SAP Manufacturing Execution

How-To Guide



How to Set Up and Use the SAP ME Work Instructions Feature

Applicable Release: ME 15.1 FP01

Version 2.5

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Document History

1.0	Document creation	Chet Moutrie
1.1	Added information on setting up a site in IIS, information for POD and NC Client configuration and Change Alert	Chet Moutrie
1.2	Replaced actual SAP server name with a phony server name.	Chet Moutrie
2.0	Updated for SAP ME 6.1	Chet Moutrie
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2.2	Replaced embedded 3D model with hyperlink to it	Chet Moutrie
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2.4	Updating in support of missing requirement. Section 3.3.1	Charlie Cutler
2.5	Updating in support of new HTML 5 Viewer functionality under section 5.1.1.2	Charlie Cutler

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1 Introduction

1.1 Purpose

The SAP ME How-To-Guide for the Work Instructions (WI) feature is intended to provide sufficient information to enable the feature to be easily configured and readily utilized to meet business needs, making use of available best practices.

1.2 Scope

This information covers all aspects of the WI feature and how to set it up.

1.3 Glossary

HTTP	Hypertext Transfer Protocol - a networking protocol for distributed, collaborative, hypermedia information systems
IIS	Internet Information Services – a Microsoft Web server product
ME	Manufacturing Execution
POD	Production Operator Dashboard
URL	Universal Resource Locator - a specific character string that constitutes a reference to an Internet or network resource
WI	Work Instruction
Work Instruction	Information, in any format and media, which can be displayed to assist someone in correctly performing a work task

2 Work Instructions Overview

This overview provides a high level description of the SAP ME Work Instructions (WI) feature.

2.1 Description and Applicability

The Work Instructions feature enables the display of work instruction information, in any format and any digital media, on the client device. The work instruction can be associated with various SAP ME objects and can be accessed directly from an SAP ME Production Operator Dashboard (POD). The WI feature is applicable to any situation where an individual is performing a task and may need instructions, guidance, demonstrations, examples, etc. to ensure that the task is performed correctly.

2.2 Business Purposes / Functions

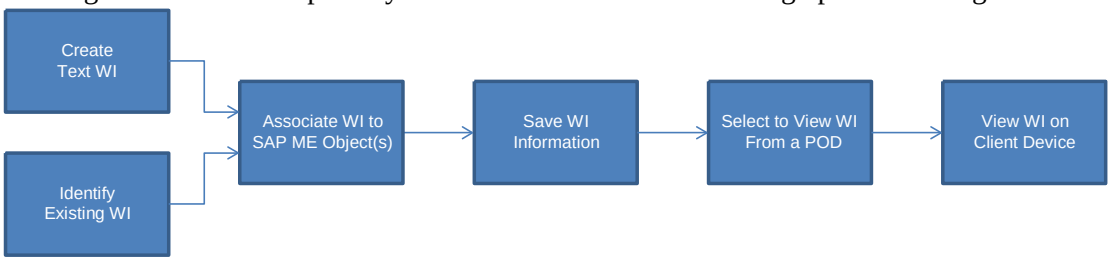
The primary purpose of the WI feature is to deliver instructional information to a worker, when and where they need it, with minimal effort required by the worker to obtain the information.

To accomplish this, the WI feature provides capabilities to:

- Create textual work instructions
- Identify existing work instructions in any format and any digital media
- Associate work instructions to SAP ME objects
- Access work instructions from any POD
- Display work instructions on a client device
- Track work instructions viewed

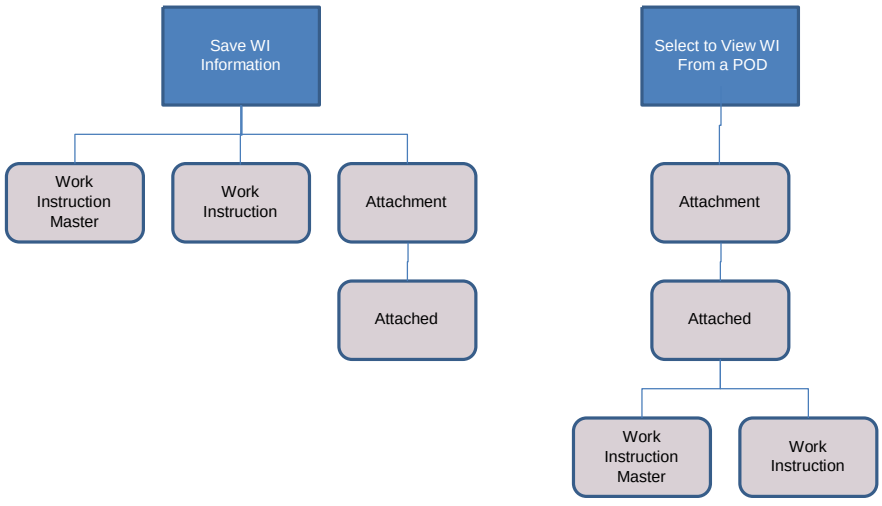
2.3 High-Level Process Flows

This figure illustrates the primary flow of user actions when setting up and utilizing the WI feature.



2.4 High Level Data Model

The following figure shows the relationship between some of the WI functions and ME database tables.



2.5 Best Practices

3 Work Instructions Functions

3.1 Prepare Work Instruction

3.1.1 Description and Applicability

The following sections describe the creation of text work instructions, the identification of existing work instructions and the association of work instructions to SAP ME objects. For additional information, see the Work Instruction Maintenance section of this document.

