

PSE-Controlled Drawing Parts List

Simon G. Lister

Electro-Motive Diesel, Inc.

simon.lister@emdieels.com

708-387-6359

Premium Partners:



Microsoft

The Old EMD: Electro-Motive Division of GM





ELECTRO-MOTIVE®



Electro-Motive Diesel, Inc

- Design & Manufacture Diesel-Electric Locomotives
 - The Original Hybrid Drive Vehicle.
 - EMD has produced over 50,000 Domestic Locomotives
 - Domestic Freight Locomotives between 1500 & 6000 hp.



**CANADIAN
PACIFIC
RAILWAY**



Electro-Motive Diesel, Inc

- Export Locomotives & Components sets
 - EMD has sold over 15,000 units to 100 countries



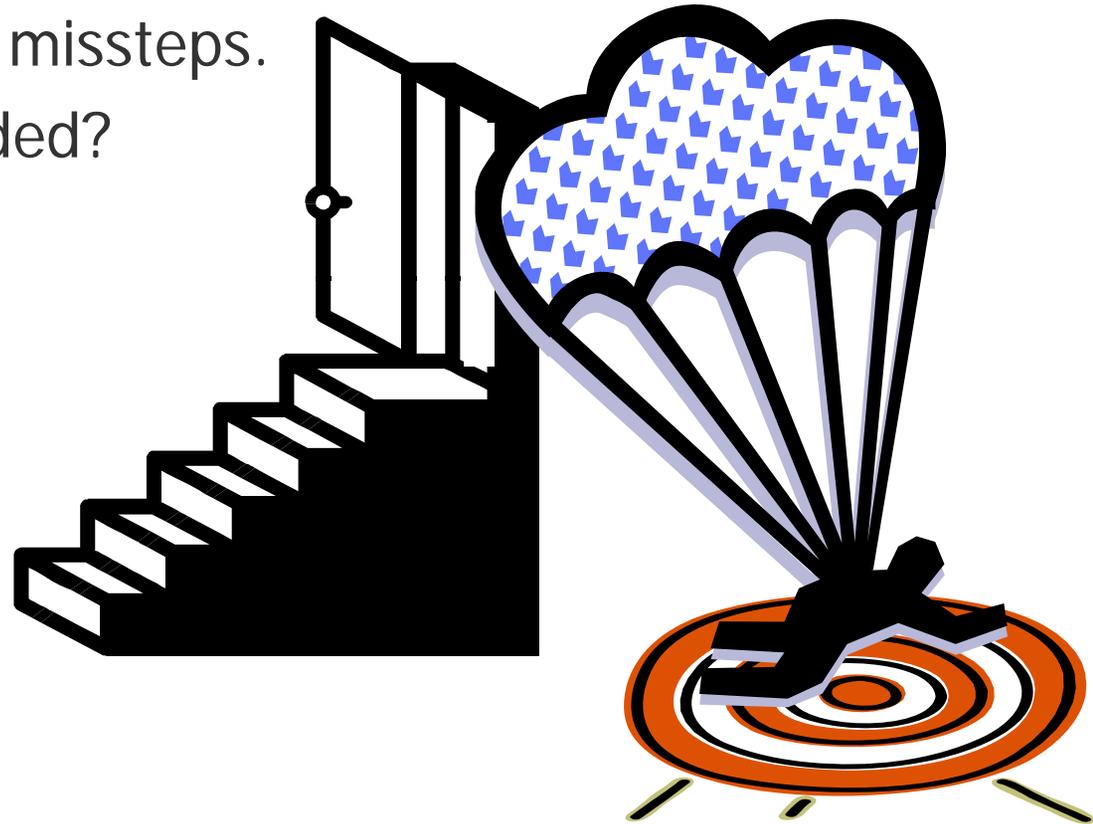
Electro-Motive Diesel, Inc

- Power, Marine, and Industrial
 - 11,000 Engines in 40 Countries



Itinerary

- What are we getting ourselves into and why?
- Where were we and what were we doing?
- Migration steps and missteps.
- Where have we landed?
- Lessons learned.
- Questions?



What is the point? Why are we doing this?

- We are no longer a division of GM.
 - Therefore parts of our old system are going away.
 - We will have to pay big \$\$\$'s just to stay at par.
- We are moving toward a single Information System Software.
 - SAP is being deployed for the new EMD.
- We are reducing Redundant or Manual inputs.
 - Yesterday, information from our Drawings was input to our multiple legacy Information Systems by hand.
 - Today (actually the near Future), information will flow to SAP automatically from TCe.

EMD's history with UGS tools...

- EMD has used NX, better known as UG, since 1993.
 - We are currently using NX2.0.5.1, MP1
 - We have 200,000 or so files all of which are considered "active".
- EMD implemented Teamcenter Engineering in 2004.
 - The scope of the first phase of the TCe implementation was limited to only the Product Design Department, as a CAD Data Management tool.
 - The Product Structure Editor was only being utilized to create Override Rules for managing Assemblies.

