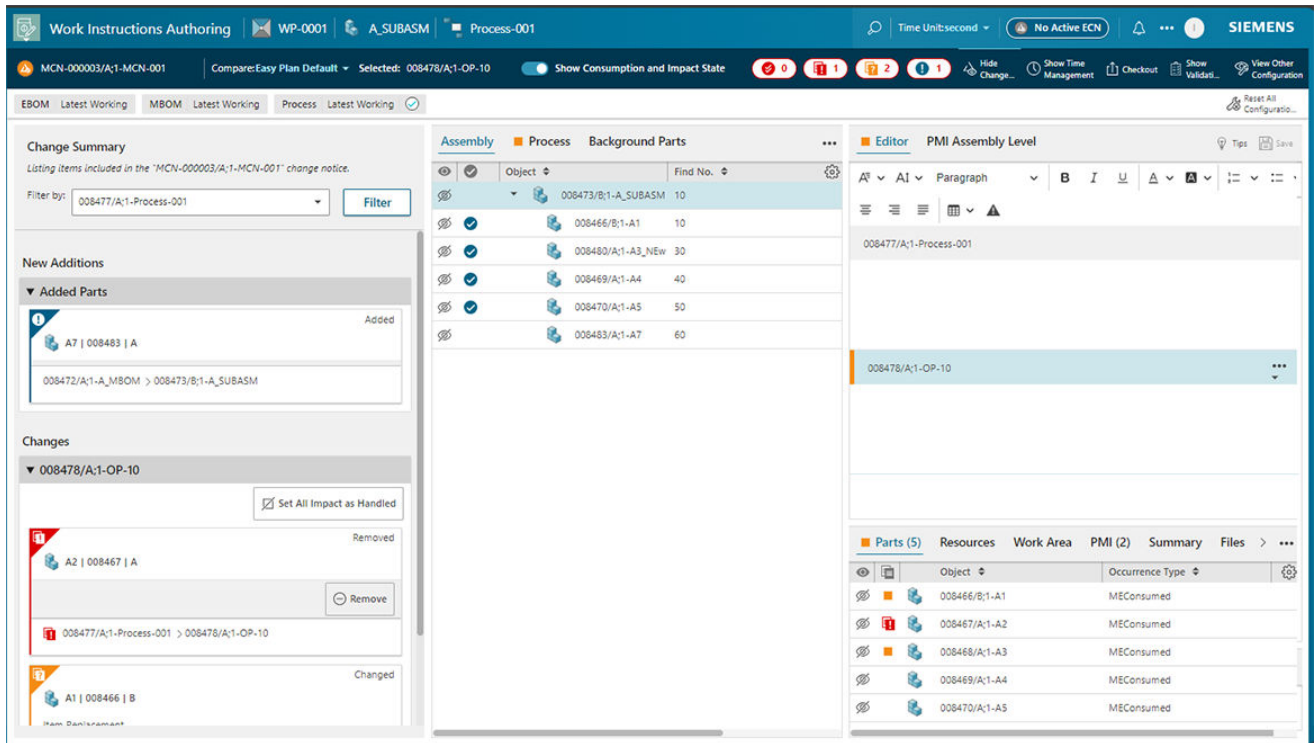
Saved setting descriptions are populated from the **Advanced Accountability Check** settings in Manufacturing Process Planner. You can find the saved settings in **Scope** tab → **Available Settings** group.
5. On the preferred task page, enable **Show Consumption and Impact State**.

The **assignment comparison control** is enabled.
6. If it is not already visible, enable the **Change Summary** panel by clicking **Show Change Summary** .

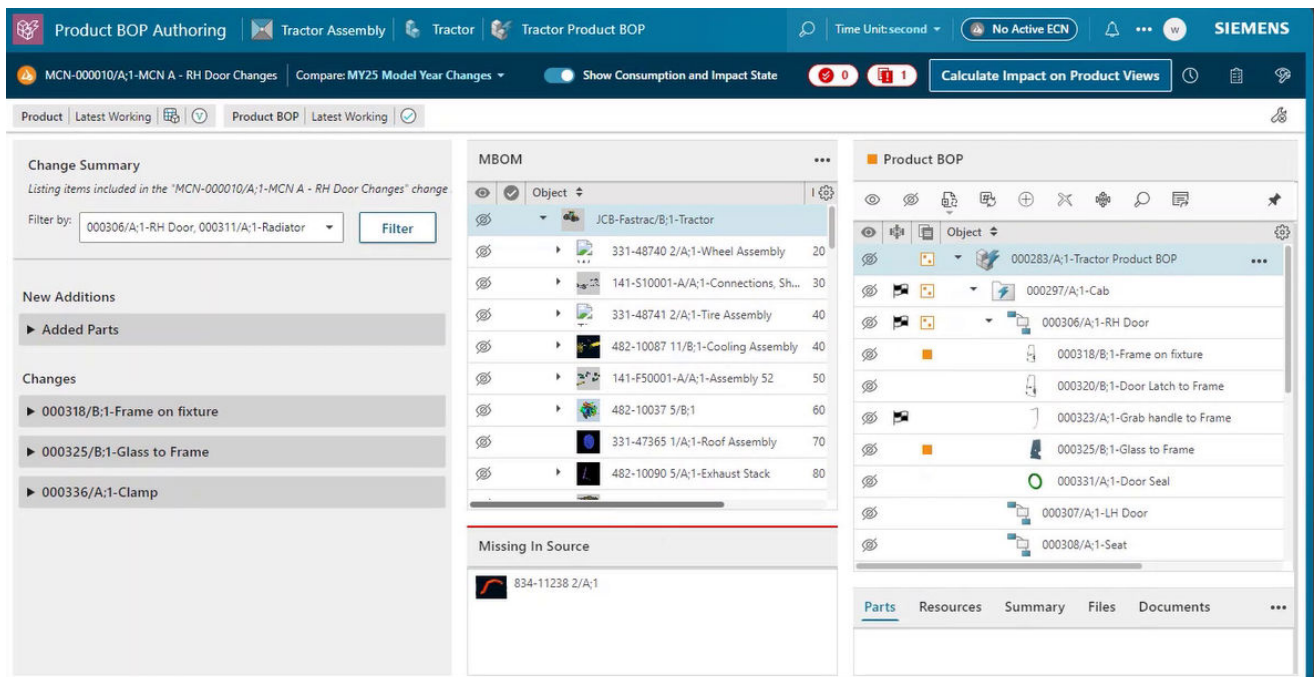
On the **Process Planning** task page, consumption and change indication icons are displayed, respectively, in the **Assembly** tab or the **Target Assemblies** panel, and in the **Process** panel.



On the **Work Instructions Authoring** task page, consumption and change indication icons are displayed, respectively, in the **Assembly** tab and the **Process** tab. Change indications are displayed when you select tiles in the **Change Summary** panel in the **Editor** panel where process changes impact individual operations. Change indications are also indicated in impacted information panel tabs such as **Parts**, **Resources**, and **Work Area**.



On the **Product BOP Authoring** task page, consumption and change indication icons are displayed, respectively, in the source **MBOM** panel and the target **Product BOP** panel.



7. (Optional) In the **Change Summary** panel, filter the scope of change target locations by selecting one or more MBOM parts and clicking **Filter**.
8. Scroll through the tiles to review changes to the MBOM not currently present in the target BOP.

Changes are displayed as separate tile notices for each BOP operation and its location, for example, a line or station. When filtered with your **Compare** selection, only specific types are shown, for example, a variant formula selection shows only operations with changes to a variant formula. When you click the operation's parent location in the tile, it synchronizes the selection to the other panels.

