

# Teamcenter® 8

Siemens PLM Software

## Engineering Documentation

You have successfully logged in to Teamcenter.

Teamcenter will share your login information with other Teamcenter products.

## Fermilab Documentation Management within Teamcenter

TEAMCENTER

SIEMENS

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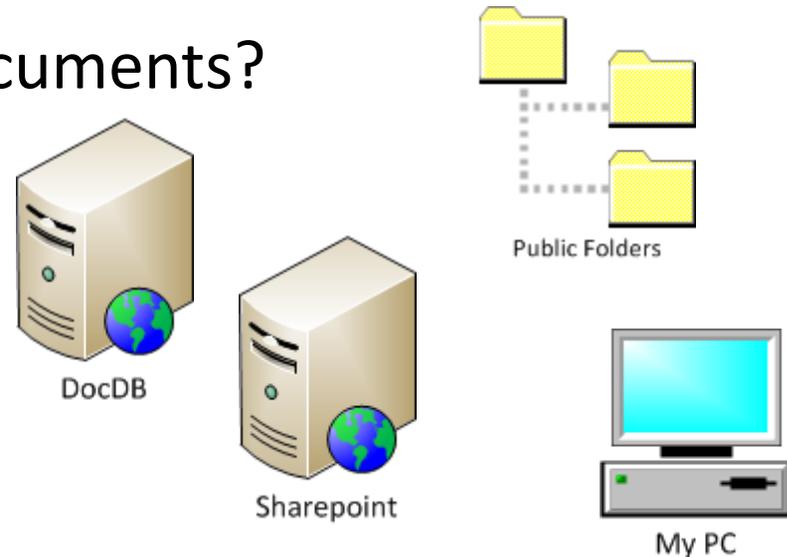
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# Agenda

- Current status of document management
- Fermilab Engineering Manual
- Our Document Management Goals
- How do we achieve our goals?
- Teamcenter Engineering Document Types
- Let's Get Organized
- Teamcenter for CAD and Doc management
- Demo
- Training requirements
- Schedule

# Current Status of Our Documentation

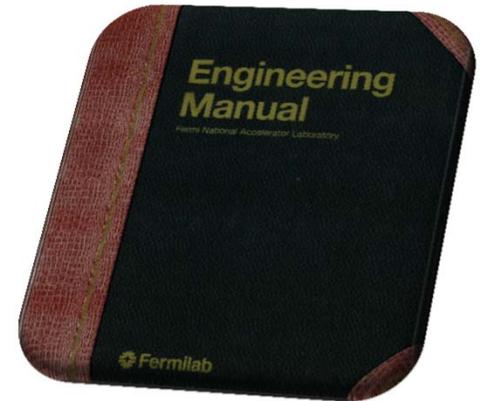
- Where do we keep our documents?
  - Sharepoint
  - DocDB
  - Local Servers
  - Local PCs
  - Paperwork in cabinets
- Is it up-to-date?
- Is it revision controlled? Reviewed? Approved?
- Is it complete or fragmented?
- Is it consistent with standard formatting:
  - Between Users?
  - Between Projects?
  - Between Divisions?



# Engineering Manual

Engineers and Designers must be aware of and comply with the Fermilab Engineering Manual.

- Chapter 1 – Requirements and Specifications
  - Functional and Technical requirements
  - Statement of Work
  - ES&H and QA requirements
- Chapter 2 – Engineering Risk Assessment
- Chapter 3 – Requirements and Specification Review
  - Various reviews of all requirements

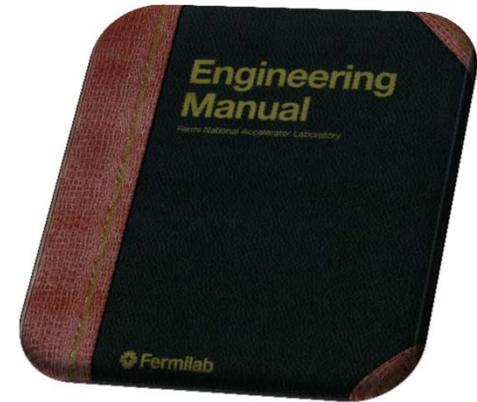


*This list is not all-inclusive*

# Engineering Manual cont.

## – Chapter 4 – System Design

- Formal Documents
  - Technical Design Report
  - CAD models and drawings
- Supporting Documents
  - Engineering and design notes
  - Design calculations
  - Assembly and operating procedures
  - Etc.
- Document control
  - Revision controlled items
  - One standardized location for engineering data
- Application of standards
  - Applicable standards based upon the FESHM requirements



## – Chapter 5 - Engineering Design Review

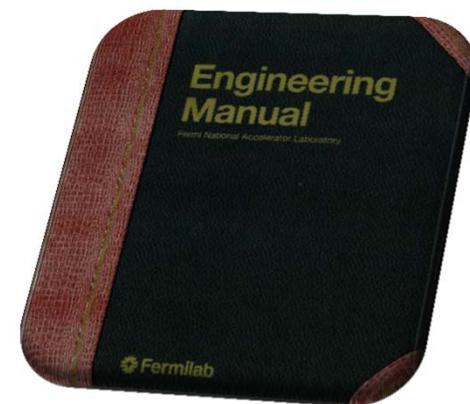
- Preliminary Design Review(s)
- Systems Integration Review(s)
- Final Design Review