A look at our old Parts List

- Our Parts List was a bit of a mess.
 - Driven mainly by the NX Assembly Structure
 - It contained some manual additions and/or manipulations.

4	REF	SCREW - # 10 - 32 FSL	120612	9
1	REF	GUSSET	40095285	8
4		SCREW - # 10 - 32 FSL	120612	7
1	7.0 OZ	LUBRICANT - SPRAY	9339834	6
1	2491	LAMINATION	40051473	5
1	AR	SHIM	40132222	4
2		PAD	40132772	3
1	OPT FOR IT.1	BRACKET	40132760	2
1		BRACKET ASM	40095286	1
NO. REQD	MATL/NOTES	NAME OF PART	PART NO.	ITEM NO.

Step 1 of Migration - The Design Document

- Set the Scope.
 - One month of development went in to this task.
 - Synchronize the parts list in the UG Drawing with the PSE BOM in Tce.
 - Set the PSE sequence numbers as numerically ascending numbers starting with 1(one), and an increment of 1 (one) for all new BOM.
 - Provide the ability to modify/edit the quantity value in the quantity column in PSE, as per EMD requirements.
 - Develop a procedure to transfer existing parts list on UG drawing to PSE BOM.
 - Configure PSE BOM to display in packed mode by default.

Step 1 of Migration - The Design Document

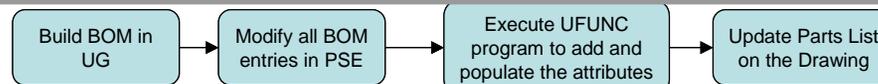
- Mapping PSE to UG Manager

Default Name in PSE	Configured Name in PSE		Configured Name in UG Parts List	
	Name	Editable (Y/N)	Name	Editable (Y/N)
Item ID	PART No.	Y	PART No.	N
Item Description	NAME OF PART	Y	NAME OF PART	N
PrfQty	No. REQD.	Y	No. REQD.	N
Pack Count	Pack Count	N	--	--
Unit of Measure	Unit of Measure	N	--	--
Sequence No	ITEM No.	Y	ITEM No.	N
Matl Notes	MATL/NOTES	Y	MATL/NOTES	N

Step 1 of Migration - The Design Document

- Consider all Parts List scenarios
 - Develop a high-level block diagram for each.

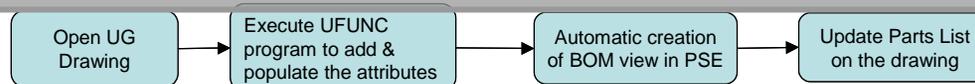
1. First Time Creation of Parts List...



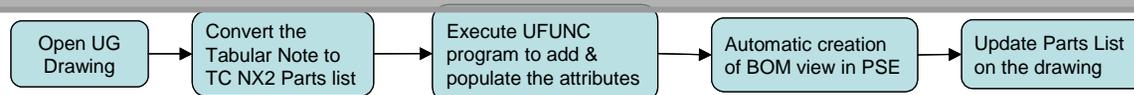
2. Modification in BOM...



3. Legacy Files – NX2 Drawings...



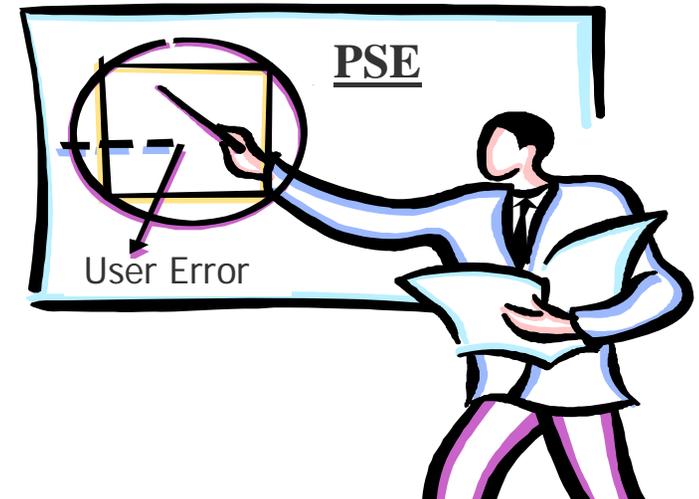
4. Legacy Files – Pre-Tce/NX2 drawings...



Step 2 of Migration – Programming Magic Happens...



- The IT Provider goes away, tries real hard, and then comes back and implements our new enhancements as they “understand” them.
- The IT provider then trains the users who will do the User Acceptance Testing (UAT).
 - Remember, we still don't really know how to manipulate BOM structure in PSE.