Mismatches reported might include parts added, removed, or revised in the MBOM, and changes to partial match properties in the MBOM. Partial match properties are defined in the preference **CM_bomline_tracked_properties**. See *Prerequisites*.

9. From the **Change Summary** panel tiles, **verify** your change notices.
 - To apply a change or new assignment, click **Set Impact as Handled**.
 - To remove a part no longer present in the MBOM from the product BOP, click **Remove**.
 - To set all changes and impact changes as handled, click **Set All Impacts as Handled**.

Note

If you set change impacts as handled and want to undo the settings, for each tile to be undone, click **Restore Impact Indication**.

10. To finish the comparison, disable **Show Consumption and Impact State**. Change indication icons are no longer visible in the panels, and the **Change Summary** panel is closed.
11. (Optional) From the **Compare** list, select a different criteria for comparison, re-enable **Show Consumption and Impact State**, and run another assignment comparison.

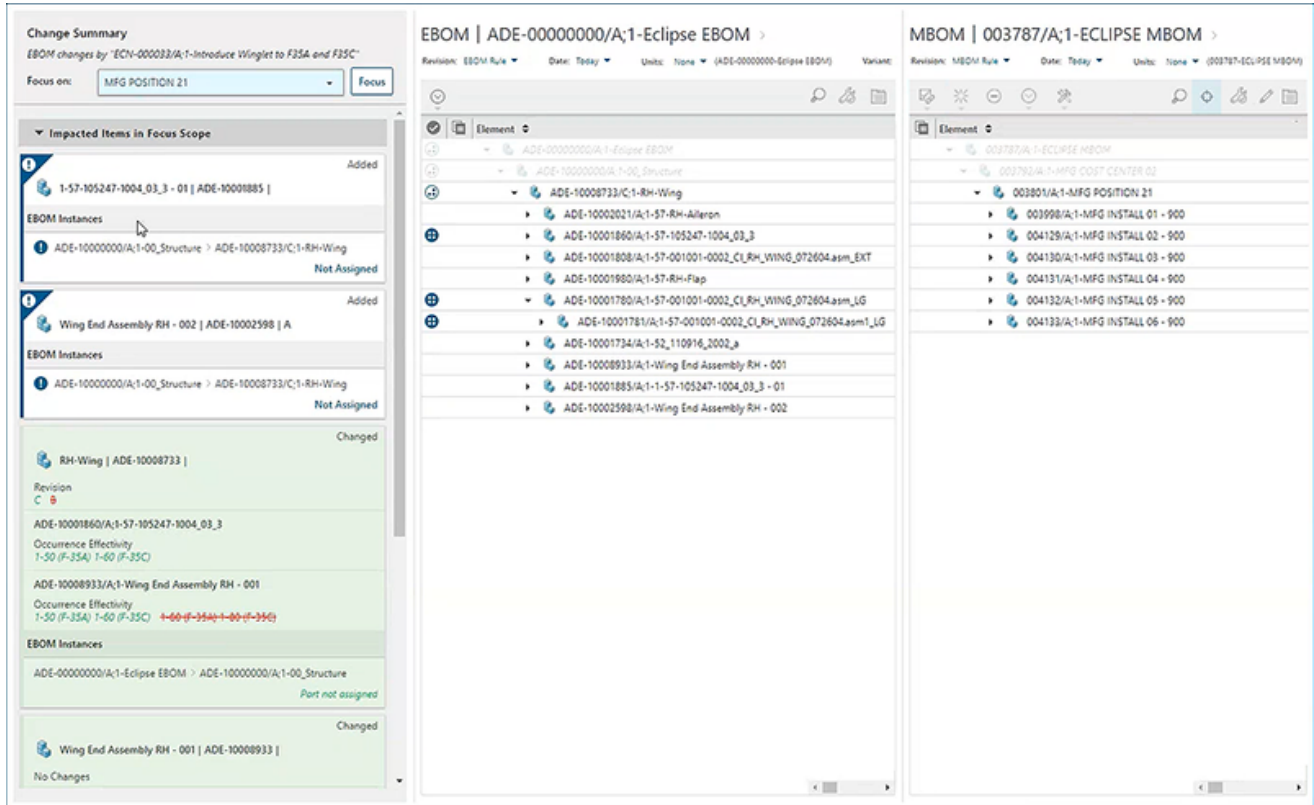
Align domain subassemblies using change management

You can align changes from an engineering bill of materials (EBOM) to a manufacturing bill of materials (MBOM) using defined domain subassemblies and the **Change Summary** panel on the **EBOM-MBOM Alignment** page.

Procedure

1. Set **domain subassembly** preferences.
2. Open a work package that contains at least one engineering change notice (ECN) or manufacturing change notice (MCN), and in the **Track Your Work** dialog box, with the **Track with this change notice** option selected, select a change notice and click **Continue**.
On the **EBOM-MBOM Alignment** page, the **Change Summary** panel displays differences between the EBOM and MBOM based only on the change notice.
3. Do one of the following:
 - To apply an existing focus, from the **Focus on** list at the top of the **Change Summary** panel, select one or more manufacturing installs impacted by the change notice.
 - To create a new focus, select the manufacturing installs that you want to focus upon in the EBOM and MBOM, and click **Focus** .

The EBOM and MBOM are computed again and items outside the focus of the selected scope are grayed out. In the **Change Summary** panel, three groups display: **Impacted Items in Focus Scope**, **Impacted Items Not in Focus Scope**, and **Impacted Items Not in Assignment Scope**. Tiles display different impacted items with different statuses in the relevant groups. In the EBOM and MBOM, **assignment status icons** are displayed to identify the assignment state of items reported in the tiles.



4. In the **Change Summary** panel, **verify** and apply appropriate changes to the change notices within the focus scope.

Propagate EBOM to MBOM changes without change notices

If you do not use Teamcenter change notices and do not want to use the **Change Summary** panel, you can propagate property changes from a work package's engineering bill of materials (EBOM) to a manufacturing bill of materials (MBOM) in the EBOM-MBOM Alignment page.

Procedure

1. **Search for and open** an existing work package using the **Work without tracking changes** option.
2. In the **EBOM-MBOM Alignment** page, identify mismatches using EBOM assembly indications to navigate through the MBOM assembly until they are visible.
3. In the MBOM, right-click the mismatched element and do one of the following.

- If the revision difference is clear, click **Update in EBOM**.
- To review the revision difference, click **Compare to EBOM**.

Note

- You can also compare the revision difference between the MBOM and EBOM by selecting the mismatched element in the MBOM and in the MBOM toolbar, clicking **Compare to EBOM** .

In the **Compare EBOM and MBOM** dialog box, the primary revisions of the EBOM are displayed in green and the MBOM in red. The MBOM revision is struck out to indicate that the MBOM requires an update.



- If you select a mismatch with an occurrence effectivity change, the **Compare EBOM and MBOM** dialog box displays occurrence effectivity differences such as unit or date range differences.

4. Click **Update in EBOM**.

Results

In the MBOM, the mismatch icon is removed and the revision reflects that in the EBOM.

Locate processes, operations, and product reviews affected by change notices

When an engineering change notice (ECN) is issued, you must perform an impact analysis to determine which processes and operations must incorporate changes from the manufacturing (MBOM) into the classic, plant, or product bill of process (BOP). You can use this procedure to determine which planning nodes are impacted by the changes to consumed parts in the BOP.

Procedure

1. Open an ECN that is actively associated with your structure.
2. In the change notice **Overview**, in the **Change Summary** panel, review engineering part status changes, that is, parts added, modified, removed, or replaced.