*This list is not all-inclusive*

# Engineering Manual cont.

## – Chapter 6 – Procurement and Implementation

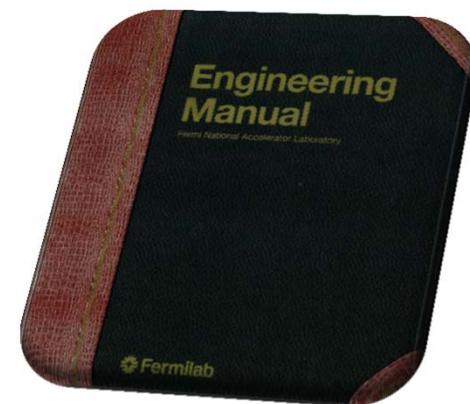
- Procurement Plan
- Request for Information
- Procurement Specification
- Technical Questionnaire
- Procurement Readiness Review
- Request for Proposal
- Vendor Proposal Review
- Vendor Selection
- Vendor Fabrication Review
- Material Certifications



*This list is not all-inclusive*

# Engineering Manual cont.

- Chapter 7 – Testing and Validation
  - Design Approval
  - Documentation and Training Requirements
  - Safety and Health Plan
  - Fabrication Acceptance Test
  - Performance Acceptance Test
  
- Chapter 8 – Release to Operations
  - Installation Plan
  - Safety Review(s)
  - Commissioning Plan
  - Operational Readiness Clearance
  
- Chapter 9 – Final Documentation



*This list is not all-inclusive*

# Our Documentation Goals

- One storage location
- Includes integration of all CAD data with all Engineering documentation
- Revision controlled
- Always up-to-date
- Provides easy access
- Provides a consistent process
- Well organized
- Adherence to the intent of the Fermilab Engineering Manual
- Accessible for global collaboration

# How do we achieve our goals?

- We get organized
- We leverage tools that we already own
- We develop a vision for the future and apply it today
- We look beyond our fears of the unknown
- We open our minds to learning new processes
- We look for solutions, not excuses
- We train to succeed
- We strive for constant improvement

# Engineering Documents in Teamcenter

The screenshot displays the 'EngrDocMaster' application window. The 'CATEGORY:' field is set to 'Analysis Report'. The 'AUTHOR:' field shows 'FnI4\_ED\_Category\_Cascading' with a sub-menu open, highlighting 'S Alphabetical'. The 'LEGACY NUMBER:' field is empty. The main list contains 45 items, each with a blue 'S' icon and a dotted line to its left. A second list on the right side of the image contains 30 items, also with blue 'S' icons and dotted lines.

**EngrDocMaster**

CATEGORY: Analysis Report

AUTHOR: FnI4\_ED\_Category\_Cascading

LEGACY NUMBER:

- S Alphabetical
- S Analysis Report
- S Assembly Data
- S Calculation
- S Commissioning Plan (CP)
- S Conference Paper
- S Engineering Order Form
- S Eng Process Document Management
- S Fabrication Acceptance Test (FAT)
- S Fabrication/Assembly/Installation Report
- S Failure Mode and Effects Analysis (FMEA)
- S Final Design Review (FDR)
- S Functional Requirements Specification (FRS)
- S Installation Plan (IP)
- S Implementation Report
- S Inspection Data
- S Instrument Lists
- S Leak Check Certification
- S Maintenance Report
- S Material Certification
- S Operational Readiness Clearance (ORC)
- S Operations Report
- S Performance Acceptance Test (PAT)
- S Poster
- S Preliminary Design Review (PDR)
- S Pressure Test Permits
- S Procedure
- S Procurement Plan (PP)
- S Procurement Readiness Review (PRR)
- S Procurement Specification (PS)
- S Project Management Plan (PMP)
- S Project Report
- S Request for Information (RFI)
- S Request for Proposal (RFP)
- S Review Report
- S Risk Assessment
- S Safety Review (SR)
- S Specification
- S Specification Review
- S Specification Review (Meeting with Attendee)
- S Statement of Work (SOW)
- S Status Report
- S Systems Integration Review (SIR)
- S Technical Design Report (TDR)
- S Technical Requirements Specification (TRS)
- S Technical Questionnaire (TQ)
- S Test/Commissioning Report
- S Testing Procedure
- S Travelers
- S Trip Reports
- S Valve Lists
- S Vendor Fabrication Review (VFR)
- S Vendor Proposal Review (VPR)
- S Vendor Selection (VS)
- S Welder Certification
- S Welding, In-Process, Radiography
- S Welding Procedure
- S Work Request
- S What-If Analysis

# Let's Get Organized

- Begin with the Work Breakdown Structure
- Develop a Document Breakdown Structure
  - Organized from the Top System Level down
  - Broken down into deliverable document packages that can be reviewed and approved
  - Create one document package for every deliverable work package
- Develop a consistent document package checklist to control the required documentation
- Connect all of the document packages into an easy to follow hierarchy
- Connect the CAD data to each document package



