



HOME

User Manual DELMIA Process Engineer®

Work Instructions Composer



Foreword

This manual provides an introduction to the basic operations and functions of the Work Instructions Composer.

While developing these functions we have made every effort to create a clearly organized, easy-to-understand program structure.

A user-friendly interface as well as a clear menu guide will enable you to quickly learn how to operate the program and to get familiar with its functions so that you can carry out your planning tasks in a quick and reliable way.

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1.Introduction

This manual explains how to use the Process Engineer Work Instructions Composer for your planning purposes.

1.1 How to Use this Manual

This manual enables you to get familiar with the operation and functions of the Work Instructions Composer.

This manual briefly describes:

- How to load data from the Manufacturing Hub (MH) database in order to author work instructions.
- How to author work instructions using the Work Instructions (WI) Composer.
- How to save work instructions back to the MH database.



Click [General Introduction](#) to access information about the basic settings functions.

1.2 Documentation Conventions and Symbols

The symbols used in this manual are intended to provide you with keys to the contents in an immediately understandable manner.



This symbol is used to introduce key concepts that are covered in the sections immediately following this symbol. As a result, this symbol most frequently appears at the beginning of chapters or sections.



Note

*This symbol is used to mark notes, which provide you with additional information you need to have for further work. You will either find the Note sign at the beginning of a chapter or in a particular text passage in the chapter. Texts bearing this sign are additionally marked with **Note**. The text is always in italics.*







Caution

*This symbol indicates that the text that follows describes particular circumstances that you must avoid to avoid potential errors with the operation of the program or harm to data. You will either find the Caution sign at the beginning of a chapter or near a particular text passage in the chapter. Texts that are introduced by this sign are additionally marked with **Caution**. The text is always in italics.*

Example

This symbol marks examples which serve to illustrate a certain situation.

-  This symbol marks the individual operational steps involved in a particular operating instruction. Operating instructions describe operational steps, for example, how to open a menu or execute a function.
-  This symbol marks listed subjects. The symbol for listed subjects can be either used to structure a continuous text or to list main subject keywords.
-  This symbol marks list inside a bulleted or numbered list.
-  This symbol marks cross reference information that is available in another manual.

1.3 New Functions in Work Instructions **Composer**

[Manufacturing Context](#) can be computed. You can compute the manufacturing context for the loaded process based on the current configuration and the loaded output products. This feature is available only if you have a PC1 license.

The [E5-Shop Order Release](#) product (SO1) has been added. With it, you can generate only PPR and WI Composer data without V5-data.



Note

A naming convention has changed: what has previously been called the “planning context” is now called the “volumetric context.”

2. Work Instructions Composer Overview

2.1 About Work Instructions Composer

This gives you the capability to load process planning and work instructions data from the Manufacturing Hub (MHub) to the Work Instructions Composer (WI Composer).

You will be able to author work instructions, create annotations, mark-up, etc., to the process.

2.2 Prerequisites

You need to have knowledge of the Process Engineer application and need to know about processes, products, and resources as those terms apply to Process Engineer applications. You also need to have a basic knowledge of objects in 3DVIA Composer and 3DVIA Player applications such as creating views, mark-ups, Digger, etc.

- Licenses for the Work Instructions Composer (WKC) and the 3DVIA Composer products are required. To use any context command, you must have a separate license (PC1). A separate license is also required for E5-SOR (SO1).
- Core XML services – MSXML 6.0 is required and can be downloaded from the Microsoft website.

2.3 Launching Work Instructions Composer



Figure 1: Launching Work Instructions Composer

Work Instruction Composer can only be launched from the Process Engineer. To launch WI Composer, here is the procedure:

Select a Process Node, in this example – *Workplan, 1* - from the DPE client. Using the right mouse button, select **Open in > WI Composer**. The WI Composer is started.

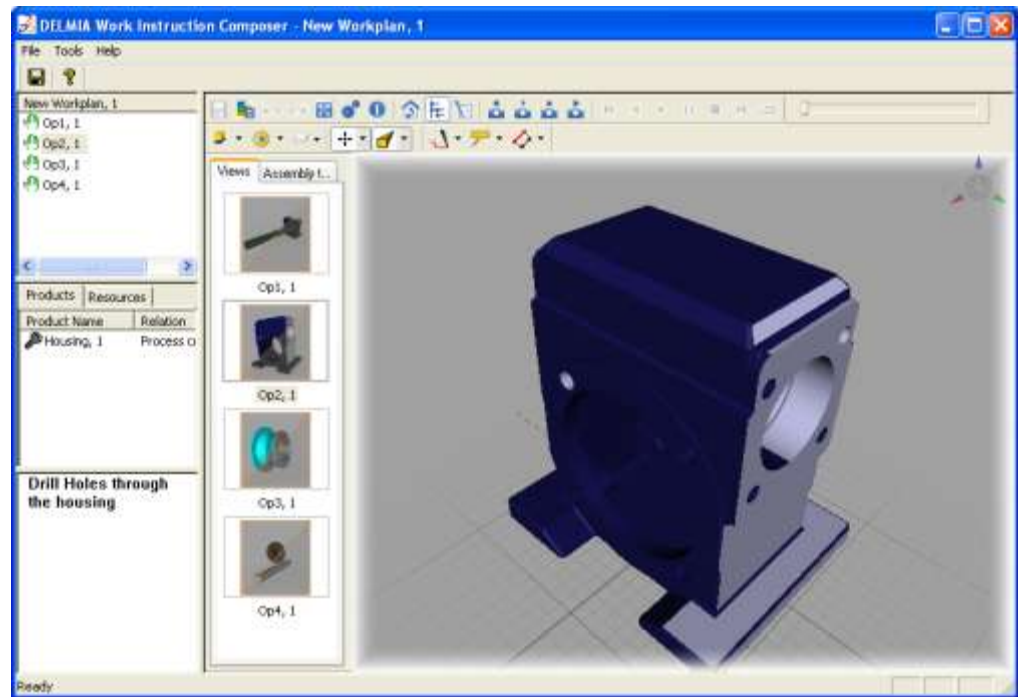


Figure 2: Work Instruction Composer Window

To be able to launch WI Composer, you need to set the path location where the WI Composer executable is installed so that using the right mouse button, DPE can pick the executable from this location. To set the path location of the executable Click **Tools > Settings > Change > Other DS Software Modules** and set the path for WI composer executable (DWIC.exe)

3.Loading Data

The terms processes and operations are used interchangeably throughout this document. You must have read permissions for the data in order for it to successfully load.

Processes:

When you select a process node to send this data to WI Composer, the first level children of the selected process is loaded into WI Composer.

If the loaded process has no children, WI Composer will not launch and you will be instructed to launch the application from the parent level.

If the processes are sequenced (process_runs_before_process relation in Process Engineer), they will appear in that sequence in WI Composer. If there is no sequence defined, then the processes will be randomly listed.

Once the process and its children are loaded, they are locked by the current user and cannot be edited by another user.

You must have Read permissions for the data in order for it to successfully load the process data.

Products:

Products assigned to each of the first level children are sent to WI Composer. This list of products will appear as a list in the WI Composer view window. In the tree view of the 3DVIA, there is a node dedicated for the products under the ROOT node.

Two variations can exist;

- **An assembly is assigned to a process.** The entire assembly, with all its children, are loaded into the WI Composer. You can see this in the tree view of the 3DVIA application.
- **A single product within an assembly structure is assigned to a process.** In this case only the assigned product will be visible in the tree view of the 3DVIA application.

You must have read permissions for the data in order for it to successfully load the product data.

Resources:

Resources assigned to each of the first level children are sent to WI Composer. These resources will appear as a list in the left-hand panel. In the tree view of the 3DVIA, there will be a node dedicated for resources under the ROOT node.

You must have read permissions for the data in order for it to successfully load.

Manufacturing Assembly (MA):

If a Manufacturing Assembly is associated to a Process, then the Manufacturing Assembly is also sent to the WI Composer.

If a MA has children, all the child parts will be loaded in WI Composer.