3.1.2 Purpose / Effects

3.1.2.1 Create Simple Text Work Instruction

Simple text work instructions (up to 1024 characters) can be created directly in SAP ME. Since this is simple text only, no formatting (text color, font, style, etc.) is allowed. In order to use rich text format, a separate text document needs to be created and then identified as a work instruction as described in the following section.

3.1.2.2 Identify Existing Work Instruction

An existing work instruction can be any electronic document whose contents are capable of being displayed on a client device. So, for example, the following could be valid work instruction documents:

- Microsoft Word document
- QuickTime movie
- Microsoft PowerPoint presentation
- VE Viewer 3D model with steps

The document must be accessible via an HTTP:// URL or a file:// URL. For an HTTP:// URL this can be accomplished by storing the document in a file folder managed by Microsoft IIS or in a directory managed by some other Web server product. For a file:// URL, the file can be located anywhere as long as it is accessible by the client device being used to run SAP ME.

3.1.2.3 Associate Work Instruction to SAP ME Objects

In order for a work instruction to be accessible from an SAP ME POD, the work instruction must be associated to one or more SAP ME objects. Objects to which the work instruction can be associated include:

- Customer Order
- Material

- Material Group
- Operation
- Resource
- Resource Type
- Routing
- SFC
- Shop Order
- Step ID
- Work Center

Additionally, work instructions can be associated to NC Clients in NC Client Maintenance.

If the work instruction is associated to multiple objects, then all of those objects must be in effect in the POD for the work instruction to be viewed.

3.1.3 Best Practices

The work instruction files should not be located on the client device, since making a file accessible via the file:// URL could cause security issues for the client device.

3.2 Display Work Instruction

3.2.1 Description and Applicability

For the user of an SAP ME POD to view a URL based work instruction, the client device must be able to display the contents of the work instruction document or browser page. Typically the client device will have access to an application that can display the contents of the work instruction document. The client device determines which application to use based upon the file extension specified in the URL for the work instruction document.

A simple text type work instruction can be displayed directly in the Work Instruction Viewer plug-in, or in a separate window, by SAP ME. No other application is needed.

3.2.2 Purpose / Effects

3.2.2.1 Access Work Instructions from a POD

Work instructions can be accessed from a POD via either a primary POD button or from a WI button from within a POD plug-in. A primary POD button must be associated with the Work Instruction List plug-in and/or the Work Instruction Viewer plug-in.

Work instructions can be accessed via the WI button in an NC Client's NC Data Entry plug-in. This button is associated with the Work Instruction List plug-in.

The Work Instruction List plug-in (WI_LIST_DISPLAY) displays a list of all of the work instructions that are associated with the SAP ME objects currently in effect in the POD.

It also contains a View button that invokes the Work Instruction Viewer plug-in for the selected work instruction(s).

3.2.2.2 Display Work Instructions

Work instructions are displayed by the Work Instruction Viewer plug-in (WI500). Work instructions can be displayed in the Work Instruction Viewer plug-in or in a

separate window. One or two work instructions can be displayed in the Work Instruction Viewer plug-in, depending upon whether the WI500 activity rule VIEWER_TWO_PANEL is set to NO or YES. If the work instruction is marked as Always Show in New Window, it will always be displayed in a separate window. Work instructions can be displayed automatically and manually. Work instructions are displayed automatically only if the WI500 activity rule AUTO_DISPLAY_REQUIRED is set to YES, the work instruction is marked as "Required" and there is no work instruction currently selected in the displayed Work Instruction List plug-in.

If multiple work instructions are to be displayed automatically or multiple work instructions have been selected for manual display, the work instructions will be displayed simultaneously. If there are more work instructions intended for display in the Work instruction Viewer plug-in than can be simultaneously displayed there, the remaining work instructions will only be displayed when accessed manually via the Next and Prev buttons.

3.3 Track Viewing of Work Instructions

3.3.1 Description and Applicability

If a work instruction is marked for Log Viewing, a Work Instruction Log record will be written each time the work instruction is viewed. If such a work instruction is viewed multiple times within the same POD session, each time it is viewed a record will be written to the log. Note: The implementation was changed to only show work instructions that have entries in the WORK_INSTRUCTION_LOG table. This way, the report can show the revision of the work instruction that was actually viewed when the SFC was processed.

The following changes were made to the report:

1) Only show work instructions in DHR report that have references for the SFC in WORK_INSTRUCTION_LOG table.

2) Remove WI links under Activity Log node.

3) Ensure that each work instruction node shows the revision.

4) For each WI Log entry, show the operation (uses the operation from the next ACTIVITY_LOG entry recorded after the WORK_INSTRUCTION_LOG entry).

5) Reverse order of WI Log and Attachment nodes in DHR report.

6) In WI Maintenance, Log Viewing should default to checked.

7) Ensure that WI Log entries are consolidated under a single node.

8) For 5.2, there is no WI Log checkbox. So, always show WI Log node details when the main Work Instruction checkbox is enabled.

Fixed in:
- ME 5.2, SP 07, patch 17
- ME 6.0, SP 03, patch 13
- ME 6.0, SP 04, patch 4
- ME 6.1, SP01, patch 4
- ME 6.2, SP02
- all later releases

3.4 Alert User of Work Instruction Change

3.4.1 Description and Applicability

If a work instruction is marked for Change Alert on the Main tab in Work Instruction Maintenance, a risk event Change Alert icon will be displayed at the locations specified in the table below, if the work instruction is present and the additional conditions are met.