ID	Element	Action	Revision Name
000284	ASM1	Modified	ASM1
000286	A1	Modified	A1
000287	A2	Removed	A2
000326	REPLACE A3 PART	Added New to Replace	REPLACE A3 PART
000288	A3	Replaced	A3
000327	ST5	New	ST5
000412	STATION NEW	New	STATION NEW

- If you have not done so already, **search for and open** the work package associated with the change notice, and **navigate** to the **EBOM-MBOM Alignment**, **Process Planning**, or **Product BOP Authoring** task page.
- Select **Show Consumption and Impact State**  or **Assignment Indication** . Consumption and change indications are displayed in the page's **Process** panel and show more detail in the **Change Summary** panel.

Object String
000293/A;1-AREA_FOR_ASM1
000294/A;1-LINE1
000297/A;1-STATION11
000303/A;1-op1
000298/A;1-STATION12
000304/A;1-op2

- Choose one of the following options to research the impacted changes:
 - Hover over an indication icon to reveal a dialog box that describes how the object is impacted by the change.
 - Select an object in the **Process** tab or panel to display detailed information about the object in an information panel.
For example, if you select an operation in the **Process** or **Product BOP** tree, details about the impacted changes are visible in the **Parts** tab.
- Click **Calculate Impact on Product Views**. Product views affected by changes to hard callouts, referenced parts, and background parts are displayed.
- In the **Change Summary** panel, review all changes to the EBOM and click **Propagate**. The changes are propagated and impact indications are no longer visible.
- (Optional) Update the structure based on the impacted changes to consumed parts.

You should be able to navigate to task-related pages such as **High Level Planning** and **Line Balancing** with the change notice still active. All actions you perform on these pages, such as creating, revising, deleting, or cloning object properties, are tracked.

Remove or restore redundant impact indications

Using an engineering or manufacturing change notice (ECN or MCN), you can manually clear impact indications from assigned parts and product views (PVs) in a bill of process (BOP) if such indications do not require action. Impact indications might include part attribute changes, part removal, part replacement, or part revision notices on assigned parts, and PVs that originate from changes to the associated engineering or manufacturing bill of materials (EBOM or MBOM).

You can also restore impact indications that were previously cleared.

Note

When applicable, clearing part or PV impact indications also updates relevant impact indications on the BOP objects associated with these parts and PVs.

Procedure

1. **Associate** a work package with a change notice, open the work package, and **navigate** to planning tasks on the **Process Planning**, **Work Instructions Authoring**, or **Product BOP Authoring** page. If the change notice is active, the **Track Your Work** dialog box is displayed.
2. In the **Track Your Work** dialog box, from the **Track with this change notice** list, select the relevant change notice, and then click **Continue** to open that part or assembly in the planning task page.

Note

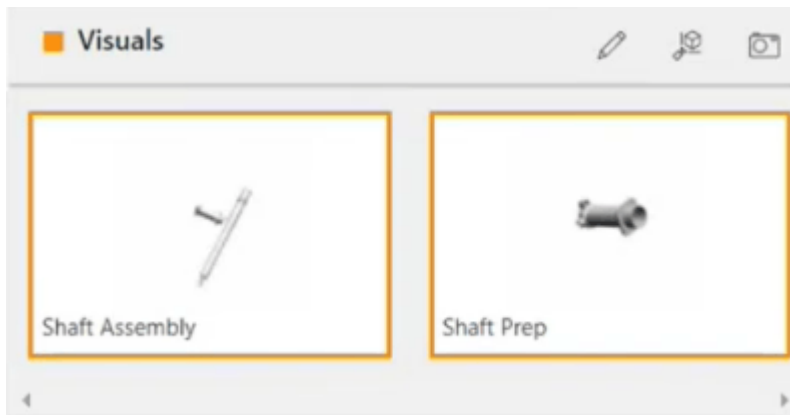
Any relevant impact indications are displayed when the BOP opens.

3. Click **Show Consumption and Impact State** . Icons for parts impacted by the change notice are displayed in the information panel beneath the **Process** panel.

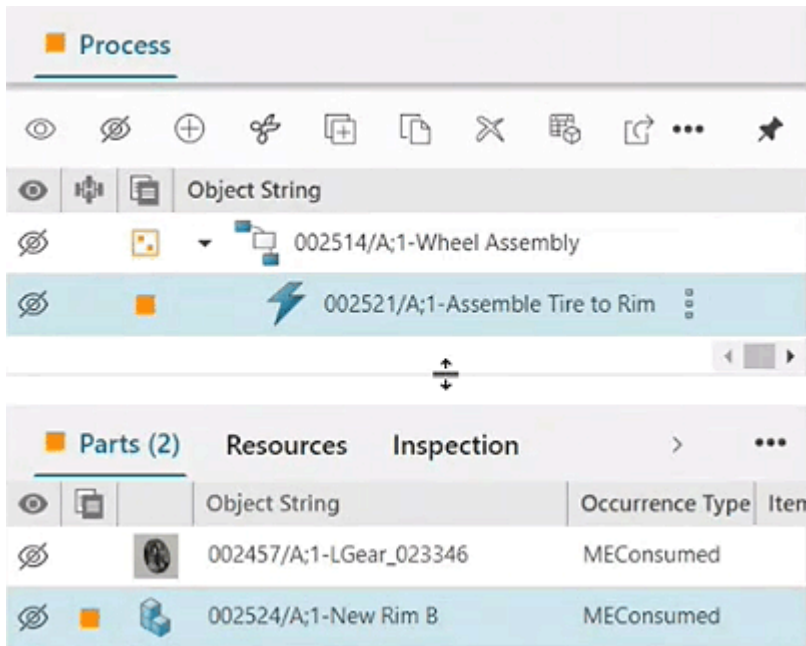
Parts (2)		Resources	Inspection	> ...	
		Object String		Occurrence Type	Item
		002457/A;1-LGear_023346		MEConsumed	
		002524/A;1-New Rim B		MEConsumed	

4. Click **Calculate Impact on Product Views**.

PVs impacted by the change notice are highlighted in orange in the **Visuals** panel.



5. To clear impact indications from a part or PV, in the **Process** panel, select an impacted element. Parts associated with the selected impacted element are detailed in the **Parts** tab of the information panel, as in this **Process Planning** page example.

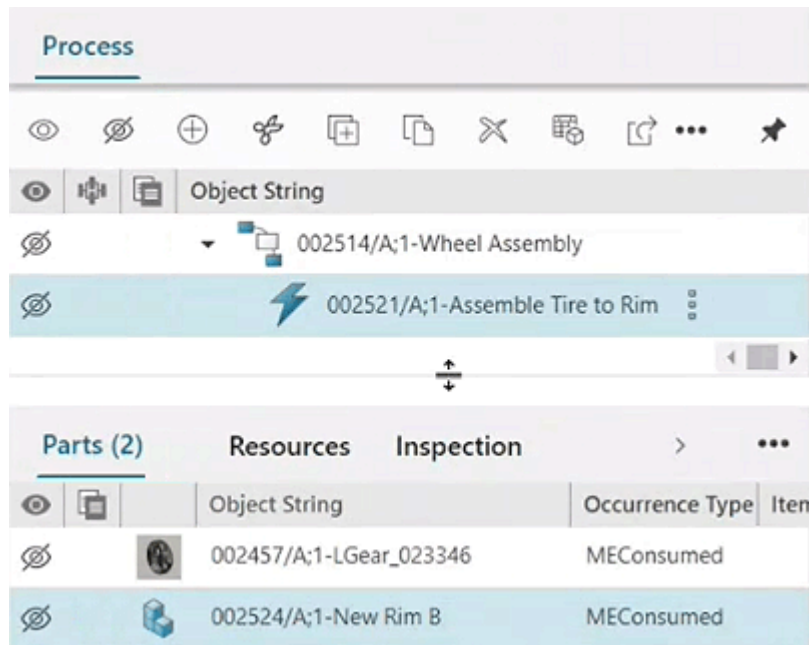


6. Do one of the following.
 - To clear impact indications from a part, in the **Parts** tab, select the part or parts with impact indications to be cleared, and in the tool bar, click **Set Impact as Handled** .