# The Document Checklist (EPDM)

Engineering Process Document Management						
Doc Name	MICE TEST STAND DOCUMENT MANAGEMENT					
Doc #	ED0000439---					
Does this task require a design?	<input checked="" type="checkbox"/> Requires a Design					
Standard Documentation						
Requirement	Document Type	Justification for "Not Required"	Author	TC Item #	Rev.	TC File name
	<b>Requirements and Specifications</b>					
REQUIRED	Functional Requirements Specification (FRS)		Steve Virostek	ED0000413	-	ED0000413---FRS.docx
<input checked="" type="checkbox"/> Required	Statement of Work (SOW)		Ruben Carcagno	ED0000414	-	ED0000414---SOW.docx
	<b>Engineering Risk Assessment</b>					
<input checked="" type="checkbox"/> Required	Project Management Plan (PMP)		Ruben Carcagno	ED0000415	-	ED0000415---PMP.docx
REQUIRED	Risk Assessment		Ruben Carcagno	ED0000438	-	ED0000438---RA.xlsx
	<b>Requirements and Specifications Review</b>					
<input checked="" type="checkbox"/> Required	Technical Requirements Specification (TRS)		Cosmore Sylvester	ED0000416	-	ED0000416---RA.docx
<input checked="" type="checkbox"/> Required	Specification Review	Only slight modifications are required. Spec Review is not necessary.				
	<b>System Design</b>					
RECOMMENDED	Technical Design Report (TDR)					
REQUIRED	Preliminary Design Review (PDR)					
<input checked="" type="checkbox"/> Required	Systems Integration Review (SIR)					
REQUIRED	Final Design Review (FDR)					
	<b>Procurement and Implementation</b>					
<input checked="" type="checkbox"/> Required	Procurement Plan (PP)	Test stand was provided by FSU and is being modified at Fermilab.				
<input checked="" type="checkbox"/> Required	Request for Information (RFI)					
<input checked="" type="checkbox"/> Required	Procurement Specification(s) (PS)					
<input checked="" type="checkbox"/> Required	Technical Questionnaire(s) (TQ)					
<input checked="" type="checkbox"/> Required	Procurement Readiness Review (PRR)					
<input checked="" type="checkbox"/> Required	Request for Proposals (RFP)					
<input checked="" type="checkbox"/> Required	Vendor Proposals Review (VPR)					
<input checked="" type="checkbox"/> Required	Vendor Selection (VS)					
<input checked="" type="checkbox"/> Required	Vendor Fabrication Review (VFR)					
<input checked="" type="checkbox"/> Required	Fabrication Acceptance Test (FAT)					
REQUIRED	Performance Acceptance Test (PAT)					
	<b>Release to Operations</b>					
<input checked="" type="checkbox"/> Required	Installation Plan (IP)					

There is one EPDM per deliverable work package

Provides:

- A checklist of all required documents
- A Listing of all supporting documents
- A hyperlink to each document in Teamcenter