Location and Object	Additional Conditions for Change Alert Icon to be Displayed
Shop Workbench SFC Node	None
Shop Workbench Operation Node	None
Worklist List Risk Event column in Operation POD, Integrated POD and Work Center POD	Worklist list configured with Risk Event and Info columns; and WI/Change Alert item is selected for Risk Event column; and Work Instruction Info item is selected for Info column
Operation List Risk Event column in Work Center POD	Operation list configured with Risk Event and Info columns; and WI/Change Alert item is selected for Risk Event column; and Work Instruction Info item is selected for Info column

The Change Alert icon will be displayed each time the work instruction is present until the Change Alert checkbox is unselected for the work instruction in Work Instruction Maintenance.

4 Integration

Not Applicable

5 Work Instructions Setup

5.1 External Configuration

5.1.1 Installation

5.1.1.1 Third Party Viewers

The appropriate viewer application or Browser plug-in must be installed on the client device in order for the user to be able to view a work instruction that is not a simple text work instruction or a browser page. See vendor supplied installation instructions for the viewer application or Browser plug-in.

5.1.1.2 Visual Enterprise Viewer (formerly Deep View)

In order to view a work instruction that is a 3D model in the .rh format, the Visual Enterprise (VE) Viewer must be installed on the client device. This viewer is a free download. You can download it from SAP Service Marketplace.

HTML 5 Visual Enterprise Viewer

SAP Visual Enterprise has created a newer version of the Model viewer that can be used in SAP ME for the same task of viewing and working with Models within the VTR and Work Instructions plugins. One reason for this is to support Browser platform independence and to provide a viewer component that does not need to be downloaded and installed separately. We have included this version in the VTR and Work Instructions plugins due to Chrome no longer supporting NPAPI in the Active X version after Chrome Version 44 (No Longer supported in Version 45). Chrome is deprecating support for the NPAPI which Viewer ActiveX relies on. There is no alternative for the ActiveX control and therefore Viewer will cease to work in Chrome. Google's estimated timeframe is September 2015. https://www.chromium.org/developers/npapi-deprecation. Since SAP ME 15.1 can now be run in Internet Explorer, Chrome and Firefox, we needed a viewer that was not limited by the browser and could still interact with the SAP ME components as before. The HTML 5 Viewer will still allow the user to work in the VTR POD, and interact with the other plugins that are required for this POD to be effective (NC Data Entry, NC Selection and NC Tree).

In the event that you only want to use the HTML 5 version of the viewer, existing file types of .rh or other supported file types for the Active X version will need to be converted to .vds file format. This can be achieved through Visual Enterprise Author or Visual Enterprise Generator.

The HTML 5 Version of the Viewer is developed within an iFrame within the JSF architecture. IFrame Plugins are a type of plugin that allows non-JSF UI's to function

within the WPMF plugin architecture. JavaScript API's are provided for communicating between the page included in the Iframe and the WPMF plugin on the server. There are basically four components that make up an IFrame plugin:

1) WPMF plugin class that extends "com.sap.me.production.podclient.BaseIFramePlugin" and implements the "com.sap.me.production.podclient.IFrameOnMessageListenerInterface" to listen for events (messages) from the page defined to the Iframe.

2) View (JSP page) for the plugin that has an <ls:iframe> control to load non-JSF view into.

3) Non-JSF view (JSP page) that is loaded into the iframe.

4) JavaScript API's for messaging between the Non-JSF view and the WPMF plugin.

In order for this to work you must be running the POD in standards mode since that is required by UI5.

The HTML5 Viewer is used in both the VTR Plugin and the Work Instruction Viewer plugin under the following conditions:

1) A ".vds" file is assigned to the material (VTR) or to the Work Instruction.

2) The POD is running standards mode.

For models other than ".vds", the Active-X VE viewer will be used unless the Chrome browser is being used in which case you will get an error since the Active-X viewer is no longer supported in Chrome.

When running the POD in quirks mode, the Active-X VE Viewer is always going to be used (Chrome will fail to work). The viewer called to the POD Plugin will be solely based on the file type associated to the material and will be seamless to the user. In the case where file types other than .vds are associated to the material, it will be necessary to still have the Active X version installed on the client PC to ensure the Models can display correctly.

NOTE: One caveat to note is that the HTML5 viewer is built with JavaScript (UI5). Any models being referenced must reside on the NW server or be available to the NW server. If the NW server does not have access to the host the model is on then you will see that message. This is different than the VE Viewer that runs in Active-X. In that case the VE software is loaded on the client PC and the models referenced are loaded from the

client. In that case the models must reside or be available to the client in which they are viewed. So the Path URL defined in System Rule Maintenance should be the path of the server where the Model files are stored.

Below are screen shots of the HTML5 viewer in VTR and in the Work Instruction Viewer.