MA respects the same relation as products so that any MA that is assigned with one of the relations previously mentioned will be considered.

You must have Read permissions for the data in order for it to successfully load.

Manufacturing Kit (MK):

If a Manufacturing Kit is associated to a Process, then the Manufacturing Kit is also sent to the WI Composer.

If a Kit has children, all the child parts will be loaded in WI Composer.

MK respects the same relation as products so that any MK that is assigned with one of the relations previously mentioned will be considered.

You must have Read permissions for the data in order for it to successfully load.

Volumetric Context:

Volumetric context is a collection of all the different parts that are needed when installing or planning a given Workplan/Installation. For the volumetric context to be loaded into WI Composer you need to have a previously defined volumetric context for a given process. The volumetric context can be defined using a DPM V5 product or using **Define Volumetric Context** command in WI Composer.

Assumptions about the Geometry Files loaded in WI Composer:

The WI Composer application will **not** generate the needed smgGeom and smgXml files on the fly from the assigned products, resources, or CGR files. The smgGeom and smgXml files need to be **pre-generated** and this can be done by setting up the 3DVIA Sync to generate these files from a given file location and create these files in another or the same location.

The locations in which these files are created needs to be specified in the *attribute_25* attribute of the product / resource object in Process Engineer. You need to set the "smgXml" file of the product/resource for the attribute 25. Please note that you cannot assign smgGeom nor the plain smg file. It needs to be smgXml file. If this attribute is already used, then you can specify an alternate name of the attribute through an environment variable MH_3DVIA_SMGGRAPHIC.

Example. If you want to use *graphicname_alt6* as the attribute where all the *SMGGEOM* and *smgXml* files are located, then you should specifically set MH_3DVIA_SMGGRAPHIC = "graphicname_alt6", so that software knows where to find the geometry files.

NOTE: The Environment variable is common for both products and resources. Also if the Environment variable is set, then the software will only look for the smgXml file specified through this Environment variable and then ignores the attribute 25. So, you should either use the Environment variable or use the attribute 25.

For the files coming from ENOVIA Vault, the CATPart/CATProduct files need to be extracted from the Vault and then copied onto a file system so that 3DVIA Sync can then be used to generate the needed smgGeom and smgXml files for these data.

It is out of the scope of this document to describe how to extract the product/part files from ENOVIA Vault and how to generate the smgGeom and smgXml files for these data coming from Enovia Vault.

If there is no smgGeom and smgXml files for a given CATProduct, then you will not see the geometry for this in the 3DVIA view. The error will be logged into a text file which you can later refer to after loading. The log files, by default, are located in the windows temp directory. Example: C:\Documents and Settings \ your login \ Local Settings \ Temp.

|

4. Work Instructions Composer Interface

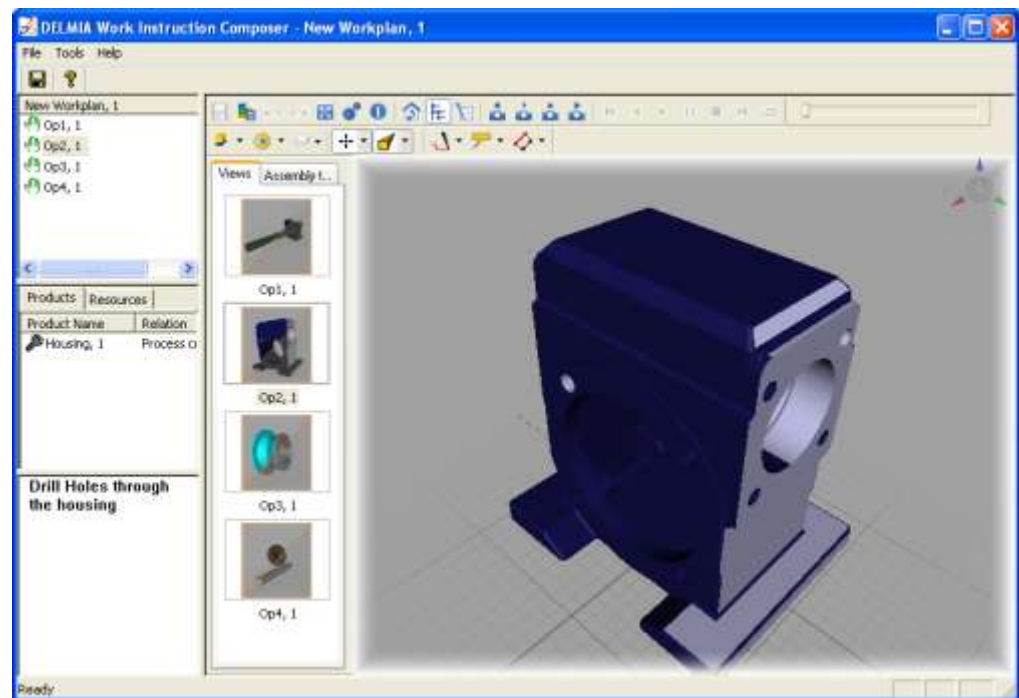


Figure 3: Work Instruction Composer Interface

As illustrated in the image, there is the left-hand panel and the right-hand embedded 3DVIA Player window where views are displayed. The thumbnails are views that map to operations and are displayed on the left of the player window.

4.1 Menu

4.1.1 File

Save As – You can save as an *.smg file to a file system.

Save - This will save all the changes that you have made in WI Composer back to the Manufacturing Hub (MH) database. After saving you can continue working.

Exit - This closes the application.

4.1.2 Tools

Load Volumetric Context – You can load a volumetric context if it already exists for given process.

Define Volumetric Context – You can define the six float values needed to define the bounding box for performing a volumetric query search.

Concurrent Planning Enabler – Two options are available from here:

- Unlock Objects
- Update Process Plan

4.2 Left-hand Panel

4.2.1 Processes

This is a list of processes that are first level children of the loaded process. All the first level children of the loaded process will be queried from MH and will be shown in the list.

You can use the right-mouse click on a given process which will display two choices:

View Properties of the Process – This allows you to see the name and description of the process.

Enrich a Given Process – This allows you to enrich a given product through 3DVIA composer product. The details of Enrich are documented [here](#).

Note: Start, Stop and other Logical Activities have no special meaning in Work Instructions Composer. As a result:

- There is one default view for each Start/Stop, just as there is one default view for each process (operation)
- Views for Start/Stop show the product build up from previous operations. This is not valid for the start process if it has been correctly sequenced before all of its other siblings.
- The views for Start/Stop show all the Products that have been loaded as part of the Manufacturing/Volumetric Context.

4.2.2 Products and Resources

This is a list of products and resources that are assigned to the currently selected process. This list gets updated based on what process has been selected in the Process List. If a MA/MK is assigned to the process, then the name of the MA/MK will be shown in the list.

Here are some notable points:

- The list is presented in the form of tab pages; one tab page for **product** and one for **resource**. In each of the tab page, there are two pieces of information given:
 - The name of the assigned object: This name is consistent with the name shown in the E5 PPR tree for this object.
 - The name of the relation with which this object has been related to the selected process. The list of relations that are supported for product and resources while loading are documented [here](#).
- The name of the actual assigned object will be shown.
 - E.g. There is a "Assembly-A" that has 2 parts - Part1, Part2. The "Assembly-A" has a relation to the process. In the list, only the name of assembly (which in this case is "Assembly-A" will be shown). The children are NOT shown. The children are nonetheless visible in 3DVIA view as well as in the 3DVIA assembly tree.
 - In the above example, if only Part2 is assigned to a process, then the list will only show the assigned "Part2" and will not show its parent Assembly-A.

Cross-highlighting is supported between the product list and 3D View. When the product is selected in the list the part is highlighted in 3D and vice-versa. If you select an assembly, then all the products within the assembly will be highlighted.

4.2.3 Attachments

Once you have associated an attachment to a Process/Operation, then the attachment can be seen in WI Composer. The attachment will be listed in a separate tab page called "Attachments".