Managed by the Work Package Engineer



# How it Looks in Teamcenter

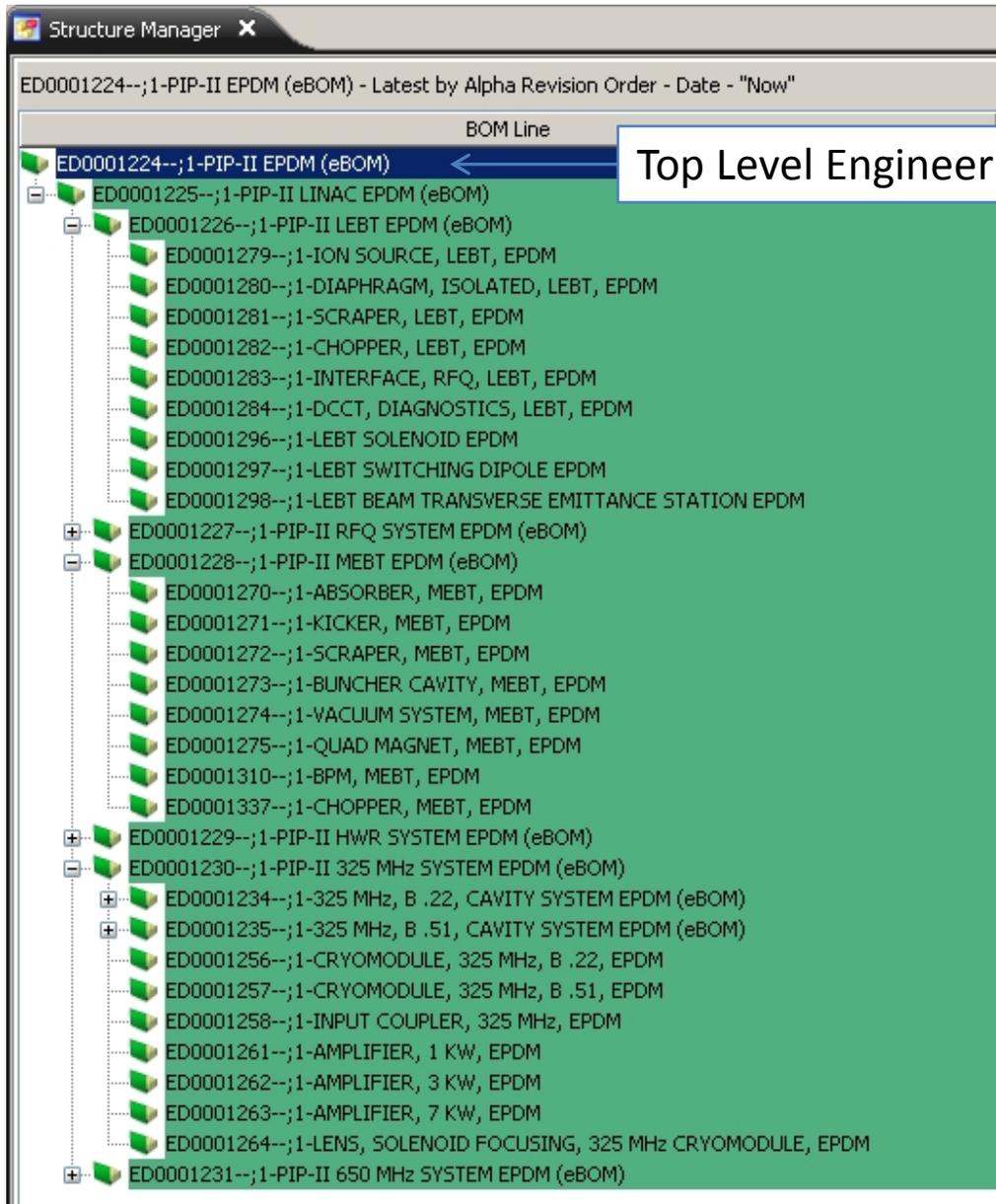
Top Level Engineering Doc Item

Send the Hierarchy BOM to the *Structure Manager*

Summary Details  
ED0001224-  
Name: ED0001224---eBOM

Properties  
Name: ED00012  
Description:  
Owner:  
Checked-Out:  
Checked-Out By: No V  
[More Properties...](#)

# How it Looks in Teamcenter cont.



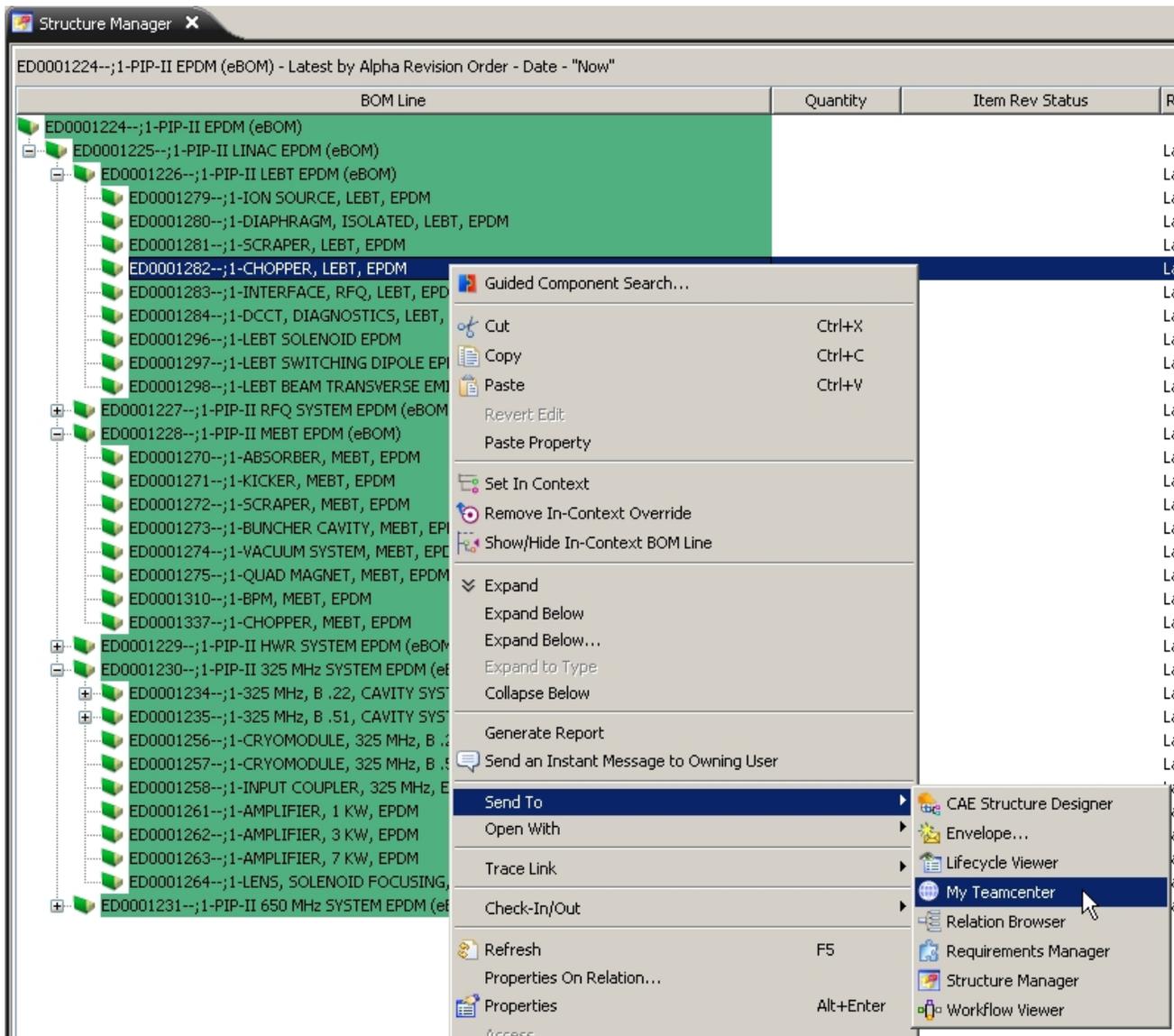
Notice how the Document structure looks exactly like a 3-D model Assembly structure.

It's built the same way in Teamcenter! Easy to learn.

The data is Live and can be edited at any time.

It can even be released and revised for document control.