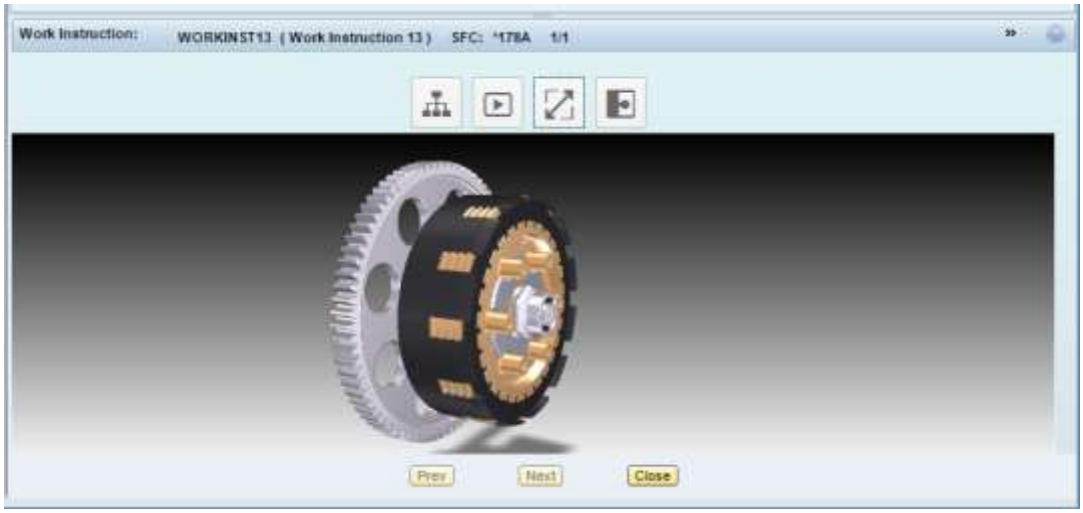
NOTE: Out of the box, the Viewer does not include all of the same functions (from the function menu bars located on the right and left side of the viewer window) but can be developed further using controls developed by SAP Visual Enterprise in UI5 to mimic the same features available as the Active X version. These can be found in the UI5 library version 1.32 containing the UI5 controls, developed for the HTML 5 version. The UI5 VIZKIT library is currently included as part of the SAP ME application SCA. It is a library of UI5 based controls, which interface to the JavaScript version of the visualization API's. Therefore, when you load the plugin containing the viewer, the JavaScript is automatically transferred to the client browser cache just like any other UI5 control. There is no native client code required for the HTML5 viewer. Once the UI5 release containing the VIZKIT library becomes available as part of the standard NW UI5 library, we will be able to remove VIZKIT from the SAP ME SCA and we will use the version that is installed on the NW server.

Multi-browser issues:

Popup mode in Chrome and Firefox: There is a problem with Chrome when running VTR in a Popup this is a known issue to Chrome and not the responsibility of SAP ME. Apparently it is no longer possible to programmatically, though JavaScript to move focus from one window to another. This is supported in the IE browser and we use it in VTR to support the selection mechanism to update the NC Data Entry plugin as well as updating the selection in the viewer when a new REFDES is entered in the NC Data Entry plugin. This also stops the REFDES selection dialog from working when no REFDES is entered and a component is entered in the NC Data Entry plugin. In the first two cases you are still able to manually select the window and the fields will be updated however it is no longer possible to get the REFDES selection dialog to display in Chrome.

There was a similar issue on Firefox, however, there is a configuration setting in Firefox that can be set to allow JavaScript to change focus on windows. To remedy this, start Firefox and enter "about:config" in the URL field and then find "dom.disable_window_flip". Select it and with right mouse button, you can toggle the value to false. Then restart Firefox and the focusing back and forth between POD and Popup started working.