Note

- Impact indications on background parts are not currently shown in the **Parts** tab but can still impact PVs.
- The **Set Impact as Handled** command is disabled for parts that are missing in the source, or if there is no impact on the selected item. The command is also not available on the **Product BOP Authoring** page.

Impact indications are hidden for the selected part.



The list of parts for the selected tracking change notice are displayed in the **Impacts Handled** panel. This panel displays parts or PVs for which impact indications are cleared in the BOP.



- To hide impact indications from PVs, in the **Visuals** panel, select the relevant PV and click **Set Impact as Handled**

Note

PV impact indications may also be due to Product Manufacturing Information (PMI). Review PMI impact before you clear PV impact indications.

- (Optional) To redisplay impact indications, in the **Impacts Handled** panel, select the parts or PVs to be restored and click **Restore Impact Indication** .

Note

Restoring impact indications may update the relevant impact indication on the associated BOP objects.

- For PVs, after clicking **Restore Impact Indication**, also click **Calculate Impact on Product Views** to view the restored impact indications to the relevant PVs.

16. Variants

Variant support

When you author a plan, you can define the product variant to which an operation belongs. Defining product variants by operation allows you to analyze the entire plan definition for a product. When variants are defined, you can also filter data on the **Line Balancing** page.

Process Planning for BTO/BTS/CTO supports both **classic variants** and **Product Configurator variants**.

Caution

Active Workspace dropped classic variant support in version 6.2. If your environment contains classic variants, you must migrate to Product Configurator variants.

Note

If you use variants, the collaboration context and structure can use either classic variants or variants from the Product Configurator. Process Planning for BTO/BTS/CTO does not support a mixture of classic and Product Configurator variants.

Process Planning for BTO/BTS/CTO uses variant information (for families and features) from the configurator context that is related to the root node.

Variant-related terminology in Process Planning for BTO/BTS/CTO differs depending upon the variant type you are using. The following table lists variant terminology, based on variant type.

Product Configurator	Classic variant
Family	Option
Feature	Value
Formula	Condition

Configure classic variants

Edit variant conditions for an operation

Often, the variant option is defined in the engineering bill of materials (EBOM) or the manufacturing bill of materials (MBOM). The assigned parts in the EBOM or MBOM contain the variant condition, and they affect operation applicability. However, if an operation does not have assigned parts, you can set the variant condition directly on the operation.

Caution

We do not recommend using classic variants with Teamcenter Easy Plan, because Active Workspace is dropping classic variant support in version 6.2. If your environment contains classic variants, please migrate to Product Configurator variants before the Teamcenter Easy Plan 6.2 release.

Procedure

- 1. In the plant bill of process (BOP), navigate to a process station or a process.
- 2. Select an operation.
- 3. Click **Edit Variant Condition** .
- 4. Modify the variants listed in the dialog.

Tip

Click **Add** to create a new variant condition.

- 5. Click **Done**.

Set the variant condition for operations

You can set the variant condition from the product bill of process (BOP) or the plant BOP. This procedure sets the variant condition in the plant BOP.

Caution

We do not recommend using classic variants with Teamcenter Easy Plan, because Active Workspace is dropping classic variant support in version 6.2. If your environment contains classic variants, please migrate to Product Configurator variants before the Teamcenter Easy Plan 6.2 release.

- 1. Navigate to a process area or process line that contains process stations.
 - 2. Select a process station.
 - 3. In the **Operations** table, select the operations to which you want to apply the variant condition.
- You can also set a variant condition for a single operation.

Operations (ST 10) (1 missing time allocation)							    	
#	 	Rev Name	Item ID	Variant Conditions	Allocated Time Converted	Estimated Time Converted	Associated Process Resource	
1		INSTALL FRONT SUSPENS...	000928	CHASSIS = STANDARD	414.99	0	Operator 10	
2		LOAD FRONT AXLE TO SU...	000930	CHASSIS = STANDARD	30.00	0	Operator 47	
3		INSTALL FRONT SUSPENS...	000931	BODY = 4-DOOR SEDAN	7.00	0		
4		Get Chasis Pan UNV	001346	TRIM = LUXURY	19.44	0		

Note

If the product operation has a status of released, Process Planning for BTO/BTS/CTO automatically revises the operation before you can set or update the variant condition.

4. Click **Edit Variant condition** .

Note

If one or more operations already have a variant condition applied, the dialog box displays a warning message.

Edit Variant Condition

BODY ▼

= ▼

4-DOOR SEDAN ▼

ⓧ

[Add](#)

ⓘ New variant formula will be applied to selected operations and override existing ones.

Clear all

Cancel

Done

5. (Optional) Click **Add** to set additional variant conditions for the operations, and click **Done**.

Product Configurator variants

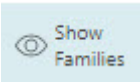
Analyze variant formulas defined for an operation

You can view and analyze the variant formulas that are defined for an operation. You can complete this task while you work in a process station, or while you work on operations from the line balancing page.

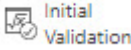
Procedure

1. In the plant bill of process (BOP), open or navigate to a process area or process line.
2. Select a station, and then select multiple operations within the station.
You can also select and analyze a single operation.
3. Click **Open Variant Formula**  icon.

4.

Click **Show Families**  to expand the **Filter** column.
5.

Review and analyze variant formulas defined for the operations.
A check mark in a table cell indicates that the formula is defined for that operation.
6.

(Optional) Click **Initial Validation**  to validate whether defined variants meet the rules.

Note

If all variant conditions are within guidelines, Teamcenter Easy Plan displays a message that states "Variant Conditions were validated."

If some variant formulas are not within guidelines, Teamcenter Easy Plan displays a message that states some variant conditions were not validated. You must resolve those variant formulas.

7.

Click **X** to return to the **Balance** page.

Define variant formulas for operations

You can add and remove variants from operations in your production plan. You can complete this task while you work in a process station, or while you work on operations from the line balancing page.

Procedure

1.

In the plant bill of process (BOP), open or navigate to a process area or process line.
2.

Select a station, and then select multiple operations within the station.

You can also select and define the variant formula for a single operation.

Operations (ST 30)		
Assign to... Cut Copy Delete Open Details Open Variant... Maximize Vertically		
Rev Name	Allocated Time Converted	Associated Process Resource
 OBTAIN AND INSTALL BREMBO ...	17.00	
 OBTAIN AND INSTALL ROTOR T...	21.00	Operator 30
 SECURE ROTOR WITH LOCK NUT	19.50	Operator 35
 SECURE ROTOR WITH LOCK NUT	9.00	Operator 30

3.

Click **Open Variant Formula**  .
The **Variant Formula** dialog box opens.