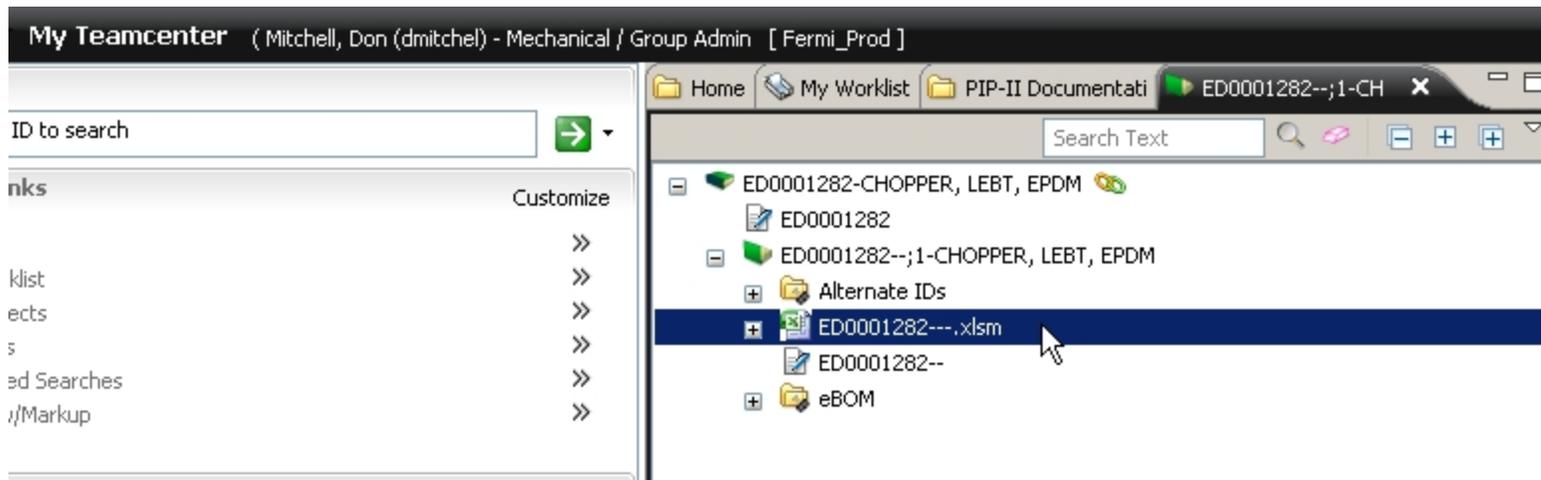
# How it Looks in Teamcenter cont.



Select any item of interest and quickly send it to *My Teamcenter* to access the EPDM checklist document.

You only need to remember the Top Level document in your system to have direct access to all of the project documentation and CAD models!

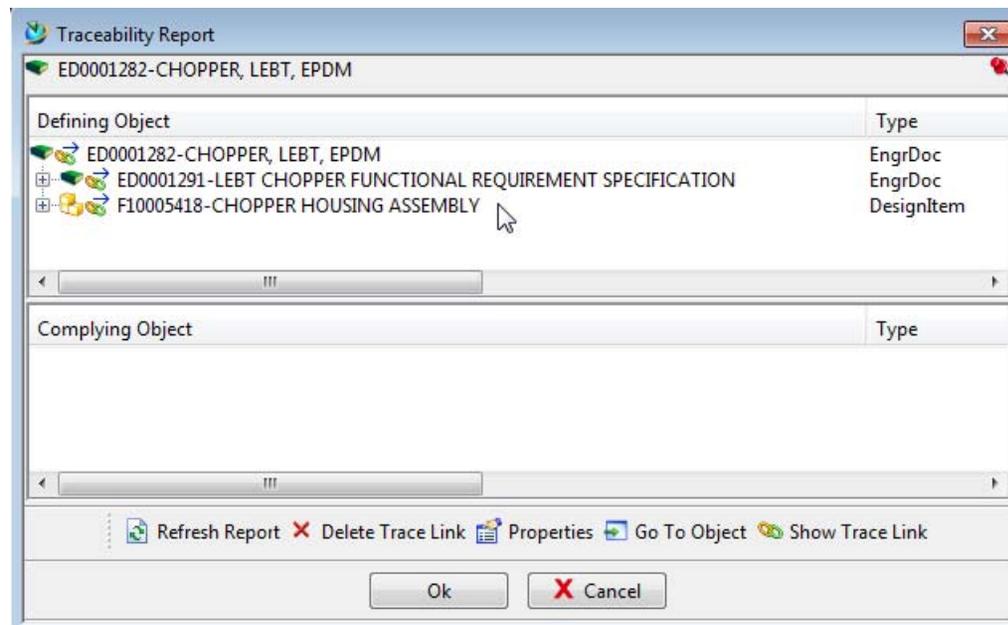
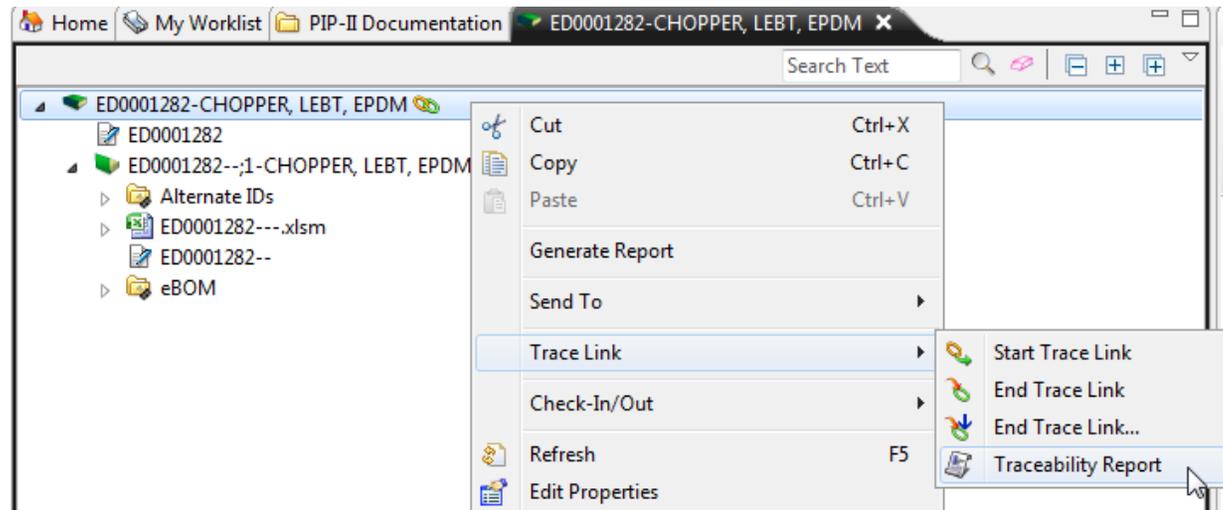
# How it Looks in Teamcenter cont.