Work Instruction Viewer

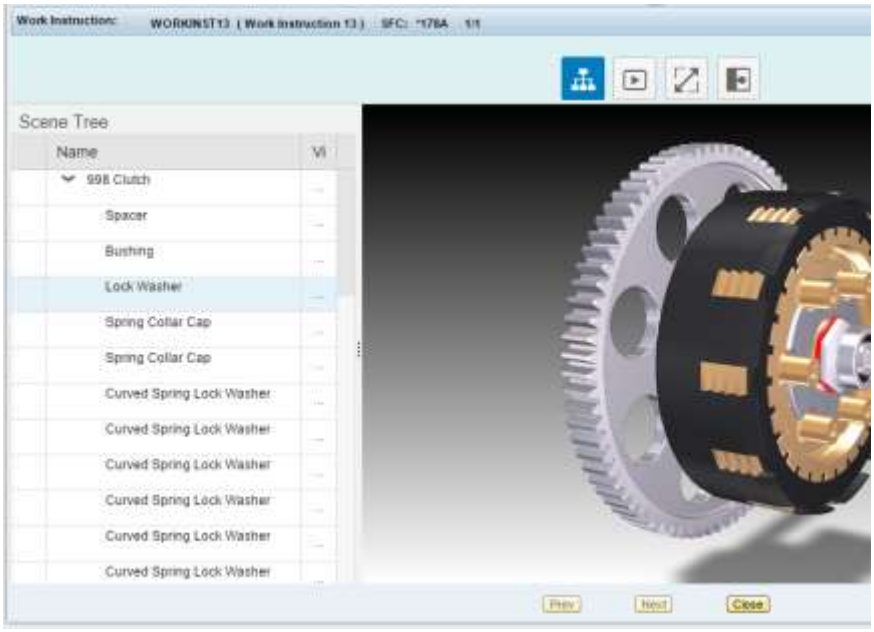


Buttons

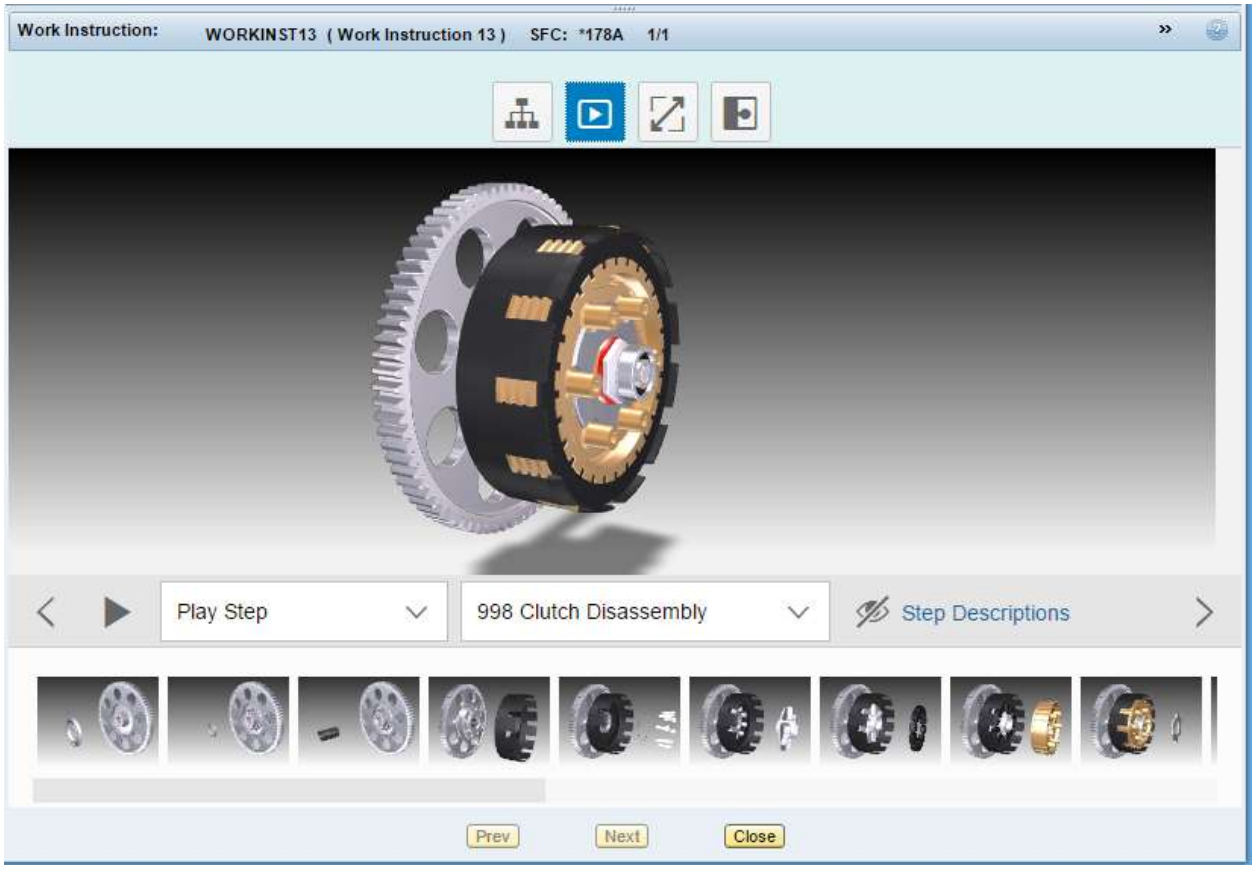
The HTML5 viewer supports the following functions in the tool bar:

 Fits model to canvas area centered in display area

 Displays the Scene Tree as shown below:



 Displays the Step Navigation controls as shown below:




Displays information about the selected element



5.1.2 Special Server Setup

Work instructions which are not simple text, must be stored on a web server (such as a Microsoft server running IIS, for an http:// URL) or in a location accessible from the client device, for a file:// URL). The work instruction files must be stored in a folder managed as a web server site for an http:// URL.

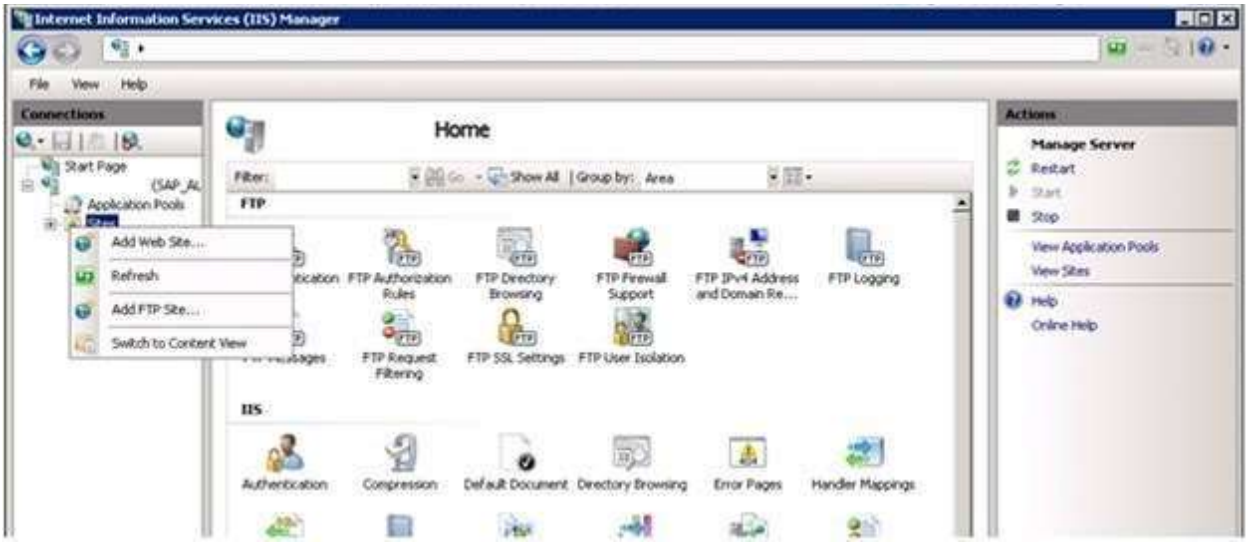
5.1.3 External Program Setup

The following sections describe how to set up an IIS site and how to set up MIMEs.