Filter					Show Families Initial Validation Start Edit		
					001188/A...	001189/A...	001190/A...
					001191/A...		
▼ [Teamcenter]doors							
4					✓		⊘
5						✓	
▼ [Teamcenter]engine							
1.6					⊘		
2.0							

Within the **Variant Formula** dialog box:

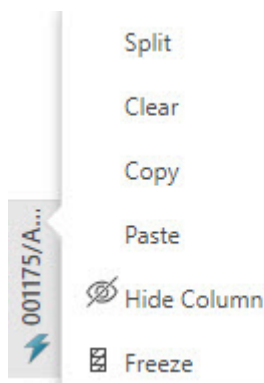
- Each operation that you selected is a table column.
- Table cells indicate the status of variant formulas for each operation.
A check mark in a table cell indicates that the formula is defined for that operation.
- The variant families or options are listed as table rows.
- The caret in each column heading opens a drop-down menu with additional options for that operation.

4. Click **Show Families** to expand the **Filter** column.

5. Click **Start Edit** .

Click inside a table cell to add a variant formula to an operation.

6. A check mark is displayed in the table cell.
7. (Optional) Click inside a table cell to remove a variant formula from an operation.
8. Click the caret in a column heading to open a menu for that operation, and select an option:



- **Split**—Creates a second column for the operation, so that you can author variants with an OR formula.

- **Clear**—Removes all variants that are defined for the operation.
- **Copy**—Copies all variants for the operation, so that you can paste them onto another operation.
- **Hide Column**—Hides data for the selected operation.
This setting is active only while the dialog box is open.
- **Freeze**—Locks data for the selected operation. Other users cannot change variant definitions for the operation.
This setting is active only while the dialog box is open.

9. Click **Save Edits**  , and click **X**.
Teamcenter Easy Plan returns to the **Balancing** page. The **Variant Formula** column displays defined variant formulas for each operation within the station.

Operations (ST 30) (2 missing time allocations)

Rev Name	Variant Formula
 OBTAIN AND INSTALL BREMBO ...	[Teamcenter]doors = 4 AND [Teamcen...
 OBTAIN AND INSTALL ROTOR T...	[Teamcenter]doors = 5 AND [Teamcen...
 SECURE ROTOR WITH LOCK NUT	[Teamcenter]doors = 5 AND [Teamcen...
 SECURE ROTOR WITH LOCK NUT	[[Teamcenter]doors = 5 AND [Teamce...

Copy defined variant formulas to another operation

After you define the variant formula for an operation, you can copy and paste the variant formula into other operations to save time. You can complete this task while you work in a process station, or while you work on operations from the line balancing page.

Procedure

1. In the plant bill of process (BOP), open or navigate to a process area or process line.
2. Select a station, and then select multiple operations within the station.

Tip

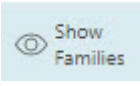
One operation must contain the variant formula you want to copy.

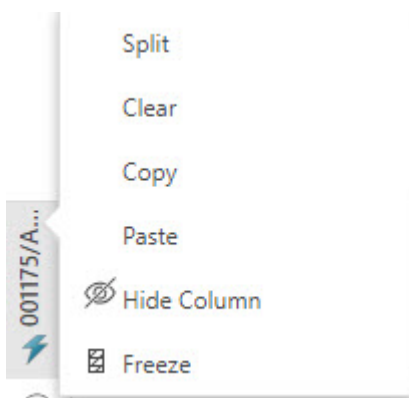
3. Click **Open Variant Formula**  .
The **Variant Formula** dialog box opens.

Show Families Initial Validation Start Edit					
Filter	001188/A... ⚡	001189/A... ⚡	001190/A... ⚡	001191/A... ⚡	
▼ [Teamcenter]doors					
4	✓			⊘	
5		✓			
▼ [Teamcenter]engine					
1.6	⊘				
2.0					

Within the **Variant Formula** dialog box:

- Each operation that you selected is a table column.
- Table cells indicate the status of variant formulas for each operation.
A check mark in a table cell indicates that the formula is defined for that operation.
- The variant families or options are listed as table rows.
- The caret in each column heading opens a drop-down menu with additional options for that operation.

4. Click **Show Families**  to expand the **Filter** column.
5. Click **Start Edit** .
6. Click the caret for the operation from which you want to copy variants, and select **Copy** from the menu.



- Click the caret for the operation into which you want to paste the copied variants, and select **Paste** from the menu.

- Click **Save Edits** .

Teamcenter Easy Plan returns to the **Balancing** tab. The **Variant Formula** column displays defined variant formulas for each operation within the station.

Operations (ST 30) (2 missing time allocations)

Rev Name	Variant Formula
 OBTAIN AND INSTALL BREMBO ...	[Teamcenter]doors = 4 AND [Teamcen...
 OBTAIN AND INSTALL ROTOR T...	[Teamcenter]doors = 5 AND [Teamcen...
 SECURE ROTOR WITH LOCK NUT	[Teamcenter]doors = 5 AND [Teamcen...
 SECURE ROTOR WITH LOCK NUT	([Teamcenter]doors = 5 AND [Teamce...

Configure variants for a process station

You can view the current variants configured for a process station, and revise the variants defined for operations within that station.

Procedure

- In the plant bill of process (BOP), **open or navigate to a process area or process line** that contains process stations.
- Open a process station and click the **Operations** tab.
- To add variants to a process station, perform the following steps:
 - Select variants in the **Available product variants** list.

Tip

If the list of **Available product variants** is long, you can apply a filter by typing in the box.

- Click .
- The variants move to the **Selected product variants** list and are added to the process station.
- (Optional) To remove variants from a process station, perform the following steps:
 - Select variants in the **Selected product variants** list.
 - Click .

The variants move to the **Available product variants** list and are removed from the process station.

5. Click **Done**.

Define and save variant rules in Easy Plan

You can define and save variant rules (SVRs) while working in the planning pages of Teamcenter Easy Plan.

You also have the option to leave Easy Plan to save variant rules on the Product Configurator page in Active Workspace.

There are two types of variant rules:

- *Global variant rules* are saved to the Configurator Context within Active Workspace and they are shared across your organization.
- *Local variant rules* are saved on your data by associating the rule with predefined object types in your data structure.

Prerequisites

Before you create local variant rules, you must set the **EP_SVROwningItemAllowedTypes** value to define the object types for which you can save a local variant rule. This preference is passed as a string property and accepts multiple values. The default value is **MfgOBvrProcessLine**.

You can save local variant rules on objects in the following structures:

- Manufacturing bill of materials (MBOM)
- Plant bill of process (BOP)
- Classic BOP
- Custom object types

Note

We recommend defining types that represent a project or an order, for example a process line or a process zone, and not common types like an operation or a process.

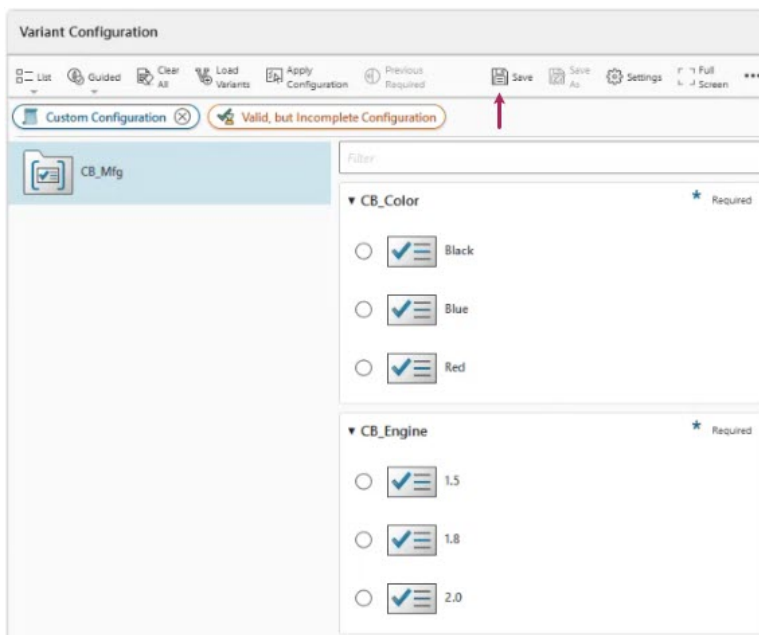
In addition, you must add **EP_SVROwningItemAllowedTypes** to the **AWC_Startup_preference** in the Teamcenter rich client.