Figure 4: Attachments Tab

All available attachments for the selected operation/process will be listed. You can double-click on an attachment and it will open based on what type of the file it is, i.e., *.ppt files will launch in MS Powerpoint, an html file will open in a browser, etc.

This tab page is updated based on what process has been selected in the process list or the view in 3DVIA.

If using Internet Explorer (IE) 6 and multiple hyperlink attachments are selected, only the last one selected will open.

4.2.4 Work Instructions

This is a text editor that allows you to type work instructions or copy / paste them from another application such as MS Word, Notepad, etc. [Details are explained](#) in Chapter 5.

4.2.5 Right-hand 3DVIA View Window

4.2.5.1 3DVIA View Mapped to Operations

The process in the MH is mapped to a View in the 3DVIA player and is a snapshot of the screen properties. You can save and restore them at any time. There is a 1:1 mapping between each of the child processes of the loaded process and each of the 3DVIA Views. The name of the view is the same as operation name that appears in the process list in the left-hand panel. The views will appear in the same order as sequenced in the MH database (Using process_runs_before relationship.).

The 3DVIA View is created fresh when you have loaded for the first time. In all subsequent loads, the previous modifications and edits that you make will be loaded and retained. The name of the view will be the same as the name of the operation. There is a limitation that no two views can have the same name, so please ensure that no two operations in MH have the same name. (Operation in MH maps to a view in 3DVIA.)

4.2.5.2 Embedded 3DVIA Player

The WI Composer application embeds the 3DVIA Player using ActiveX controls.

The same set of commands which are available through the default 3DVIA Player is also available in the embedded ActiveX 3DVIA Player. To enrich the work instructions, you can annotate the part / resources using the set of tools exposed by the 3DVIA Player in a given view.

5. Authoring Work Instructions

If there is a volumetric context defined for a given process, you can use **Tools > Load Volumetric Context** to load that context. Or, you can define a volumetric context using **Tools > Define Volumetric Context**.

5.1 Defining Volumetric Context

When you choose **Define Volumetric Context**, the Define Bounding Box dialog is shown so that you can define a bounding box. You can also see a bounding box in the 3DVIEW window. You can manipulate the bounding box in the 3DVIEW window to define the size of the bounding box visually, as shown in the following illustration.

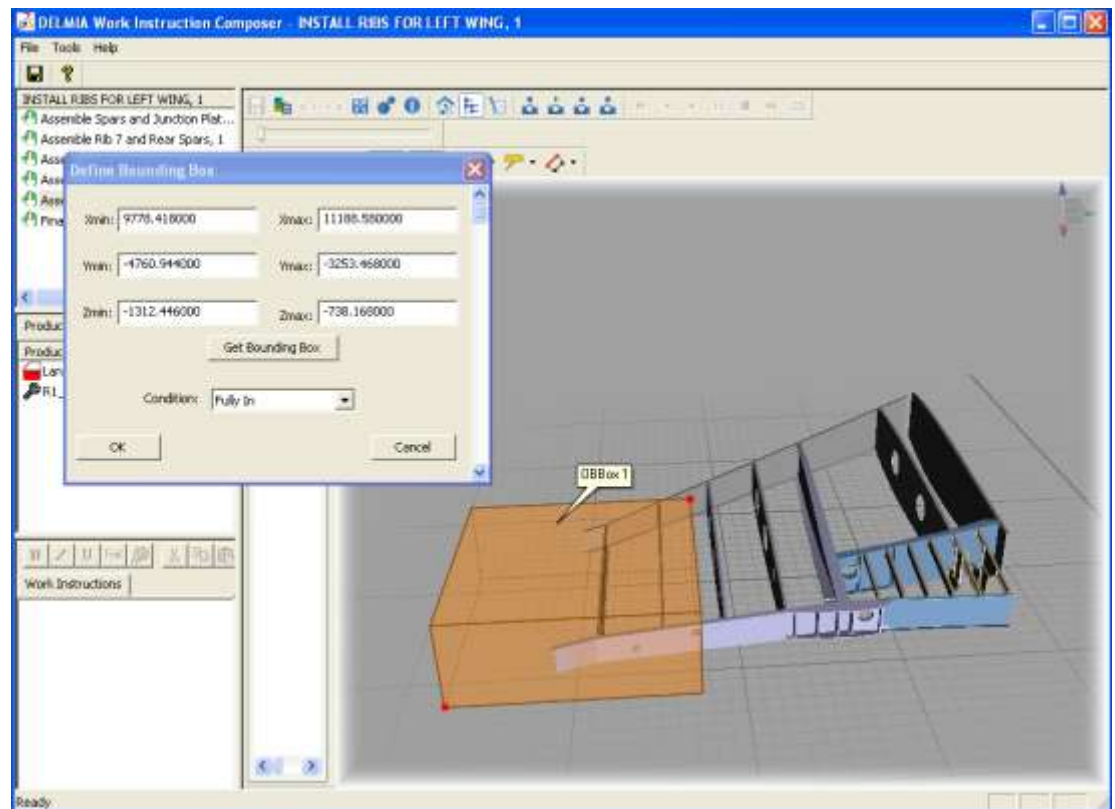


Figure 5 Bounding Box

Once a Bounding Box is defined in 3D, as shown in the illustration above, remember to click the **Get Bounding Box** button.

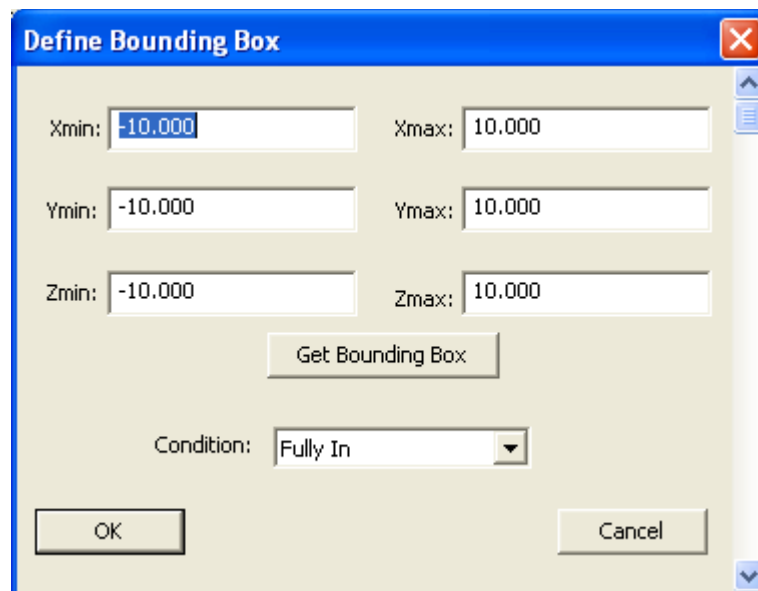


Figure 6 Define Bounding Box

You can enter the six float values; Xmin, Xmax, Ymin, Ymax, Zmin, and Zmax, that define the bounding box and also the criteria for the search – Fully In or Partly In.

- **Fully In:** With this option, the query will search the database for all the parts that are fully inside the defined bounding box area.
- **Partly In:** With this option, the query will search the database for all the parts that could be partly inside the defined bounding box area.

OK: This will launch the E5 query for parts in the bounding box and loads this volumetric context into the session.

Cancel: This will cancel the command.

Once you save the session, the volumetric context will be saved back into the MH as a blob on the loaded process.

NOTE: In order to load any parts through a Bounding Box query, the parts defined in the MH database should have those bounding box limits, otherwise, the software has no values to check against to load.

5.2 Loading Volumetric Context

You can load a volumetric context if it already exists for given process. The previously defined volumetric context will be loaded under a dedicated node calling Volumetric Context under the ROOT node in the assembly tree and you can see these volumetric context parts in all the views.

Note that, if a part/product already exists in the Product List, then it will not be loaded again as part of the volumetric context.

5.2.1 Right-mouse Button

You can use the right-mouse button and click on a given process in the process list. Two more options will be available.

5.2.1.1 Properties

You can query the properties for the selected process. Currently, the software only supports the Notes attribute defined on the process.