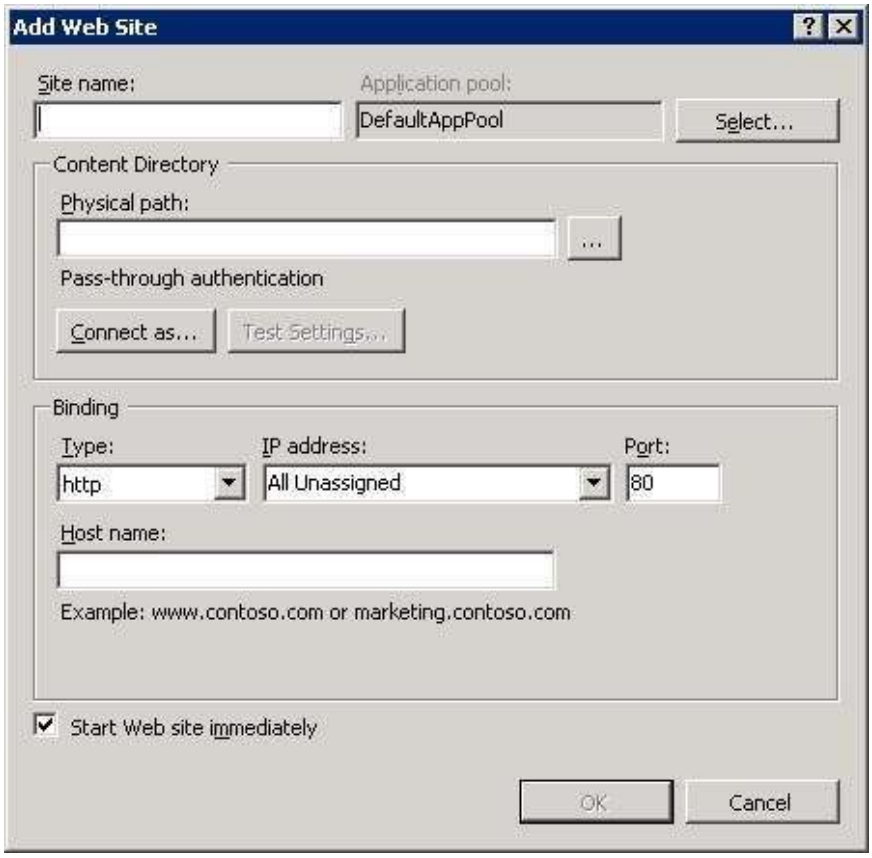
5.1.3.1 Setting up a Site in IIS

Work instructions accessed via an http:// URL must be accessible from a web server site. On a Windows server, one way to accomplish this is to create a site in IIS and associate it to the folder where the work instruction files are stored. For example, to set up a site in IIS 6.1 on a Windows 2008 Server, the following steps need to be performed:

- Select Administrative Tools in the Control Panel
- Double click on Internet Information Services (IIS) Manager
- Left mouse click on the plus sign next to the computer name in the Connections (left) panel
- Right mouse click on the Sites entry in the tree



- Select Add Web Site in the context menu



- Enter a name for the site in the Site name field (e.g. WIData)
- Enter or browse for the path to the folder containing the work instruction files (e.g. D:\WIFiles)
- Select OK

This will create the site, which can then be used in the http:// URL for the Work Instructions.

5.1.3.2 Setting up MIMEs in IIS

Some file extensions for work instruction files must be set up as MIMEs on the web server. In order to use the preview option (View button) in Work Instruction Maintenance for an .rh file, a MIME must be set up. For example, to set up a Microsoft IIS 6.1 site with a MIME for .rh files, the following steps need to be performed:

1. In IIS Manager, select the Web site or Web site directory for which you want to add a MIME type
2. In the Features View, double click on MIME Types
3. In the MIME Types area, right click and select Add in the context menu

4. In the File Name Extension field, type the file name extension .rh
5. In the MIME type field, type a description that exactly matches the file type defined on the computer (e.g. application/RightHemisphere.rh)
6. Click OK.

5.1.4 Client Device

In order to view 3D models, the Visual Enterprise Viewer must be installed on the client device. The Visual Enterprise Viewer is available free of charge on SAP Service Marketplace.

5.2 Maintenance Activities

5.2.1 Activity Rules

5.2.1.1 VIEWER_TWO_PANEL

This activity rule applies to the Work Instruction Viewer activity (WI500).

5.2.1.1.1 Purpose / Effects

When set to YES, this activity rule causes the Work Instruction Viewer plug-in to use two separate panels, so it can display two work instructions simultaneously.

5.2.1.1.2 Settings / Example

VIEWER_TWO_PANEL = NO



VIEWER_TWO_PANEL = YES



5.2.1.2 AUTO_DISPLAY_REQUIRED

This activity rule applies to the Work Instruction Viewer activity (WI500).

5.2.1.2.1 Purpose / Effects

This activity rule controls whether or not required work instructions are automatically displayed when the Work Instruction Viewer is invoked.

5.2.1.2.2 Settings / Example

When set to YES, this activity rule causes the Work Instruction Viewer plug-in to automatically display all work instructions marked as “Required” if there is no work instruction currently selected in the Work Instruction List plug-in.