Step 3 – User Acceptance Testing

- UAT revealed several problems...
 - The Business asked for things we “didn’t” need.
 - The Business didn’t ask for things we “did” need.
 - The IT Provider misunderstood some requests.
 - Some things simply did not work.
- IT Provider changed programming...
- UAT was restarted...
- Again, problems were found...
- IT Provider changed programming...
- UAT was restarted and finally completed...
- **Some Business processes were changed.**



Step 4 – Go Live – Finally!



- Thankfully, the Go Live was a smooth transition.
- Developing the Go Live presentation was a little more bumpy.
 - There were some changes to the schedule to accommodate the development.
 - The presentation was out of date after the development.
 - A new presentation was developed from scratch.
 - With some effort, we were able to make it happy and successful.



Step 5 – User Training Product Structure Editor (PSE)

- Isn't that what we use to create Override Rules?
 - Yup! We will still be using the PSE to create Load Option Override Rules, but now it will also drive our Parts Lists.



- We will continue to develop assemblies using standard UG assembly techniques.
 - The NX Assembly Structure is still the driver.
 - Add / Delete Components in NX, as always.
- New Drawing Parts Lists will be completely manipulated using the PSE.
- Legacy Drawing Parts Lists will be captured from the Drawing and Pushed to the PSE.
 - Further manipulations to the Parts List will be done using the PSE.

New Parts List Creation

- Once the UG Master is added to the Drawing...
- Select Application → Modeling...
- Select the new PSE SYNC icon on your EMD-Standards Toolbar...



This icon adds some new attributes to your Drawing File & NX Master File. Once this is complete,

- Save your Drawing File.
- Ensure NX Saves your Assembly Structure.
 - Select your Item Revision in TCe.
 - Select the Properties Tab.
 - Check the Date Modified time.

Contents of: 40126658/---SHEET ASM	
Object	Date Modified ▲
view	
40126658/---view	11-Nov-2005 13:48
40126658/---DWG	11-Nov-2005 13:48
40126658/--	11-Nov-2005 13:48
40126658/--	11-Nov-2005 13:49

New Parts List Creation (cont)

- Launch your assembly in the PSE.
 - Double-Click the BOM View Dataset in TCe.
- Assign the Item No.'s if need be.

40126685/---AWERG (view) - Latest Released - Date - "Now"									
BOM Line	Prfqty	No.REQD	Pack Count	Unit of Measure	MATL/NOTES	NAME OF PART	PART No	ITEM No.	POS
40126685/---AWERG (view)			1	PC		AWERG	40126685		
12015792/---ASM CONN			3	PC		ASM CONN	12015792	1	
120013/A-GROMMET			6	PC		GROMMET	120013	2	

- Continue by assigning any MATL/NOTES & Prfqty.
 - Prfqty is meant for changing the QTY to something other than that of the Assembly Structure.
 - Acceptable overrides include; AR, REF, OPT, 7.0 0Z, 1373.
 - Do NOT use this to change a quantity from 3 to 4.

40126685/---AWERG (view) - Latest Released - Date - "Now"									
BOM Line	Prfqty	No.REQD	Pack Count	Unit of Measure	MATL/NOTES	NAME OF PART	PART No	ITEM No.	POS
40126685/---AWERG (view)			1	PC		AWERG	40126685		
12015792/---ASM CONN	2568		3	PC		ASM CONN	12015792	1	
120013/A-GROMMET	REF		6	PC	SEE EDL	GROMMET	120013	2	

New Parts List Creation (cont)

EMD Tools

NO.REQD Sync

ITEM NO Sync

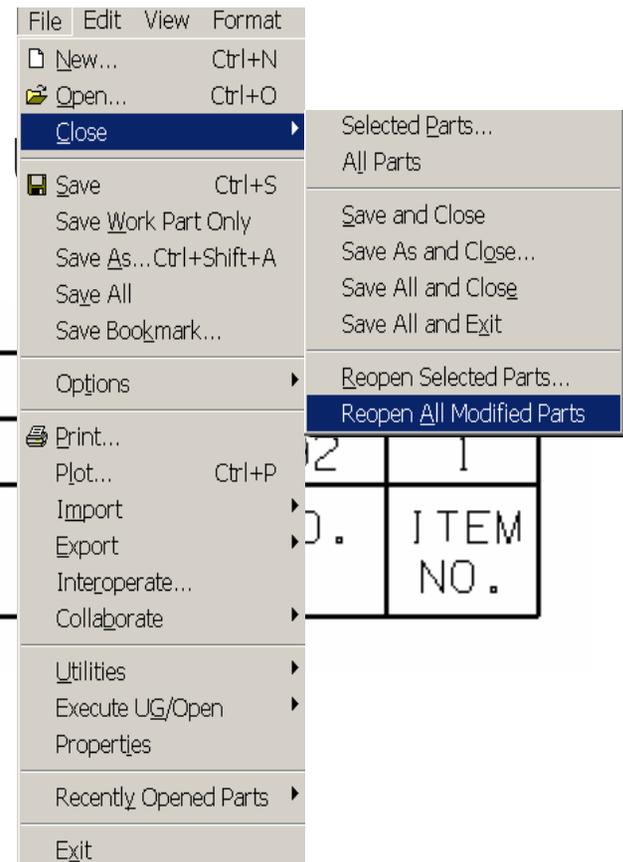
- Select the EMD Tools Pull down →
- NO.REQD Sync.
 - This takes the Pack count from the UG Assembly if there is no Prfqty and puts it in the NO.REQD column.
 - If there is a Prfqty specified that is put into the NO.REQD column.