5.2.1.2 Enrich

Standalone 3DVIA. You can select a given process and launch a standalone 3DVIA Composer session only for that operation. When a standalone 3DVIA composer is launched, the WI Composer window will be unavailable and will be reactivated only after you have closed the standalone 3DVIA Composer session. There is no multi-selection supported for this option. Once in 3DVIA composer session, you can enrich the view by adding more annotations, markups, etc.

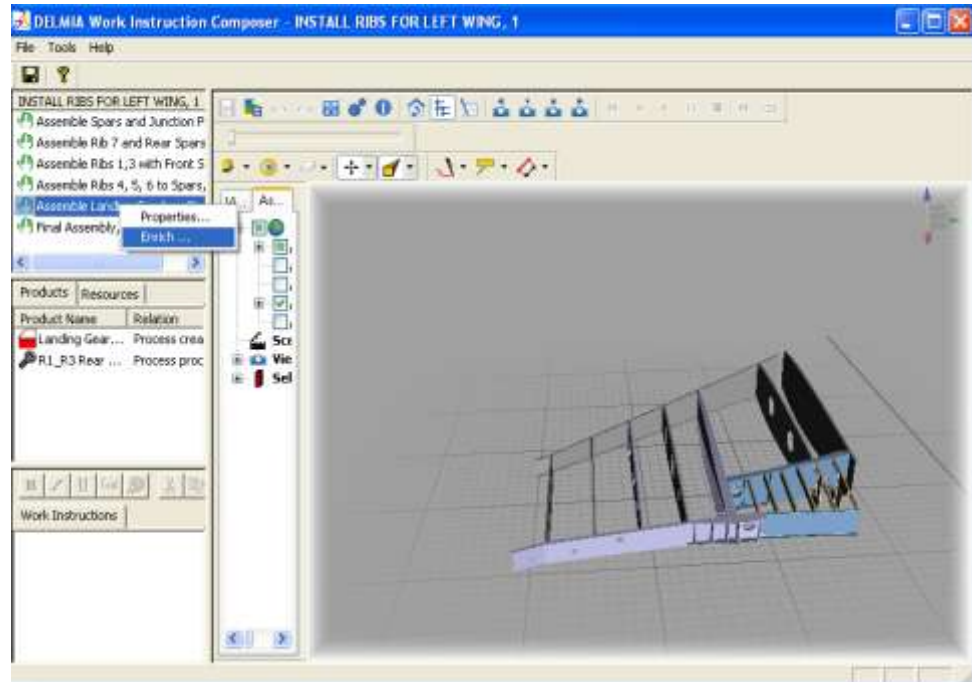


Figure 7 How to Launch Enrich

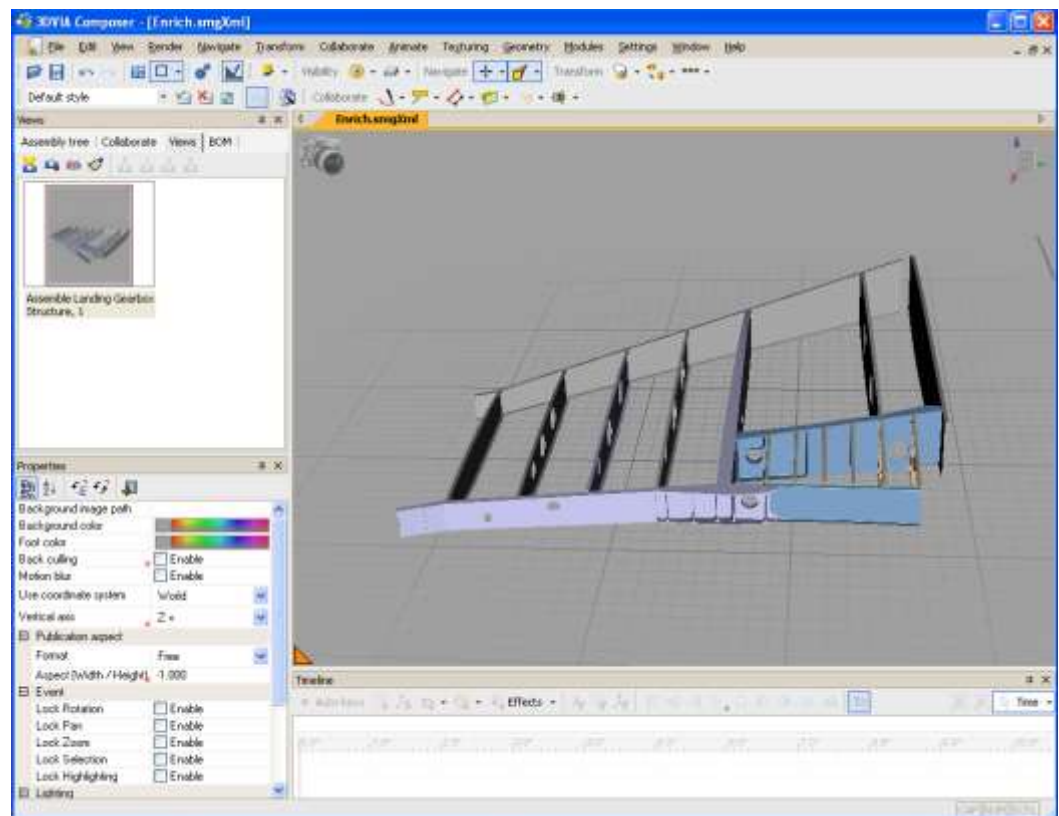


Figure 8 View Launched in 3DVIA Composer Session after Enrich

After adding the annotation / markups, etc., you need to complete Update View to see the changes and save the file. Once you exit the 3DVIA Composer, you can see that the changes you made are automatically synchronized in the WI Composer.

NOTE: It is mandatory to use **File > Save** in order to see the changes back in the WI Composer.

Currently, Creating Animations is not supported and is not synchronized back into WI Composer from a 3DVIA Composer session.

Creating Multiviews in 3DVIA. You can create multiple views for a given operation and save those in the Manufacturing Hub.

While in Enrich mode add new views. When the 3DVIA composer session is saved and returned to WI Composer, the new views will be associated to the Operation on which Enrich was launched.

- If you make changes to a given view then the change is visible only for that view. Example: Op1 has three views: V1, V2, V3. Add an annotation to V2 to change it. That change will only apply to V2.
- If you create multiple views associated to an operation in a previous session, then in the next session, you can choose to remove the view in 3DVIA Composer and the changes will be synchronized. However, if you delete ALL views, then the software will still retain at least one view for the operation.

If you add any new part or resource to the operation, then, when you load the operation each view corresponding to the operation will show the newly added part or resource. Or, if you removed or unassigned a part from the operation, this this will be removed from all views corresponding to the operation.

Any change you make to an individual view will be maintained when the views are loaded from the MHub.

Multiple Views behavior in WI Composer.

- When you double-click on an operation in the left-hand panel, if there are multiple views associated with the operation, the “first” view will become the active view by default. To make a different view active, double click on the thumbnail associated with the view.
- If you are using step through commands with the VCR controls, the software will also step through all the available views. This is because the views are always in sequence in WI Composer and the Next button will go to the next view for the current operation.
- Each view that is associated with an operation will follow the life cycle of the operation. If the operation is deleted, it will also delete all views associated with the operation.

Multi Views Limitation. While running step through commands in WI Composer, the system will walk through each individual view corresponding to the operation. This is because in 3DVIA, the views are always in a sequence and are not structured. So if Operation1 has three views and Operation2 has two views, then all five views are in sequence and the Step Through function has to pass through each of the views.

5.2.2 Single click selection

If you select a process with a single click, then the following will happen:

- The Products and Resource list will be updated to show the assigned objects for this selected process.
- In 3DVIA, the view corresponding to this operation will be selected, that is, the thumbnail in the left side will be selected.
- The Work Instruction, if any, for this process will be shown in the Text editor pane.

If you make a multi-selection, then the single-click behavior will apply for the first selected process, as it is impossible to synchronize product/resource lists for multiple operations!