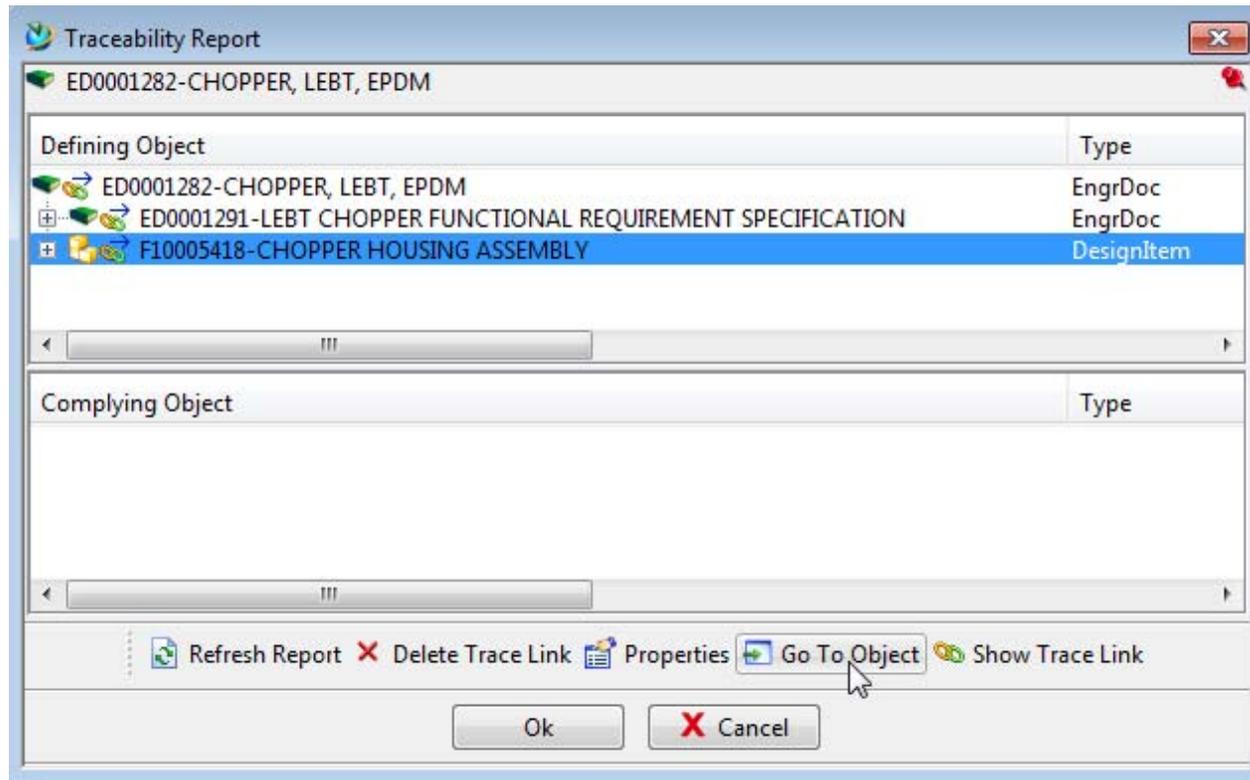
Double-Click on the EPDM Excel dataset to launch the checklist into Excel.