BOM Line	Prfqty	No.REQD	Pack Count	Unit of Measure	MATL/NOTES	NAME OF PART	PART No	ITEM No.	POS
40126685/---AWERG (view)			1	PC		AWERG	40126685		
12015792/---ASM CONN	2568	2568	3	PC	-	ASM CONN	12015792	1	
120013/A-GROMMET	REF	REF	6	PC	SEE EDL	GROMMET	120013	2	

- The No.REQD column is what gets sent to the Drawing Parts List & SAP
- Save your changes
 - Select File → Save (in the PSE).

New Parts List Creation (cont)

- If your drawing is still loaded, you must close and reopen it to refresh the data.
 - Select File → Close → Reopen All Modified Parts.
 - This works about 90% of the time.
- Now your Parts List is ready for
- Update your Parts List.



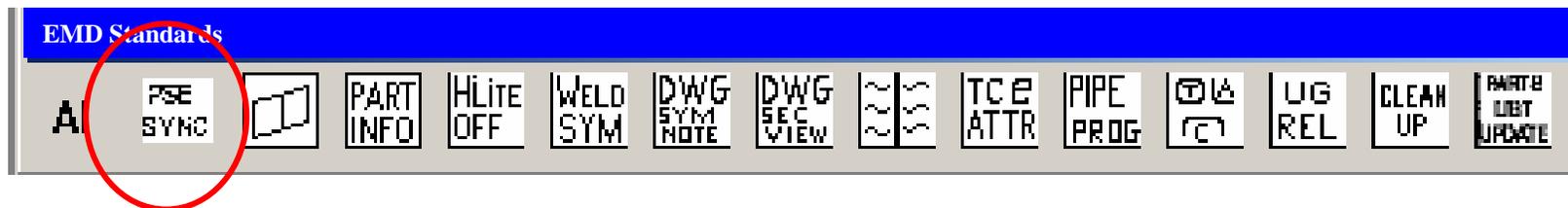
REF	SEE EDL	GROMMET
2568	-	ASM CONN
NO. REQD	MATL/NOTES	NAME OF PART

2	1
NO.	ITEM NO.

▪ ***Voila!***

Legacy Parts List Updation

- Open your Drawing (Specification)
- Update Your Parts List (P/L)
- Display Your Position Column
 - Select the Right Edge of the Parts List with the LMB
 - Hit RMB → Select “Resize” → in the pop-up window, Key in .5
- Your Parts List is now ready to be “Synchronized” with the PSE
 - Go to Application → Modeling
 - Poke the PSE SYNC button on the EMD Standards Toolbar.
- Save Your Drawing



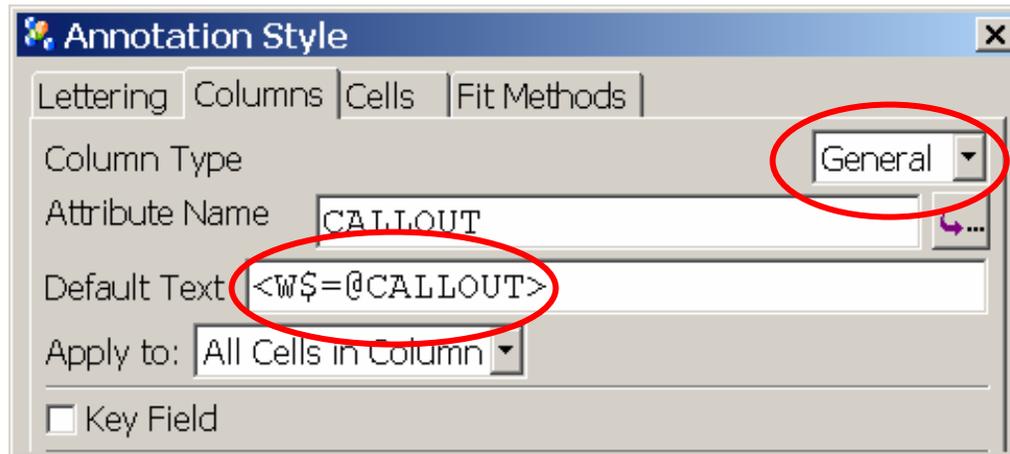
Legacy Parts List Updation – In PSE



- Continue by Fixing any MATL/NOTES & Prfqty's.
 - Remember to hit the EMD Tools Pull down → No.REQD SYNC
- Save your changes
 - File → Save (in the PSE)
- Reopen your Drawing (Specification)
 - If your Drawing is still open in NX, you have two choices:
 - Use the File → Close → Reopen All Modified Parts.
 - Or
 - Use the File → Close All Parts.
 - From TCe, double click the Dataset.
 - From UG Manager, select File → Open