See the *Preferences* section in the *Active Workspace Administration* documentation for a description of preferences and how to set them.

Procedure

1. If you have not done so already, **search for and open an existing work package** and **navigate to the EBOM-MBOM Alignment, High Level Planning, or Process Planning page**.
2. Do one of the following:
 - If you are working in the **EBOM-MBOM Alignment** page, in the **MBOM** panel, select the object for which you want to save a variant rule.
 - If you are working in the **High Level Planning** page, in the **BOP** panel, select the object for which you want to save a variant rule.
 - If you are working in the **Process Planning** page, in the **Process** panel, select the object for which you want to save a variant rule.
3. Click **Show Variant Configuration** .

The **Variant Configuration** panel is displayed.



4. Set the options for the variant rule.
5. (Optional) Select a local object onto which you want to save the variant rule and click **Save**.

Save As ✕ Close

▼ **Properties**

* **Name:**

Required

Description:

Attach to:

☒ Current Structure

☐ Configurator Context

6. Type a **Name** for the variant rule.
7. Select an option in the **Attach to** section and then click **Save**.
 - To create a local variant rule, click **Current Structure**.
 - To create a global variant rule, click **Configurator Context**.

Note

If you cannot create a local rule for the object you selected, Easy Plan does not display the **Attach to** section in the **Save As** dialog box. You can only create and save a global variant rule.

Configure data with a variant rule defined at the sub-level

To configure any structure in Easy Plan, you can use variant rules that have been saved locally.

The root structure is used as the owning variant item by default, which means that the sub-level data lists the root structure's global variant rules. For this configuration, you find a local object and apply a locally saved variant rule for that object to a sub-level structure.

Procedure

1. If you have not done so already, **search for and open an existing work package** and **navigate to the EBOM-MBOM Alignment, High Level Planning, or Process Planning page**.
2. Click the **Plant BOP** configuration header.
Teamcenter Easy Plan displays the **Plant BOP Configuration** panel.

3. Select an object with locally saved variant rules, right-click the selection, and choose **Copy** to copy it to the clipboard.
4. In the **Variant** section, click on the icon shown in the **Saved Variant** section. Teamcenter Easy Plan opens a new section of the **Plant BOP Configuration** panel.
5. Click the **Search** tab and type the **Item ID** for the object associated to the saved variant rule you want to apply, and then click **Search**.
6. Select the correct item from the search results or the Clipboard.



Teamcenter Easy Plan opens the **Plant BOP Configuration** panel.

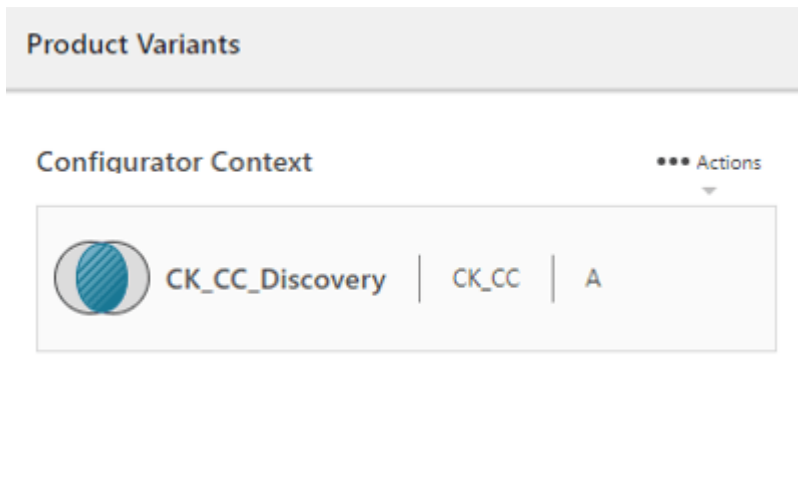
7. In the **Variant** section, click the **No Variant Rule** list, select a variant rule to apply, and click **Configure**.
Teamcenter Easy Plan:
 - Changes the owning variant item.
 - Applies the locally saved variant rule.
 - Updates the **Plant BOP** configuration header to list the applied variant rule.

Configure variants for MBOM elements

Add variant formulas to MBOM elements on the **EBOM-MBOM Alignment** page.

Procedure

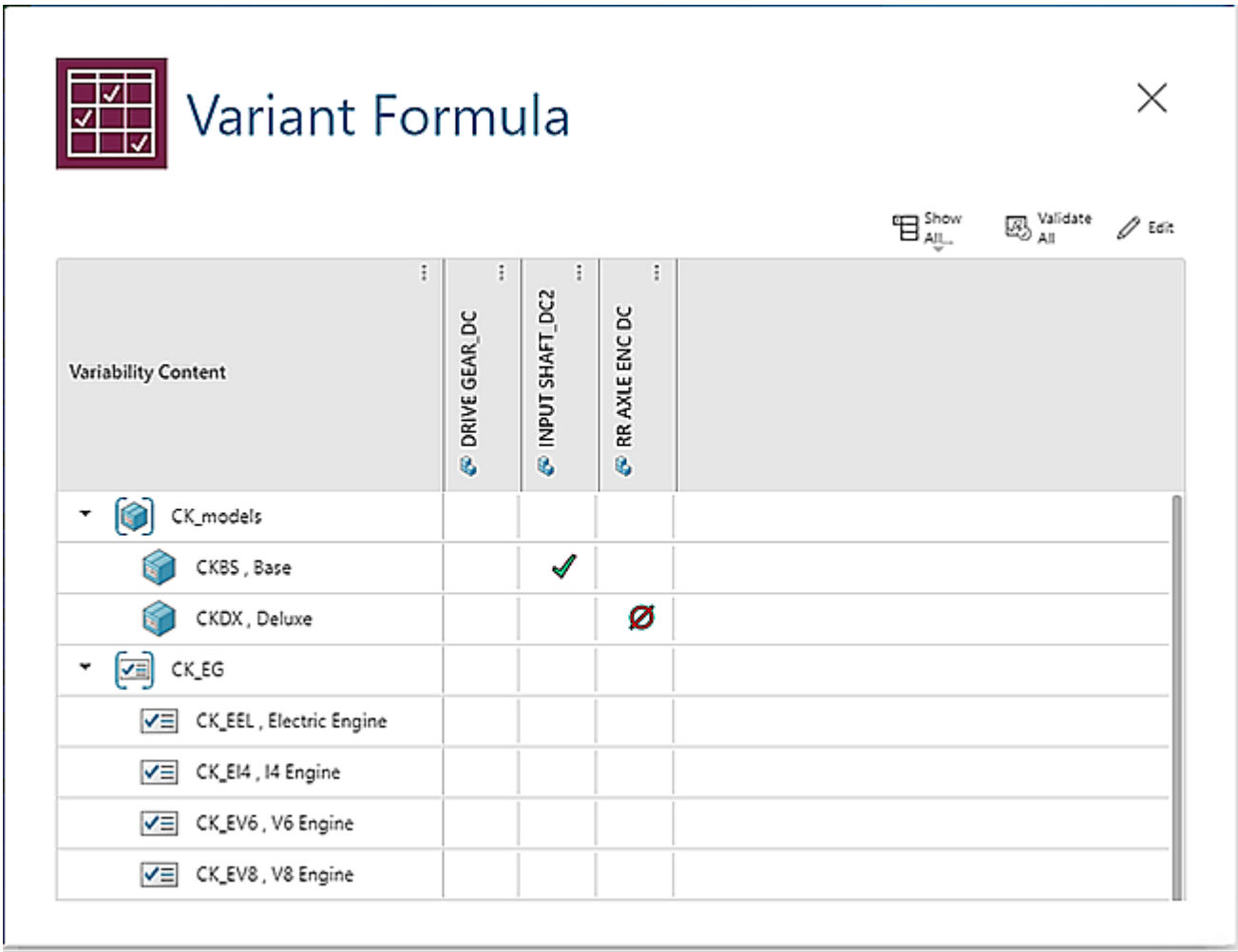
1. Ensure that a **Configuration Context** object is added to the **Product Variants** panel of the **Manage Work Package** page.