Engineering Process Document Management						
Doc Name	CHOPPER, LEBT, EPDM					
Doc #	ED0001282					
Does this task require a design?	<input checked="" type="checkbox"/> Requires a Design					
Standard Documentation						
Requirement	Document Type	Justification for "Not Required"	Author	TC Item #	Rev.	TC File name
<b>REQUIRED</b>	Requirements and Specifications					
	Functional Requirements Specification (FRS)		Jim Steimel; Lionel Prost; Alexander Shemyakin	ED0001291	-	ED0001291---FRS.docx
<input type="checkbox"/> Required	Statement of Work (SOW)					
<b>REQUIRED</b>	Engineering Risk Assessment					
<input type="checkbox"/> Required	Project Management Plan (PMP)					
<b>REQUIRED</b>	Risk Assessment					

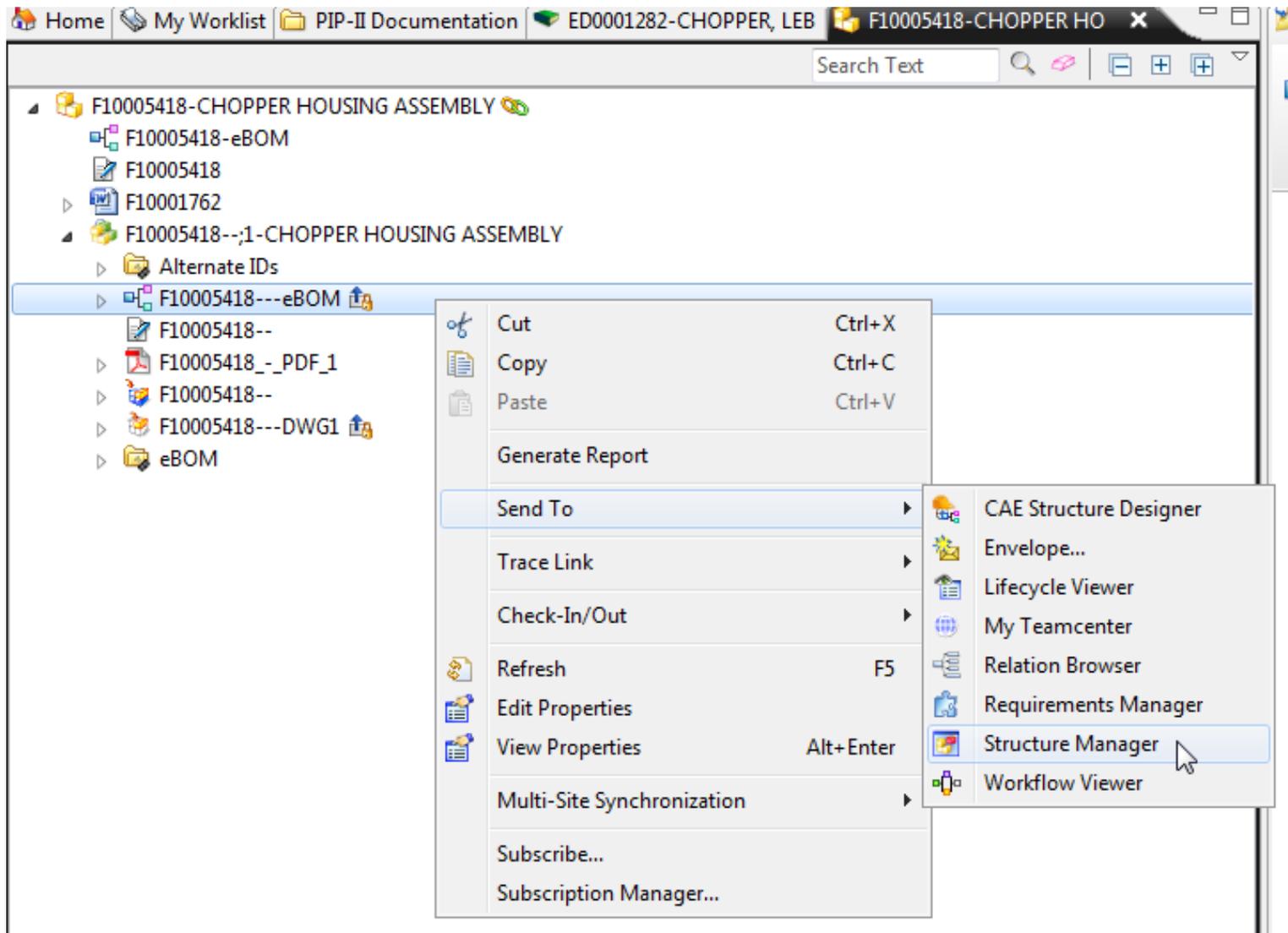
# How it Looks in Teamcenter cont.