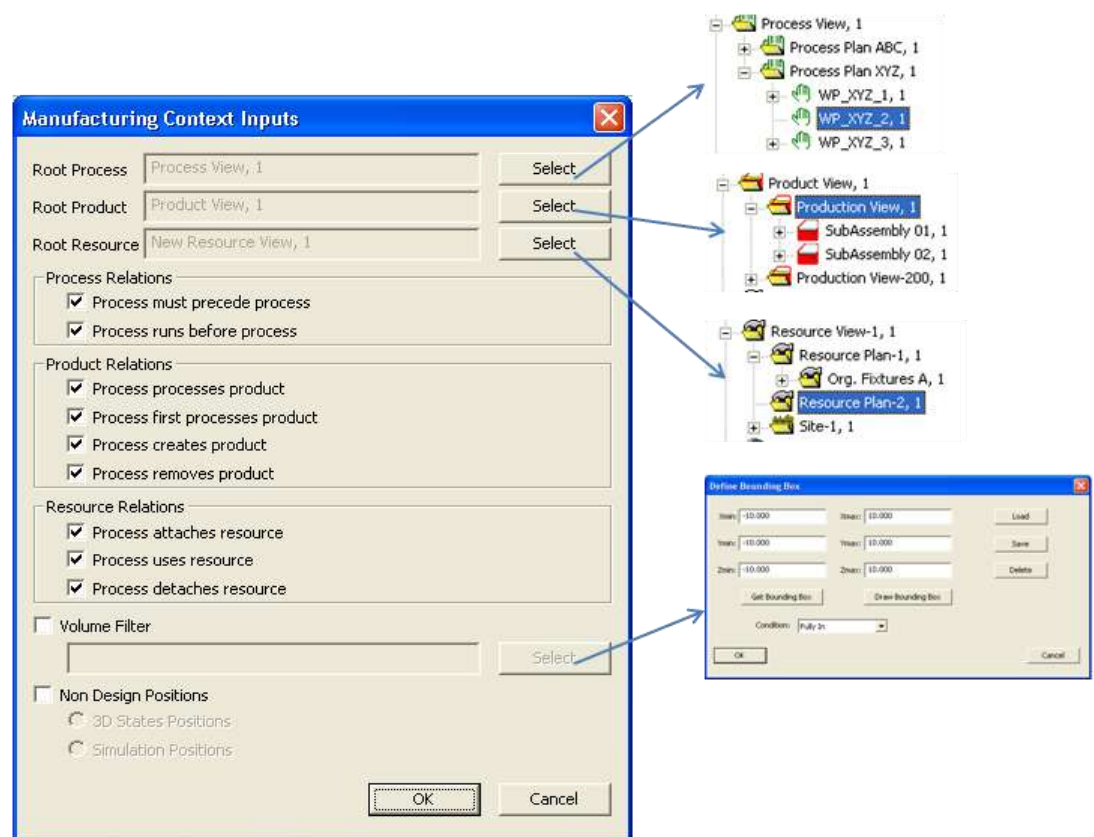
5.2.3 Double click selection

If you double click on a process, all the actions mentioned above for a single click will happen. In addition, the 3D view will be updated and the view corresponding to this selected process will become the active view. If you make a multi-selection, then the double-click behavior will apply for the first selected process as it is impossible to synchronize product/resource list for multiple operations.

5.3 Computing the Manufacturing Context

You can compute the manufacturing context for the loaded process based on the current configuration and the loaded output products.

To use the command, select **Tools > Compute Manufacturing Context..** The **Manufacturing Context Inputs** dialog box appears:



When you execute **Compute Manufacturing Context** for the first time inside a WI Composer session, the dialog box is filled with the context inputs from **Context Specifications** in DPE. For the later executions of the command, the dialog box is filled in with inputs used during previous execution of the command. If there are no **Context Specifications** in DPE, the dialog box opens with default values.

Once you have selected the required options in the dialog box and clicked OK, then the manufacturing context is computed for the configuration selected while opening the project in DPE client.

- The name of the main context node changes from **Volumetric Context** to **Manufacturing Context**..
- WI Composer builds the hierarchy between output parts and shows them under the **Manufacturing Context** node.

5.3.1 Manufacturing Context Input Dialog Box

The options for the dialog box are:

Root Process:

This option defines the process scope for the context computation, i.e., only those preceding processes that are inside this scope are used in the computation. To select a **Root Process** object, click the **Select** button and then a dialog box with process tree structure of the project available in the Manufacturing Hub appears. To choose a particular process as root process, select that process in the tree and click **OK**.

Root Product:

This option defines the product scope for the context computation, i.e., all products returned after computation are under this scope. To select a **Root**

Product object, click the **Select** button and then a dialog box with product tree structure of the project available in the Manufacturing Hub appears. To choose a particular product as the root product, select that product in the tree and click **OK**.

Root Resource:

This option defines the resource scope for the context computation, i.e., all resources returned after computation are under this scope. To select a **Root Resource** object, click the **Select** button and then a dialog box with resource tree structure of the project available in the Manufacturing Hub appears. To choose a particular resource as the root resource, select that product in the tree and click **OK**.

Relations Used during Context Computation:

You can select the relations to be considered for the manufacturing context computation in the dialog box. Most of the relations are inclusive with the exception of Process Removes Product and Process Detaches Resource. These remove objects from the context.

Type of Relation	List of supported relations
Process Relations	<ul style="list-style-type: none"> - process_mustprecede_process - process_runsbefore_process
Product Relations.	<ul style="list-style-type: none"> - proc_processes_prod - proc_creates_prod - proc_firstprocesses_prod - proc_removes_prod
Resource Relations.	<ul style="list-style-type: none"> - process_attaches_resource - process_detaches_resource

Volumetric Filter:

This option defines the bounding box scope for context computation, i.e., all the products and resources returned after computation are within these bounding box constraints. To launch the **Define Bounding Box** dialog box, select the check box, then click the **Select** button. For more information on defining the bounding box, see [Defining Volumetric Context](#).

Note: Unless the check box is selected, the volumetric filter values are not applied during the context computation even if the bounding box values are defined.

Non-Design positions:

You can choose to specify the positioning of Manufacturing Context parts. You can chose to apply either 3D States positions or simulation positions, but not both. Based on the option selected, the context parts are loaded in:

- **Design Positions:** These positions are defined while designing the product structure in DPE. By default, context parts are loaded in the design position if no other option is selected. Also by default, all the position information is not queried from DPE; only the relative position information between the context products is queried and applied on the parts. Querying the total position information from DPE is a PCS-intensive step.
Note: If you want to view the context parts in exact positions as they are defined in product structure, then set the option **wkc_apply_position_for_context** to *true*. . This option is available in DPE Tools->Maintenance Tool->Global->ErgoPlan->wkc.
- **3D States Positions:** These positions are defined in context of a particular process. The same part can be placed at multiple locations in a single project in the context of different processes, e.g., the same screw driver could be used to tighten fasteners at multiple locations. Defining manufac-

turing positions involves 3dstates and positions for a particular part or assembly.

- **Simulation Positions:** These positions are an outcome of performing actions defined in a process simulation, e.g., in an assembly move operation, a part could be moved from one location to another. The simulation positions are created with the V5 **Publish Simulation Position** command.



Notes

- When you load a context with one of the non-design position options but there is no non-design position information available on a particular part, that part will be loaded in design position.
- When non-design positions are applied on context parts, by default the context parts are placed in non-design positions. You cannot see them moving from design position to non-design position when you switch between the views (This behavior is different from the **Apply 3d states and positions** functionality, where in the application simulates a part to move it from its design position to a non-design position).

5.4 Selecting from the Product / Resource Lists

From the Product or Resource list you can:

- Use a single click on a product or resource, which will show the item selected in the 3DVIA Player window. The product or resource will be outlined in the chosen color and in the assembly tree of 3DVIA. You can perform multi-select of products or resources.
- Double-click on a product or resource. This will zoom the view in the 3DVIA Player window and be reframed to the selected product or resource. It will be highlighted in the assembly tree of 3DVIA. You can perform multi-select of products or resources.