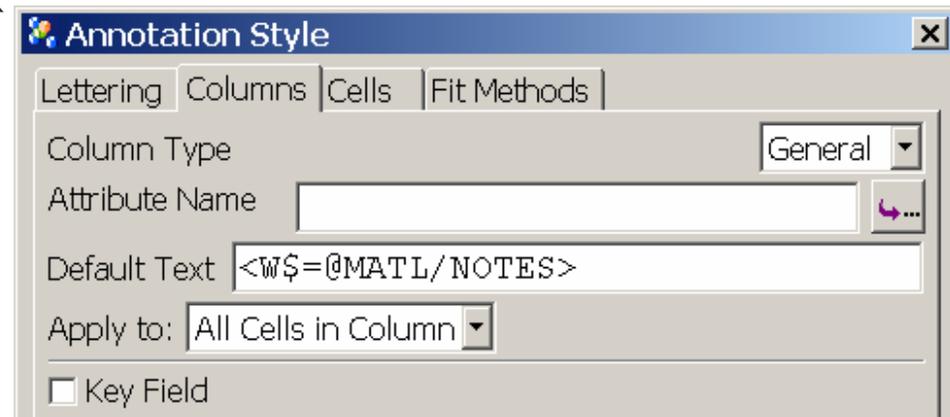
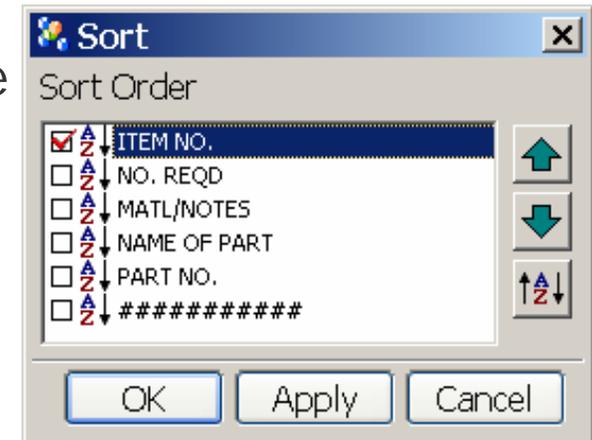
Legacy Parts List Updation - Post PSE

- Fix your ITEM NO. Column...
 - Select the ITEM NO. column w/ LMB, then hit RMB → Select "Style"
 - In the "Columns" Tab
 - Change the Column Type to "General"
 - Change the Default Text to <W\$=@CALLOUT> → OK
 - If your P/L has Multiple Occurrences of the same Part Number, as is the case of an EDL Drawing, Turn ON Key Field. Turn it OFF for the POS Column.



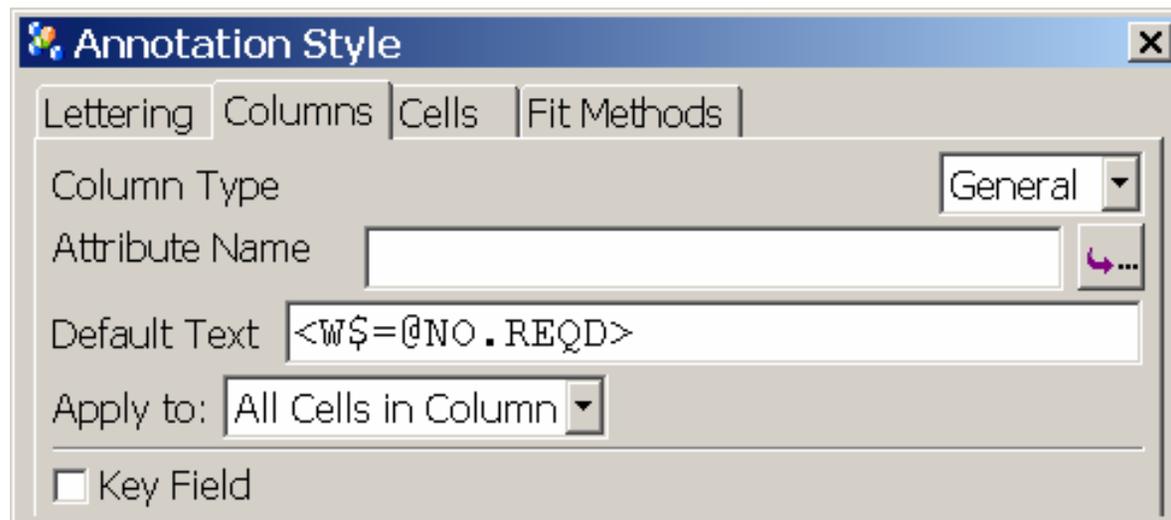
Legacy Parts List Updation - Post PSE (cont.)