When set to NO, the Work Instruction Viewer does not automatically display the “Required” work instructions. However, it will automatically display the first work instruction (based upon sequence number) when there is no work instruction currently selected in the Work Instruction List plug-in.

5.2.2 Product Configuration

5.2.2.1 Work Instruction Maintenance

Use this activity to:

- Create simple text work instructions
- Identify URL based work instructions
- Attach work instructions to SAP ME objects
- Specify options for a work instruction

An HTTP:// URL can be of the form HTTP://<server name>/<filename.ext>, for example HTTP://SERVER1/File_A.html.

A file:// URL can be of the form file://<server name>/<file path>/<file name.ext>, for example file://server123/folder_a/folder_b/WI file.ppsx.

For more information, see Work Instruction Maintenance in SAP ME Help.

5.2.3 System Configuration

5.2.3.1 Activity Maintenance

5.2.3.1.1 Purpose / Effects

This activity is used to set the activity rules for WI500, as described in the Activity Rules section.

5.2.3.2 POD Maintenance

5.2.3.2.1 Purpose / Effects

If necessary, POD Maintenance can be used to add a primary POD button, or a button group entry, for initiating the Work Instruction List plug-in. For more information, see Creating New POD Pushbuttons in SAP ME Help.

5.2.4 Other Maintenance Activities

5.2.4.1 NC Client Maintenance

5.2.4.1.1 Purpose / Effects

An NC client can be configured to enable the display of specific work instructions. In NC Client Maintenance, the Display Work Instruction Button checkbox must be selected on the Main tab and the Work Instruction(s) must be specified in the table on the Work Instructions tab. For more information, see NC Client Maintenance in SAP ME Help.

6 Usage Scenario Examples

6.1 3D Assembly Model Work Instruction

6.1.1 Purpose / Goal

This scenario provides an example of setting up and utilizing a work instruction for a disassembly operation.

6.1.2 Scenario Specific Settings

For this scenario, the file Reallight_Transmission_with_Steps.rh needs to be stored on a web server. This file is available on the SAP Community Network (SCN) at Small 3D Model of Transmission. The Visual Enterprise Viewer needs to be installed on the client device.

6.1.3 Scenario Steps

This scenario involves the following steps:

- Identify and configure a URL based work instruction
- Create an operation
- Associate the work instruction to the operation
- Create a router, material, shop order and SFC
- Utilize an SAP ME POD to access and view the work instruction

6.1.3.1 Identify and configure an http:// URL based work instruction In Work Instruction Maintenance, perform the following:

1. Enter "TRANSMISSION_DIS-ASSEMBLY" in the Work Instruction field
2. Enter "A" in the Version field
3. Select the Required checkbox, if not already checked
4. Select the Current Version checkbox, if not already checked
5. Select the Log Viewing checkbox, if not already checked
6. Select the Instructions tab
7. Select URL for the Type
8. Enter "http://<server name>/ Reallight_Transmission_with_Steps.rh" (e.g. http://actualservername/ Reallight_Transmission_with_Steps.rh)

6.1.3.2 Create an operation

9. Create a normal operation called DIS-ASSEMBLY for the DEFAULT resource

6.1.3.3 Associate the work instruction to an SAP ME operation

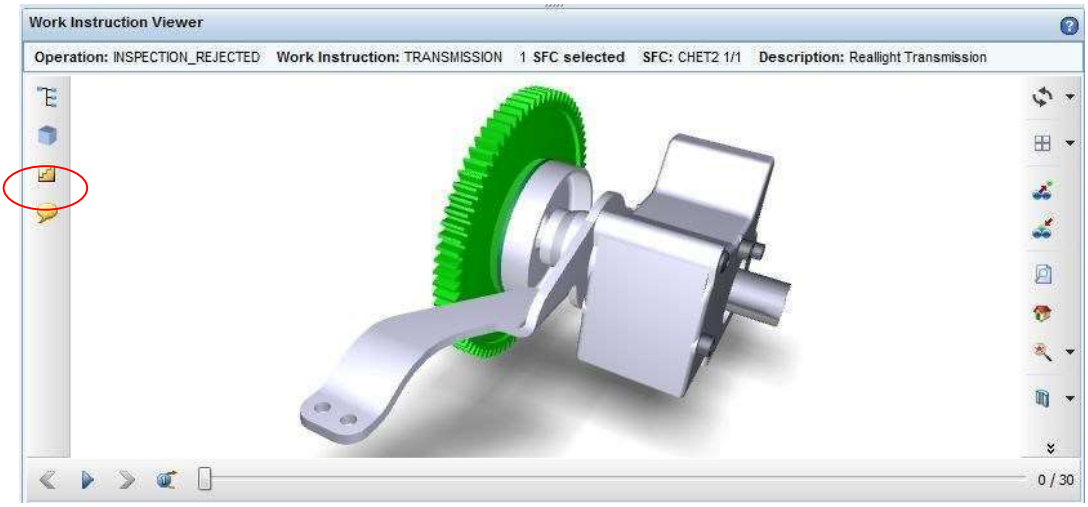
10. Select the Attached tab
11. Select Insert New
12. Enter "10" in the Sequence field
13. Select the Browse icon for the Operation field
14. Select the DIS-ASSEMBLY operation
15. Select Save