5.5 Using the Work Instructions Text Editor

The text editor allows you to apply Rich Text Format (RTF) to Work Instructions. Font, font size, bold, italic, underscore, and text color are available via buttons in the text editor. Additionally, the formatting will be imbedded when the data is saved to the Manufacturing Hub and restored when the data is loaded again. The RTF enriched text can be extracted from the MES partners and can be displayed in their viewers.

You can copy / paste from other applications such as MS Word or Notepad. If the text is RTF, it will be preserved in the copy/paste from another application.

5.5.1 Work Instructions Library

A Work Instruction Library contains sets of instructions which provide more details of how a specific Process needs to be carried out. The library can contain one or more such instruction items. The library is defined and stored as an object in the MH database as part of a Plan Type Set. In a real time scenario, the WI Library is expected to be defined/authored by an administrator.

You can create a set of libraries for different work situations in the shop floor. For instance, a DRILL LIBRARY, PAINT LIBRARY, etc. Once the libraries are

defined, you can define Library Items (LI) that will contain text with details of the work instructions.

The picture below shows a sample LI defined in DPE:

Work Instruction Library Item <Machine Drill>

Properties

General

Name: Machine Drill

Identifier:

Hyperlink:

Text: Drill holes of diameter [Diameter] using a machine drill.
Follow the specification number SPEC 9087 as mentioned in the FAA regulations

Obsolete: ☐

Assigned V5 Script

Script Name:

Parameter List:

Figure 9: Work Instruction Library Item Properties

5.5.1.1 Ability to choose a Library Item in WI Composer:

Once you have associated a WI Library to a WIText plan type, you can choose this library and the LI inside of this library to automatically copy the text from this template and make a Work Instruction from it.

Use the right-mouse to select text editor. Using the right mouse button, you can select a work instruction library and library item.

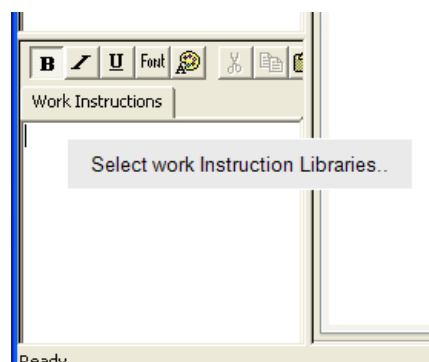


Figure 10: Work Instruction Library List

Once you have select a library item, you will see a preview of the text.

Shown below is an example.



Figure 11: Work Instruction Library Item Preview

When you click OK, the text shown in the preview will become the WI text in the WI Composer. You can edit this text field and enter values for the text fields; here shown as <Diameter> and <Angle>.

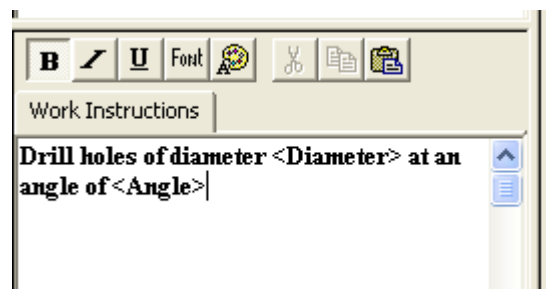


Figure 12: Editing Text Field

5.6 Concurrent Planning Enabler

You can make changes in the Process Engineer even when a Work Instructions Composer session is open. There are two commands available:

- Unlock Objects
- Update Process Plan

5.6.1 Unlock Objects

The following objects will be unlocked in Manufacturing Hub using this command:

- The Loaded Process plan (like Workplan) and all the children of the Workplan will be unlocked so that you can add/delete/edit Operations and WIText.
- Products and Resources will be unlocked so that you can change the assignments and/or make any other editing that Process Engineer permits.

Once you click on this command, you will be prompted to save any of the changes you have made in the WI Composer. Once you make a selection, the File > Save is not available. This is to ensure that you don't make any changes in WI Composer after the locks on objects have been released.

You cannot make or save changes until you click **Update Process Plan** and exit Unlock.

5.6.2 Updating a Process Plan

Selecting the **Update Process Plan** command will enable you to see, in WI Composer, the changes that have been made on the Process Engineer side. The WI Composer will be synchronized with the changes made in DPE.

After the software makes all the changes to update the process plan, the **File > Save** is available so that you can continue working in WI Composer.

The following cases are supported through the **Update Process Plan** command.

5.6.2.1 Adding an Operation

If a new operation is added to an existing set of operations underneath of a parent, then during update process, a new View will be inserted in WI Composer corresponding to the new added operation. The update mechanism will respect the sequence of the addition. That is, if an operation Op3 has been newly added between Op2 and Op4 and is sequenced, then it will be shown in the same sequence even in WI Composer. But if the operation has been inserted arbitrarily under a Workplan, then the order in which the View corresponding it will appear in the WI Composer is not guaranteed, because there is no logic underlying for the software to display. The tree display is not a good indicator for the order of objects.

5.6.2.2 Deleting an Operation

If an existing Operation is deleted from an existing set of operations beneath a parent, then during Update Process Plan, the view corresponding to the deleted operation will be removed from the WI Composer session. The update mechanism will respect the sequence after deletion, meaning, if an operation Op3 has been newly deleted between Op2 and Op4 and re-sequenced in DPE, then it will be shown respecting that order even in WI Composer.

5.6.2.3 Changing the Attribute of the Operation

Changing Name and Notes attributes of Operations will be reflected in WI Composer.

The operation and view name are the same. Therefore, when the name is changed in DPE, the view is renamed in WI Composer to match the new operation name. In addition, the NOTES information and balloon help is changed.

5.6.2.4 Re-sequencing the Operations

When a sequence of operations is changed in DPE, the corresponding WI Composer sequence for each operation will reflect the re-sequencing. The product build-up computation will change accordingly.

If the sequence has been completely changed, the software performance will be affected because of the massive recomputation that has to be completed to ensure proper product build-up and correct resource display.

5.6.2.5 Assigning / Unassigning New Parts / Resources to the Operation

If you change the assignment of parts/resources to operations, the update mechanism in WI Composer will reflect this change. Each of the views for the operations will be updated to manage the visibility of products/resources as established with the assignments.

The product build-up is also recomputed to reflect the assignment / un-assignment of products and resources. The principal rules on which product build still remains unchanged; meaning, it is still based depending on the types of relations used to assign the parts and resources to the operations

5.6.2.6 Changing the Attributes of the Product / Resource

If you change the name of the products / resources that are assigned to the operations, then the correct names will be displayed in the Product and Resource lists that are shown for each Operation. The same changes are also made in the assembly tree in the 3DVIA window.

5.6.2.7 Effect of 3DVIA Composer Settings on Visibility

The settings you use in 3DVIA Composer have an impact on the visibility of objects in Work Instructions Composer. In most cases, your 3DVIA Composer settings do not confound your Work Instructions Composer settings. However, if in 3DVIA Composer, you:

- select Enrich-Module-View,
- do not enable visibility for an object,
- and set the object to either current selection or all parts

then consult the table below to ascertain the expected visibility.

If...	Then...
if the view is created in 3DVIA Composer with above settings, and the view is not the first view	It behaves as it was set to behave in composer, with all parts are visible (double click), regardless of the visibility setting.
The view is created in 3DVIA Composer with above settings, and the view is the first view and "Load On Demand" LOD) is disabled (set DEL_WIC_DISABLE_LOD=TRUE,)	All parts are visible.
The first view is not created with above setting,	The visibility in Work Instructions Composer is as expected: i.e., display visible parts, hide invisible parts.
LOD is not set (default) or set to FALSE	No parts are visible, since no part is loaded yet.

5.7 Using the Embedded ActiveX 3DVIA Player

This product allows all the native user interface capabilities provided by the ActiveX 3DVIA player such as, selecting an object from the assembly tree, double-clicking, etc.