**Note**

If a **Configuration Context** object is not added to the work package, the **Open Variant Formula** command is not available.

2. On the **EBOM-MBOM Alignment** page, in the **MBOM** panel, select an element, and then click **Manage**  → **Open Variant Formula** .

The **Variant Formula** dialog box is displayed. You can **define**, edit, and **analyze** variant formulas for MBOM elements.



Set multiple configurator contexts within a structure

Prerequisites

Procedure

- 1.
- 2.
- 3.

Filter by product variant

Note

When you filter by product variant, you cannot create cycles for all product variants, or for product variants that you have filtered out. Teamcenter Easy Plan displays an error message and does not let you create or update the cycle.

1. In the plant bill of process (BOP), **open or navigate to a process area or process line** that contains process stations.
2. Select a station or process resource for which you want to view variant data.
3. Click the **Product Variant** drop-down, and select the variant on which you want to analyze data.

You can select **Maximum** in the **Product Variant** drop-down list to see the maximum effect of product variants on each station's cycle time.

Caution

- In the **Line Balancing** page, verify that all operations are assigned to a process resource before you set the **Product Variant** to **Maximum**. If there are unassigned operations in the line, the **Maximum** calculation will not be accurate.
- Teamcenter Easy Plan does not support shared process resources when you apply the **Maximum** product variant.

Planning **Balancing** Details

Overview 

Product Variant:

LUXURY

Balancing | driven by CarEbomProductBOP

 Station 1A  6.12

test	0		0
Operator 10 50%			6.12
Operator 20 50%	0		0

After you apply a filter to variant data, Teamcenter Easy Plan:

- Shows only the stations, process resources, and operations for the specific variant configuration on which you filtered data.
- Updates total time so it displays a rollup of time for only the product variant on which you filtered.
- Filters the balancing overview cycle and wait times to show data for only the product variant on which you filtered.

Compare and propagate variants in the plant BOP

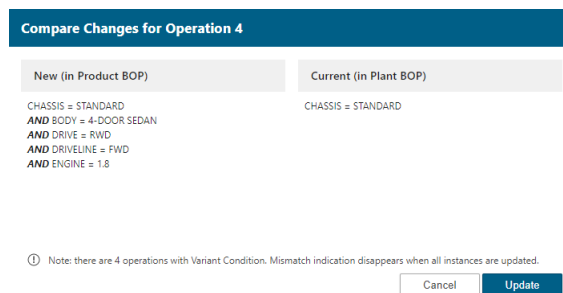
When operation properties change in the product bill of process (BOP), you need to determine whether to update the plant BOP. Follow these steps to compare only those operations whose product BOP variant differs from the plant BOP. Then, you can quickly propagate those variant differences to the plant BOP, if necessary.

1. In the plant bill of process (BOP), **open or navigate to a process area or process line** that contains process stations.
2. Select a process station and click **Balancing**.
3. Click **Show Product BOP**.
4. In the Product BOP toolbar, click **Show indication information** .

Process Planning for BTO/BTS/CTO displays icons next to operations that are allocated to a process area in the line you are balancing.

5. Hover over the in-scope partial mismatch indicator  and click it, then select **Compare with source in Product BOP**.

Process Planning for BTO/BTS/CTO displays details about the operation. Review new variants in the product BOP against the current variants in the plant BOP.



6. Select an option:
 - Click **Update** to propagate changes in the operation variant from the product BOP to the plant BOP. Process Planning for BTO/BTS/CTO propagates the variants, and removes the in-scope partial mismatch indicator for the operation.
 - Click **Cancel** to keep current operation variants in the plant BOP.

Analyze variant time distribution

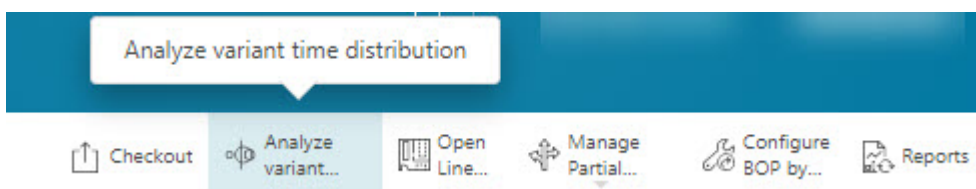
You can use the **Variant Time Distribution** dialog box to highlight problems with product variants. Use this dialog box to scan all the stations and process resources in a zone or line, and:

- Look for product variants that take considerably more time than the takt time in certain stations or process resources. These product variants create a bottleneck on the manufacturing line.
- Look for product variants that take considerably less time than the takt time, which means that station or process resource has capacity.
- Review the probability of the product variants, because problems with common product variants have a greater effect on the manufacturing line.

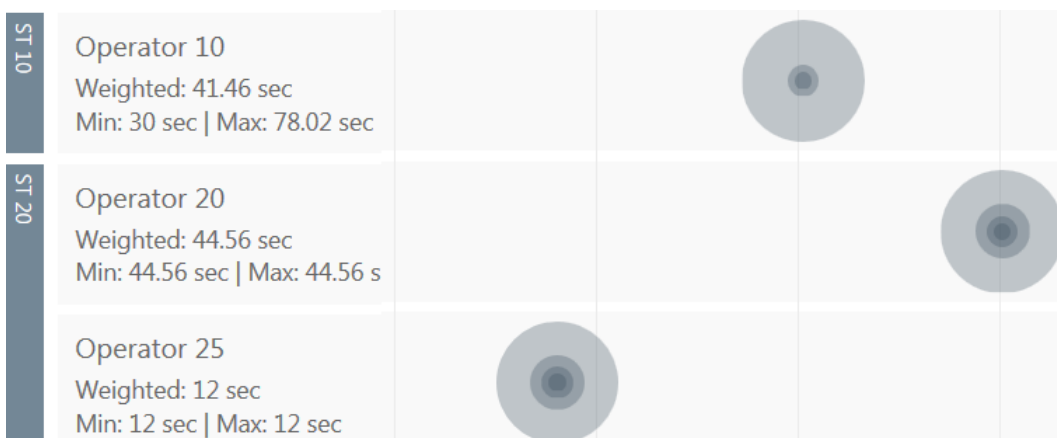
Analyzing variant time distribution

Procedure

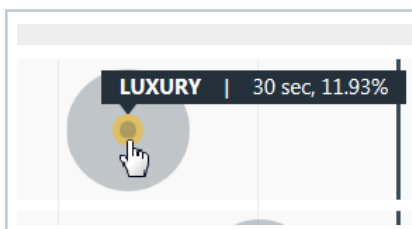
1. In the plant bill of process (BOP), **open or navigate to a process area or process line** that contains process stations.
2. Click **Analyze Variant Time Distribution**  on the **Balancing** page.