6.1.3.4 Create a router, material, shop order and SFC

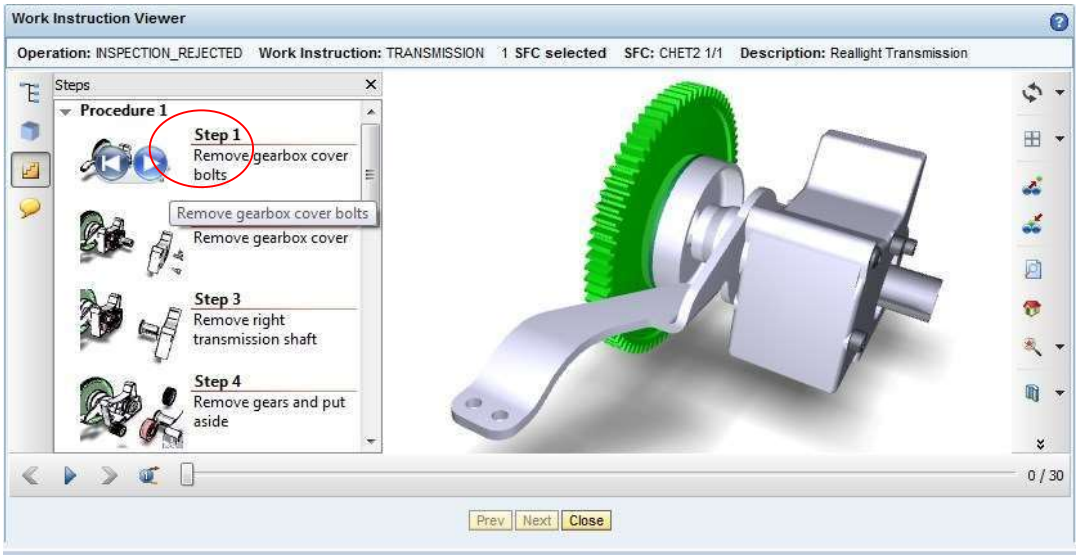
16. Create a router having the DIS-ASSEMBLY operation as the first operation
17. Create a manufactured material TRANSMISSION
18. Create a shop order for the TRANSMISSION material
19. Release the shop order for a quantity of 1

6.1.3.5 Utilize an SAP ME POD to access and view the work instruction

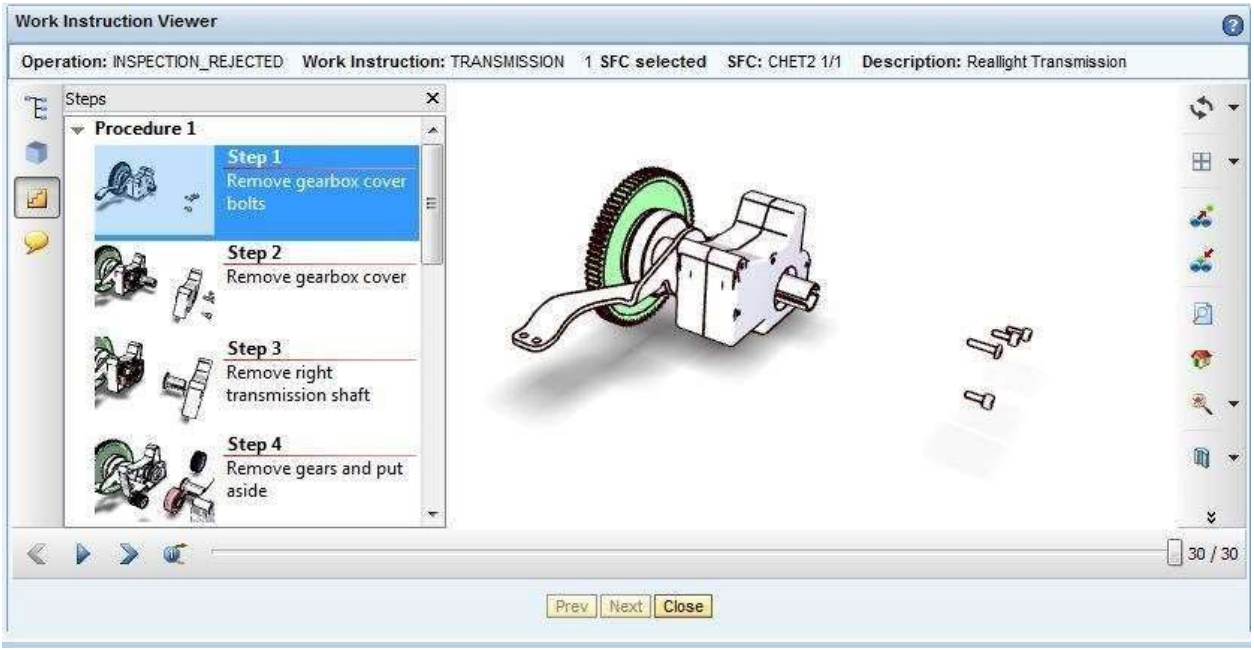
20. Open the POD – Operation standard Production Operator Dashboard
21. Select the DIS-ASSEMBLY operation
22. Select the DEFAULT resource
23. Select the SFC created in step 19 above
24. Select the Work Instruction button
25. Select the Steps icon in the WI Viewer pane



26. Select the right arrow in Step 1.



27. This will perform the first step in the dis-assembly process in the work instruction.



28. Select additional steps and the right arrow to continue the dis-assembly process or the left arrow to re-assemble.

7 Links to Additional Information

SAP ME Work Instructions Help

8 Other Reference Material

Visual Enterprise Viewer

9 Overview of Changes

ME 6.1 Changes

3D models can now be viewed as work instructions in the WI Viewer POD plug-in.