# How it Looks in Teamcenter cont.



# How it Looks in Teamcenter cont.



# How it Looks in Teamcenter cont.

**Structure Manager** (Mitchell, Don (dmitchel) - Mechanical / Group Admin [ Fermi\_Prod ])

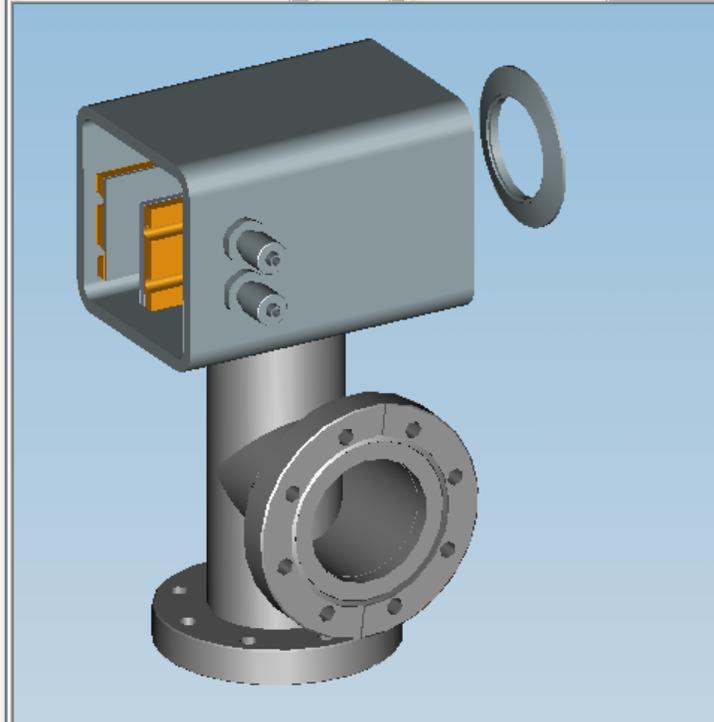
Structure Manager x

F10005418--;1-CHOPPER HOUSING ASSEMBLY (eBOM) - Latest by Alpha Revision Order - Date - "Now"

BOM Line	Quantity
✓ F10005418--;1-CHOPPER HOUSING ASSEMBLY (eBOM)	
✓ FC0016407--;1-FLANGE-CF, 4.5x2.5 TUBE,NR,C,SS316L x 2	2
✓ F10008739--;1-HIGH VOLTAGE ABSORBER COOLING PLATE x 2	2
✓ F10008735--;1-HIGH VOLTAGE CHOPPING ELECTRODE PLATE	
✓ F10008736--;1-HIGH VOLTAGE ABSORBING ELECTRODE PLATE	
✓ FC0027320--;1-TEE TUBE 2-1/2 INCH WELD TYPE	
✓ F10009370--;1-LEBT CHOPPER COOLING PLATE TUBE	
✓ F10018261--;1-BASE PLATE QUICK COUPLING PEEK BODY FOR 1/4 INCH TUBING ...	2
✓ FC0026926--;1-O-RING, -010, VITON	
✓ FC0027272--;1-O-RING, -907, VITON	
✓ F10005911--;1-QUICK CONNECT COUPLING ORING RETAINER .25 TUBE	
✓ F10006698--;1-QUICK COUPLING THICK WALL BODY WITH FLANGE .25 TUBE	
✓ F10005912--;1-QUICK CONNECT COUPLING CAP .25 TUBE	
✓ F10018295--;1-CHOPPER HOUSING TUBE MACHINING DETAIL	
✓ F10018114--;1-FLANGE NW-50 BORED FLANGE X C-BORE 1.760 INCH ID	

Structure Manager x

Viewers: Variants, Viewer, Referencers, Supersedure, Attachments



The image shows a 3D CAD model of a mechanical assembly, specifically a chopper housing. The model is rendered in a grey metallic finish. It consists of a main housing with a rectangular top section and a cylindrical base. A large circular flange is attached to the base. An exploded view of a ring component is shown to the right of the main housing, indicating its position relative to the assembly. The interface includes a BOM table on the left, a search bar at the top, and a toolbar with various viewing and editing tools.

# How it Looks in Teamcenter cont.

The screenshot displays the Teamcenter software interface for a mechanical design project. The main window shows a CAD drawing of a 'CHOPPER HOUSING ASSEMBLY' (F10005418) with multiple views: a top view, a side view, a front view, and an exploded view. The drawing includes section lines for 'SECTION A-A' and 'SECTION B-B', both at a scale of 1:1. A parts list table is located in the bottom right corner of the drawing area, listing components such as 'VIEWPORT-GLASS', 'FLANGE', 'TUBE', 'ELECTRODE PLATE', 'FITTING', 'ROTATABLE HALF-WHEEL', and 'CHOPPER OUTER HOUSING'. The interface also features a left-hand navigation pane with 'Quick Links', 'Open Items', 'History', and 'Favorites' sections. The top of the window shows the 'My Teamcenter' header with user information and navigation tabs like 'Summary', 'Details', and 'Viewer'.

ITEM NO.	ITEM NAME	QTY	UNIT
9	F00019807 VIEWPORT-GLASS, 2.75	1	1
8	F00034378 FLANGE OF 2210 LEN	1	1
7	F00027321 TUBE 3/4 INCH WELD	1	1
6	F10008736 HIGH VOLTAGE EXHAUSTING	1	1
5	F10008730 HIGH VOLTAGE EXHAUSTING	1	1
4	F10008738 HIGH VOLTAGE ABSORBER	1	1
3	F00034488 ROTATABLE HALF-WHEEL	2	2
2	F10005418 CHOPPER OUTER HOUSING	1	1
1	F00017973 TUBE, 1/2 INCH, 1/2 INCH	4	4

# Demonstration

- Let's take a look at how Teamcenter manages documents
- Tracelink Usage
- 3-D CAD data viewing

# Training Requirements

- Non-CAD User Track
  - 1 Day training on Teamcenter basics
  - ½ day training on Document Creation, Structure Manager, and Life Cycle Viewer
  - ½ Day training on Workflows
- Video training will be made available for reference use AFTER formal training

# Schedule

- Set up training dates beginning in April
- Establish all Teamcenter User accounts
- Collect ALL documentation
  - Users collect and input documents into Teamcenter
  - System Engineers manage the EPDMs
  - Project Engineer:
    - Manages the Top Level EPDM structure
    - Mentors engineers on Teamcenter use
    - Ensures documents are being managed properly in TC
- Introduce scientists to Teamcenter

# Summary

- A new era of document management is here
- We start training in April
- Begin collecting your documentation now
- Additional questions?

*Thanks for your attention,*

*Don*