Some methods of selecting objects in the left-hand panel of WI Composer are described below:

5.7.1 Double-click on a Product

When you double-click on a product in 3DVIAView or in the Assembly Tree, the camera will zoom on the product selected, which is general 3DVIA behavior, and the product will also be highlighted in the list view of products and resources (WI Composer behavior).

5.7.2 3DVIAView Thumbnails

The views in 3DVIA that map to the processes will be sequenced in the same way that they are sequenced in the MH with a "Process runs before Process". Also, the ActiveX 3DVIA player does not support capabilities such as Adding a View, Deleting a View, or re-sequencing the views; therefore all these operations need to be done only through the left side panel of the application.

5.7.3 Double-click on a 3DVIA View Thumbnail

When you double-click on a view thumbnail, the process corresponding to that view will be selected and highlighted in the list. The Product/ Resource List will also get synchronized to show the products and resources for that selected process.

If you have made edits in the views, then you need to update the view in the embedded 3DVIA player.

5.7.4 Product Build-up View in 3DVIAView

You will have the ability to see a build-up of the products in WI Composer.

5.7.4.1 Product Build-up

When the higher level process such as a Workplan that aggregates processes is loaded into WI Composer, the processes are loaded along with their assigned products and resources. There is one 3DVIA View generated for each of the processes. You can navigate through the different views using the Play View buttons in the player.

5.7.4.2 Behavior of product build-up with different relations

Process Runs before Process

The product build-up is computed based on the "Process Runs before Process" relation between processes (aka Control Flow in DPM V5 terminology). So the product build-up will be shown as long as there is a control flow link between the processes. If there is no link /or the link is broken, then the product build-up will not be shown for this unlinked process.

If you initially had no links, then when this process is loaded in Work Instructions Composer, there will be no product build-up. However, returning later to Process Engineer and connecting the process, the next time data is loaded in

Work Instruction Composer, the views will show a product build-up. In other words, at load time, the software will compute the build-up properly in accordance with the control flow links in the Manufacturing Hub database.

Process Processes Product

Process First Processes Product

Process Creates Product

The Views will show a cumulative build-up of the products if the parts/products are associated to a process with any of the three above-mentioned relations.

Process Removes Product

If a product is associated with a Process Removes Product relation for a given process, then that part/product will be removed from the build-up for that process.

Process Attaches Resource

Process Detaches Resource

There is no concept of Resource Build-up. But the Process attaches resource relation has a special consideration. If a Resource has been assigned to a process with a Process attaches resource relation, then that resource will continue to be shown in the all the views in the sequence until there is a relation of type "Process detaches Resource" to that same resource. When there is a process detaches resource, then from that point onwards this resource will not be shown in the subsequent views.

Process Implements Requirements

There is no build-up shown for the parts associated with the Process Implements Requirements (PIR) relation. Only the entities that are associated with the current process will be shown for the PIR relations.

NOTE: Only the products are included in the build-up. It does not include dress-up, i.e., markups, annotations, etc., from one view to another.

5.7.4.3 Override of Product Build-up

You can manage the hide/show of the products manually in a given view (ex: in the 3DVIA assembly tree user can check/uncheck the box to show/hide the products). In that case, the software will respect the hide/show setting as made by the user. You will have the ability to see a build-up of the products in DELMIA Work Instructions.

5.8 Viewing Engineering Requirements and Black Box Components-

The Engineering Requirements / Black box components that are associated with an operation are displayed in the "Product List" as illustrated and described in the following paragraphs and illustrations. Additional information on Engineering Requirements can be found in V5 documentation: *"DPM Process and Resource Definition – Engineering Requirements Planning"*.

5.8.1 Engineering Requirements

The name of the part that contains the Engineering Requirement (ER) along with the Functional Tolerance Annotation (FTA) and the geometric object that was assigned to the operation in DPM V5. The name displayed here is consistent with what is seen on the relation object in DPE client as well.



Products		Resources
Product Name		Relation
	PART FlagNote.1 + Point.1	Process Implements Requirements (Partial)
	PART FlagNote.1 + Point.2	Process Implements Requirements (Partial)

Figure 13 Engineering Requirements

5.8.2 Black Box

The name of the black box part that is planned for the operation is shown.

The product list shows each of the individual parts inside the blackbox that are associated with the selected process. When you select one item in the list, that entry is highlighted in the 3D view.

Products		Resources
Product Name		Relation
	BlackBox Prod Part-B	Process Processes Product
	BlackBox Prod Part-A	Process Processes Product

Figure 14 Black Box listing

For example. If you select BlackBox / Part-A on the list, then Part-A is highlighted and it is also highlighted in the assembly tree.

When you double click on an entry, the 3D view is zoomed to that specific part inside the BlackBox.

6. Saving Work Instructions

Use **File > Save to Manufacturing Hub** to save the data that has been created in the WI Composer application back to the MH.

6.1 Filters

All WI Composer authoring, mark-up, etc., is recorded against a given filter setting that was used for loading. The filter settings for the entire WI Composer session is the same as the filter setting that was used when the DPE project was opened.

While loading data in WI Composer, a check is made to determine whether the filters of the process that is being loaded match the filter of the other project. If the filters match, the WI Composer is opened in Edit mode, otherwise, WI Composer will be opened in a read-only mode.

6.2 Data Saved

The following data will be saved back to MH from the WI Composer application

- [Work Instruction Texts](#)
- [3DVIA Views containing the View-specific data](#)
- [3DVIA XML file on the loaded Process node](#)
- [Volumetric context](#)

6.2.1 Work Instruction Texts

The work instructions text can be authored in a simple text editor in the WI Composer application. This data will be saved as a Work Instruction object created directly under the operation. After saving the data back to the MH, you can see the textual content of the string within the Display Text box as shown in the illustration.

If a WI Text has been created by inserting from an existing WI Template Library, then when this WI Text is saved, the software will manage a link between the Library Item and the WI Text. This can be useful when you want to run an impact analysis tool to determine which WI Text objects need updates if a Library Item were to be changed.

In this example, the work instruction *“Drill holes of diameter 10 mm” under Assemble Spars and Junction plate, 1* was created. When saved, a new WIText activity was created and the Display Text box is filled with the same textual content.

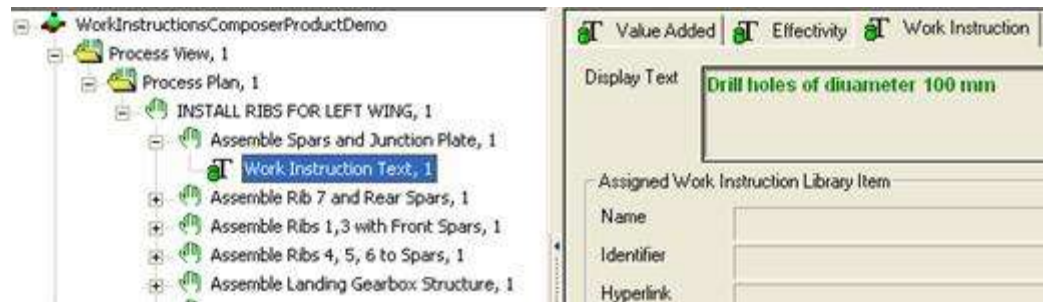


Figure 15: Display Text Box

There can be only one WIText activity under a given operation. When this operation is reloaded into the WI Composer session, the same display text is shown and you have the choice to edit the text.

IMPORTANT: To save Work Instructions text in MH, the WITextplantype should be customized to be an authorized child of the operation for which the Work Instruction is being authored.

6.2.2 Volumetric Context

If you have [defined a volumetric context](#) in the WI Composer application, during the Save, this volumetric context will be saved as an XML blob on the loaded process.

7. Generating E5-Shop Order Release Data

With the E5-Shop Order Release product (SO1), you can generate only PPR and WI Composer data without V5-data. This combination of data is referred to as a shop order instance (SOI). Using the extracted SOI, Shop Floor workers can see the same 3D visualization and mark-ups, measurements, and annotations as a planner sees while authoring in Work Instructions.

To generate this data, you can use the **DELE5SOR.exe** executable, which is found in the **~DELMIA\PPRClient\program\bin** directory.