The **Variant Time Distribution** dialog box displays a time line that includes a circle for each worker. The circle location on the time line represents when a worker finishes working with a specific product variant.



3. Hover over a circle to display a tooltip that lists:



The variant name. In this example, it is **LUXURY**.

Time required to perform the allocated operations with this variant.

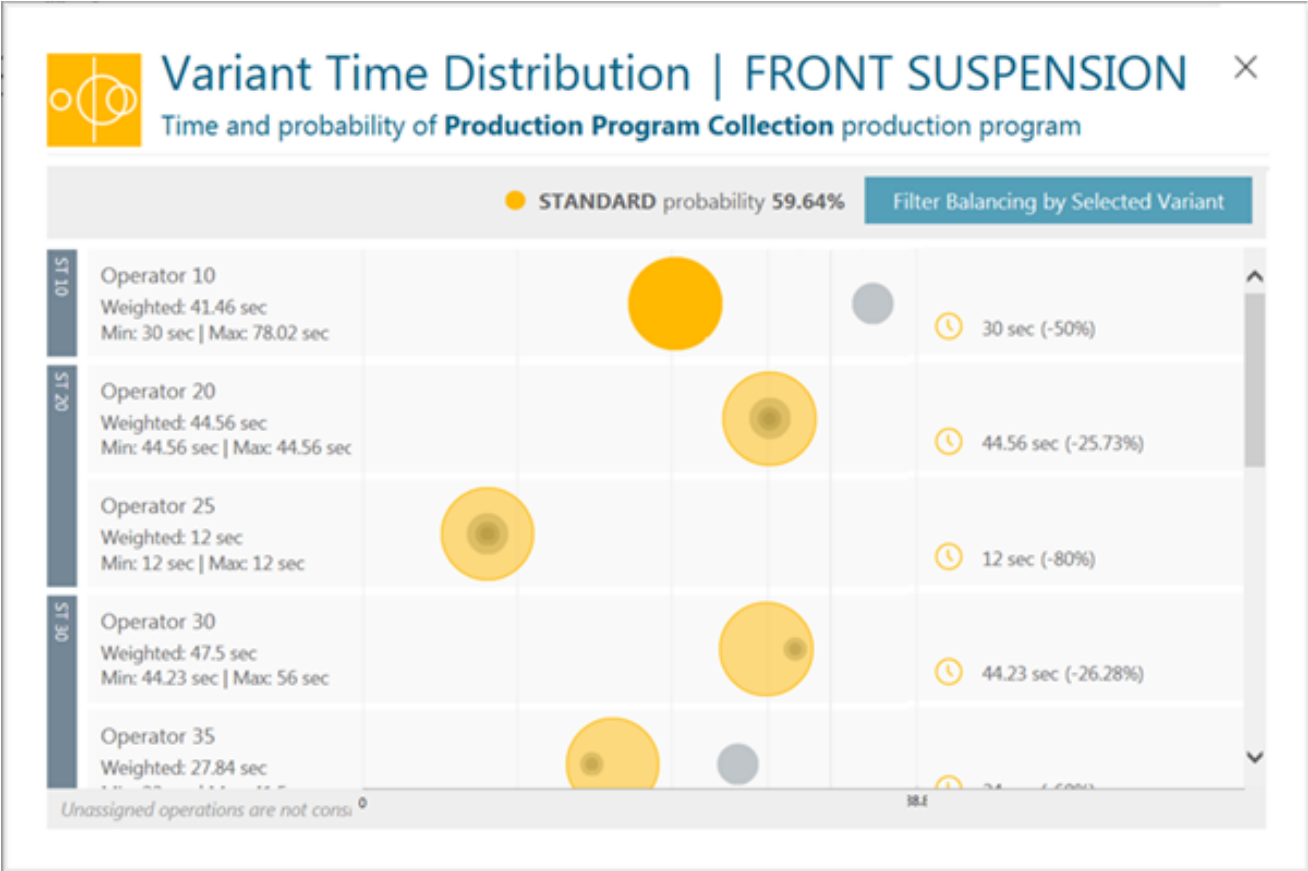
In this example, it is **30 sec**.

Percent probability of the product variant. In this example, it is **11.93%**.

A vertical black line on the chart represents the takt time for the station.

4. (Optional) Select a circle to see where and when all work for a specific product variant takes place. This highlights all circles that represent the product variant.

Information displayed on the right side of the chart describes what each circle represents. This is the same information that is displayed on the tooltip.



17. Submit to workflow

Submit objects to a workflow

You can submit objects to a workflow from several different task pages and their included tabs and panels. See *Submit work packages to a workflow* for instructions about submitting all other Teamcenter objects to a workflow.

Objects that you can submit to a workflow include:

- Processes and operations.
- Process areas and process containers.
- Product bills of procedures (BOPs).
- Plant BOPs.
- Manufacturing bills of materials (MBOM) and their specific parts and assemblies.
- **Enterprise Recipe Management (ERM)** general and master recipes.

Note

You must have write permissions for any object that you submit to a workflow.

After you submit an object to a workflow, it is assigned a status. Before you can modify an object or children of an object with a status, you must create a new revision.

Procedure

1. If you have not done so already, **search for and open** an existing work package and **navigate** to a work package planning task.
2. In the appropriate tab or panel, select the object to be submitted and in the tab or panel toolbar, click **Submit to Workflow** .
3. In the **Submit to Workflow** dialog box, do the following.
 - a. From the **Workflow Template** list, select a template appropriate to the workflow task and object being submitted.
 - b. In the **Workflow Name** text box, accept the default object name or type a unique name for the workflow.

- c. (Optional) If the workflow calls for an assignment, click the **ASSIGNMENTS** group and filter the list of users as follows.
 - From the **Group** list, select a group appropriate to the workflow task and object being submitted.
 - From the **Role** list, select a user role appropriate to the workflow task and software application being used.
 - On the filter text box, type text characters to further limit the list of users.
 - Select the users you want to assign to the workflow by pressing **Ctrl** and selecting each.
- d. (Optional) If the workflow calls for an assignment, click the **ASSIGNMENTS** group and filter the list of resource pools to be assigned to the workflow as follows.
 - On the filter text box, type text characters to further limit the list of resource pools.
 - Select the resource pools you want to assign to the workflow by pressing **Ctrl** and selecting each.
- e. Click **Submit**.

Tip

A status is assigned to the object. If you try to modify the object or its children, you are prompted to create a new revision.

Submit a work package to a workflow

You can submit an entire work package to a workflow in Easy Plan.

See [Submit objects to workflow](#) for instructions about submitting all other Teamcenter objects to a workflow.

Prerequisites

You must have write permissions for any object before you can submit it to a workflow.

After you submit an object to a workflow, it is assigned a status. Before you can modify an object or children of an object with a status, you must create a new revision.

Procedure

1. [Search for and select a work package](#).
2. From the **Manage** menu, click **Submit to Workflow** .
3. In the **Submit to Workflow** dialog box, do the following.
 - a. From the **Workflow Template** list, select a template appropriate to the workflow task and object being submitted.

- b. In the **Workflow Name** text box, accept the default object name or type a unique name for the workflow.
- c. Click **Submit**.
Teamcenter Easy Plan assigns a status to the object. If you try to modify the object or its children, you are prompted to create a new revision.