- Sort on the ITEM NO Column
 - Select Your Parts List, then hover your Mouse over the P/L, Hit RMB → "Sort"
 - In the "Sort" Pop-Up select the "ITEM NO."
- Fix your MATL/NOTES Column
 - Select the column w/ LMB, then hit RMB → Select "Style"
 - In the "Columns" Tab, Change the Default Text to <W\$=@MATL/NOTES> → OK



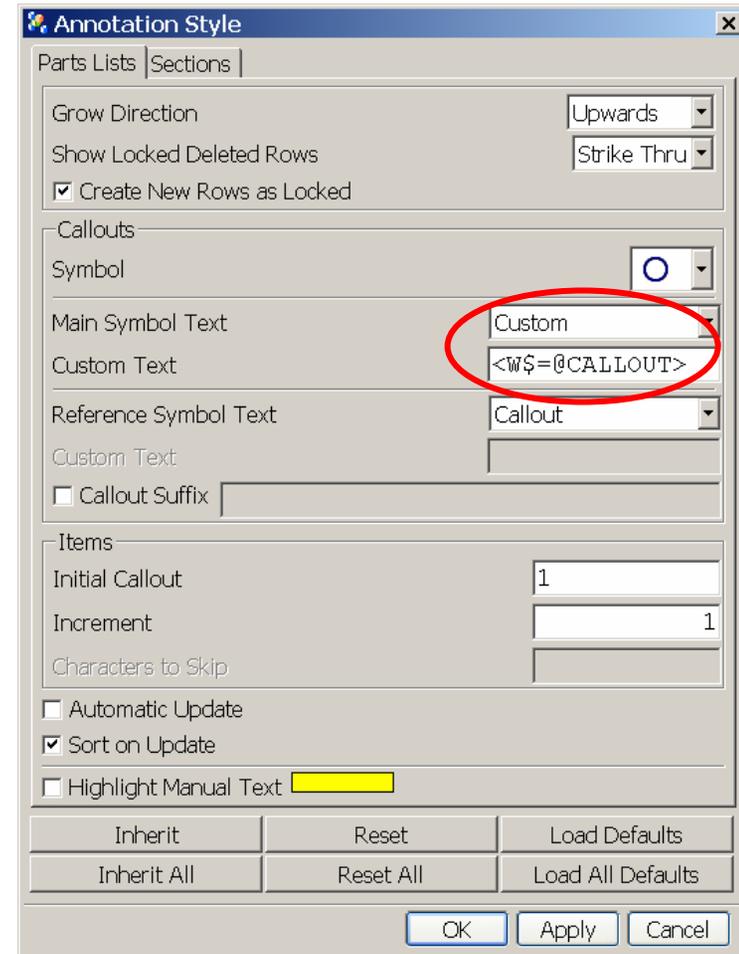
Legacy Parts List Updation - Post PSE (cont.)

- Fix your NO. REQD Column
 - Select the column w/ LMB, then hit RMB → Select "Style"
 - In the "Columns" Tab,
 - Change the Column Type to General
 - Change the Default Text to <W\$=@NO.REQD> → OK



Legacy Parts List Updation - Post PSE (cont.)

- Fix Your Parts List Format.
 - Select your Parts List , hover your Mouse over the P/L, Hit RMB → Select "Style"
 - In the "Annotation Style" Pop-up, select the "Parts List" Tab
 - set the "Grow Direction" to "Upwards"
 - Change the "Main Symbol Text" to "Custom"
 - Change the Custom Text to `<W$=@CALLOUT>` → OK



Legacy Parts List Updation - Post PSE (cont.)

- Un-Lock all Rows of the Parts List
 - Hover your Mouse over the Left Side of the Row for Item 1.
 - Click and Drag up to the Last Item in Your Parts List.
 - Hover your Mouse over the P/L, Hit RMB → Select "Lock/Unlock Rows"

REF	SEE EDL	SCREW - #10-32 FSL	120612	9
REF	SEE EDL	GUSSET	40095285	8
4		SCREW - #10-32 FSL	120612	7
7.0 OZ		LUBRICANT - SPRAY	9339834	6
2491		LAMINATION	40051473	5
AR		SHIM	40132222	4
OPT	FOR IT.1	BRACKET	40132760	2
1		BRACKET ASM	40095286	1
NO. REQD	MATL/NOTES	NAME OF PART	PART NO.	ITEM NO.