To run the executable, enter:

```
D:\DELMIA\PPRClient\program\bin>DELE5SOR.exe -objectid "$id$(0:0-274511#0, 218)" -projectid "$id$(0:0-234105#0, 168)" -username admin -userpassword admin -filtersettings "00008<Global>0003100015<Mod-Statement>00001000000" -soidir D:\temp\E5SOIOutputDir -context "Manufacturing Context" -position "3D_States" -light -mapping
```

Where:

Option	Description	Mandatory?	Sample	Possible Values
-objectid	DPE Process ID	Yes	"\$id\$(0:0-274511#0, 218)"	-
-projectid	DPE Project ID	Yes	"\$id\$(0:0-234105#0, 168)"	-
-username	DPE User Name	Yes	admin	-
-userpassword	DPE User Password	Yes	admin	-
-filtersettings	Project filter settings	No	"00008<Global>0003100015<Mod-Statement>00001000000"	The filter settings values should be obtained from the DPE project attribute activefiltersettings
-soidir	Path for the output	Yes	D:\temp	-
-context	Name of the context to load	No	"Manufacturing Context"	"Manufacturing Context" "Volume Context" "OnTheFlyMfgCxt"
-position	Type of position info to apply	No	"3D_States"	"3D_States" "Simulation_Positions"
-light	Enable light PackNGo	No	No value required	
-mapping	Generate mapping XML	No	No value required	

Notes:

- Run the E5-VB Script to get the **activefiltersettings** attribute for the project, then use that as the argument for **-filtersettings**.

- The **–position** option is not related to the position of context parts; it applies positions to the parts directly linked to the operations..
- For a process plan that has the **–position** option specified , you can extract 3D states or simulation position states (but not both). The simulation positions are created with the V5 **Publish Simulation Position** command.

7.1.1 XML Mapping

The output of E5 SOR is sent to an MES system. On the shop floor, the MES system displays the data in a viewer, which enables shop floor personnel to:

- See the Process/Product/Resource/Work Instruction data
- See the 3D geometry and dress-up in an embedded 3DVIA Composer Player
- Cross-highlight the shown Process/Product/Resource and the 3D geometry

The Mapping XML is a file that E5 SOR generates. It tells the MES viewer which 3D geometry to highlight when a Process/Product/Resource is selected.

The Mapping XML should not be confused with the Job XML that is generated by V5 SOR. Please refer to the documentation for V5 SOR for details on Job XML.

Since only products/resources linked to processes are loaded into WI Composer, there is no Work Instruction information listed in the Mapping XML, insofar as there are not products or resources to highlight when users select a Work Instruction.

8. Limitations

8.1 Limitation #1

The “Process List” only shows the first level child processes. There is no capability to see a deeper level of children. There is no access for the different properties of the process other than “Description” (or Notes) for a given process. Also, there is no capability to ‘Add Operation’, ‘Remove Operation’, ‘re-sequence’ or to ‘assign products and resources’ within this application

8.2 Limitation #2

The system does not bring in Precedence Constraints information from MH. and there is no support for parallel processes. If there are parallel processes under a given parent, then the system will randomly serialize the processes that are in parallel and when saved in the database this will change the sequence.

8.3 Limitation #3

The only attributes that you can see for the product in the list view is the name of the product that is displayed. There is no access for other attributes of the product or resource. You cannot assign resources or MA/MK to processes in WI Composer.

8.4 Limitation #4

ER Limitation

When the assigned Engineering Requirement (ER) information is displayed in the Product list, it is not possible to display the name of geometric set, if any, in which the ER is residing.

8.5 Limitation #5

Build-up Limitation #1

The build-up is based on the "Process Runs before Process' relation. It is not based on precedence constraint, so you must create runs before relation to see the build-up behavior. If there is a broken link between the processes, then the build-up will not be shown from that point onwards.

8.6 Limitation #6

Build-up Limitation #2

There is no build-up of the annotations, markups, etc., that are created in a previous view. The software will do a build-up only for the products.

8.7 Limitation #7

Build-up Limitation #3

In order to see what products are associated to a given process during a build-up, you need to use the left view - the one that shows product list - and make a multi-select it to see all the assigned products.

8.8 Limitation #8

No two operations in MH should have the same name because two views cannot have the same name in 3DVIA.

8.9 Limitation #9

When the volumetric context is loaded, the parts that are in the list of volumetric context are not filtered for a configuration. In addition, the software does not remember the bounding box a user has created in a previous session, so when the user wants to alter any Bounding Box query, the bounding box is not auto-populated from the previous session.

8.10 Limitation #10

Attachments

There is no capability to create attachments in WKC. You can only read something that is authored in DPE.

8.11 Limitation #11

Attachments

If the web browser is IE6.0, and you select multiple hyperlink attachments to open them, only the last hyperlink attachment will open because IE6 cannot support opening in multiple tabs.

8.12 Limitation #12

Library

Non-text attributes of a Library Item, such as hyperlink, parameters, scripts, etc., are not supported if you create an instance of work instruction from the Library Item. The only attribute that is used is the text of the Library Item.

8.13 Limitation #13

Library

There is no automatic update of all associated work instruction text objects if the library item from which it has been instantiated from changes. But the software does save a link from the work instruction to the Library Item. This link can be queried in the DPE to find out the impacted work instruction texts if a Library Item is changed.

8.14 Limitation #14

Library

The Libraries and Library Items posted for selection in WI Composer are only the ones that are associated with WIText Plan type. There is currently no support for any other plan types.

8.15 Limitation #15

Attribute-25 is not available for Work System Components

Work System Components can use the attribute **strattr_15**. If this attribute has already been used, you can specify an alternate name of the attribute through an environment variable **MH_3DVIA_SMGGRAPHIC_WSC**.

9. Best Practices/Methodologies

WI Composer will load the geometry that is already created and stored somewhere in the file system. The geometry files are to be generated using the 3DVIA Sync tool. There are different options provided in the 3DVIA Sync to generate the files and the choice of the right option is based on the user scenario.

It is observed that in some cases during “Main WKC load” or during “Context load” or “Context query” the “Server Busy” message appears. This indicates that WKC had requested a query to DPE server and it has not responded in the specified time.

By default, 5 minutes is set for “Main WKC load” and 45 Minutes for “Context load” and “Context query”. If server does not respond within this time the “Server Busy” message appears. Based on the data complication, you can control this time with the help of environment variable:

`DEL_WIC_SERVER_TIMEOUT_MINUTES`. The value to be set for this environment variable is the number of minutes after which the “Server Busy” message appears; if there is no response from DPE server for a query by WKC. If value is set in the environment variable then it is applicable for all “Main WKC load”, “Context load” and “Context query”. This message does not stop any processing in the background and disappears when background processing is complete and “Retry” is clicked. This message helps to identify the problem in communication network.

10. Glossary of Terms and Abbreviations

Terms	Abbreviations
Bridge	EH-MH Bridge
DPE	Process Engineer
EH	Engineering Hub
FTA	Functional Tolerance and Annotation
IPD	Integrated Process Database
LI	Library Item
MA	Manufacturing Assembly
MH	Manufacturing Hub
MK	Manufacturing Kit
PAR	Process Attaches Resource
PCP	Process Creates Product
PDR	Process Detaches Resource
PFPF	Process First Processes Product
PIR	Process Implements Requirements
PPP	Process Processes Product
PROR	Process Runs on Resource
PRP	Process Removes Product
PUR	Process Uses Resource
SMGXML, SMGGEOM, and SMGVIEW	These are the different file formats for reading / writing the data that is understandable to 3DVIA applications
SOI	
SOR	Shop Order Release
3DVIA	3DVIA is a brand in the Dassault portfolio
3DVIA Composer	Application that allows user to author mark-ups, text, annotations, etc.
3DVIA Player	Free downloadable viewer application that allows you to view the data created using Work Instructions Composer and to make basic mark-ups, annotations authoring, etc.
3DVIA Sync	Application that allows user to convert data from CAD vendors to SMG format, etc.
WI Composer	Work Instructions Composer

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