- Save your Drawing.

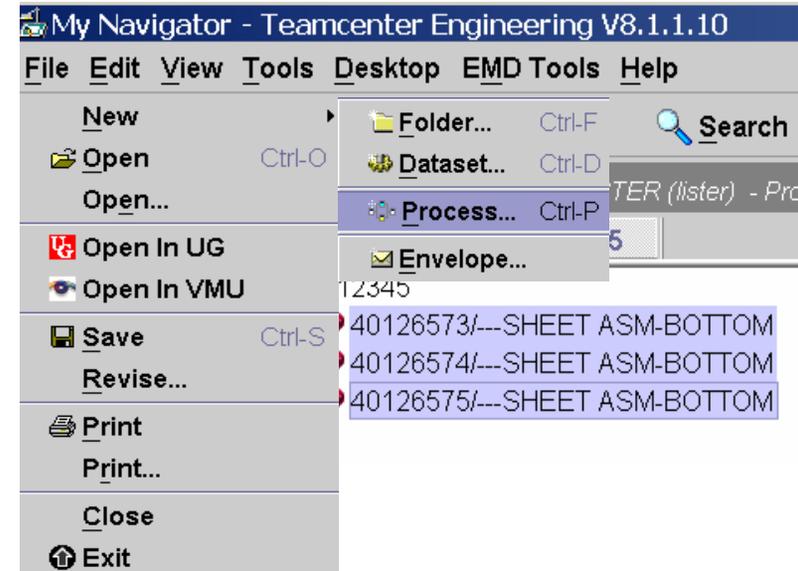
New EMD Workflow

- Three new Workflow Processes were created.
 - Part Release Process.
 - Discontinue Process.
 - Quick Release Process.

- Work Your Job as Usual
 - Ensure your Job numbers are Valid

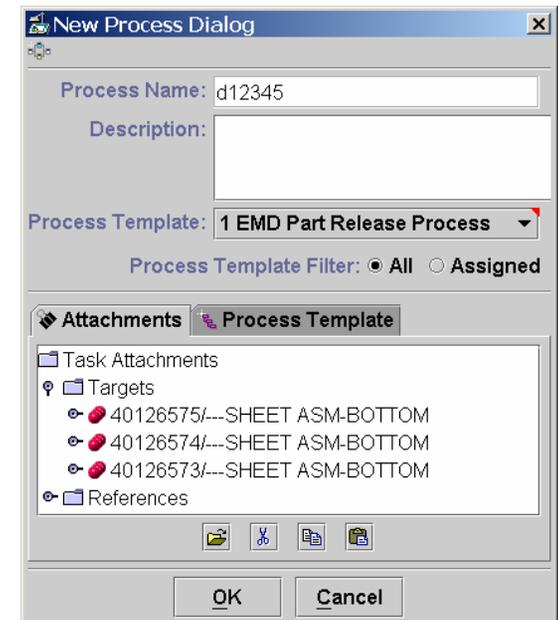
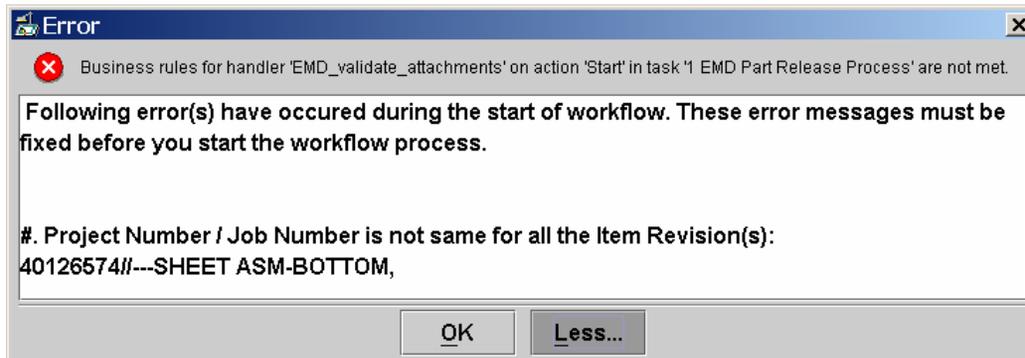
Create Your Release Process

- Same Technique as Old Process
- When you're done with your Job, Select all of your Item Revisions
 - Then Select File→New→Process.
 - Name the Process.



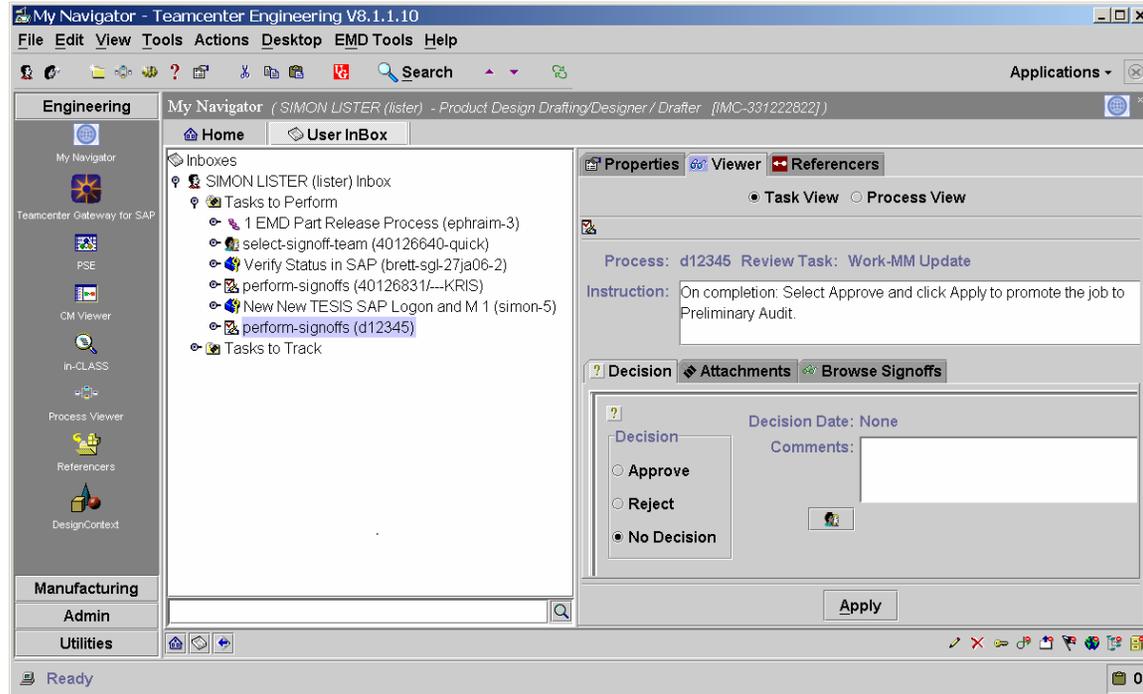
New Part Release Process

- New Error Reporting will tell you what went wrong using more descriptive error messages.



New Part Release Process

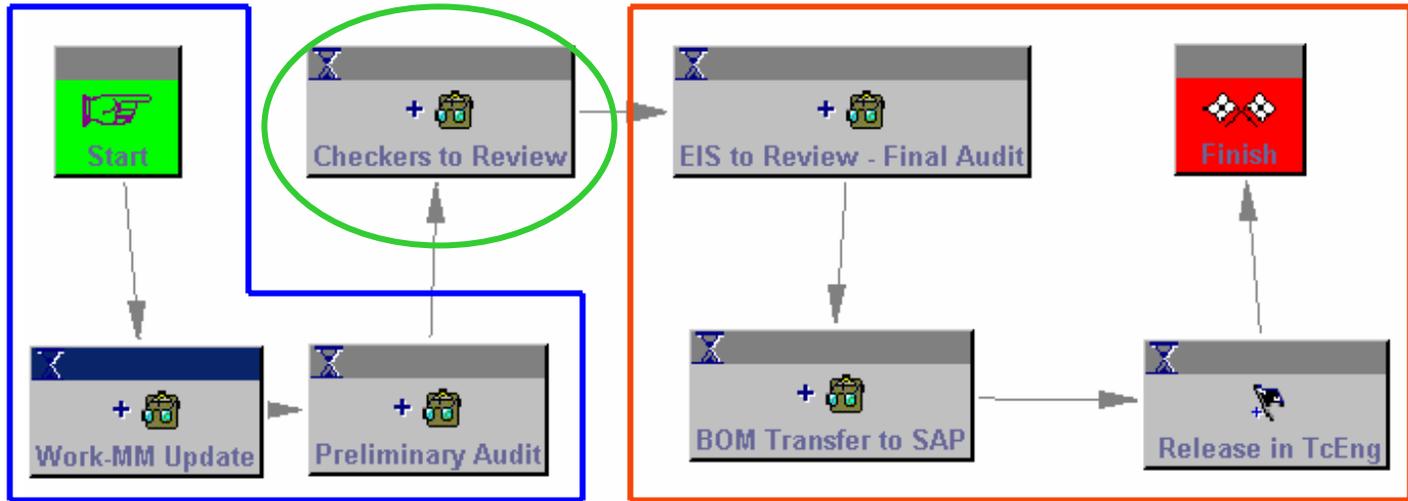
- Go to the TCe Inbox
 - Navigate to your "Tasks to Perform"
 - Select your New Workflow Job
 - Select the Viewer Tab
 - Poke "Task View"
 - Poke Approve → Apply



This will Automagically push new Material to SAP Using the Tesis software T4S.



New Part Release Process



Designer Tasks

Checker Task

EIS Tasks

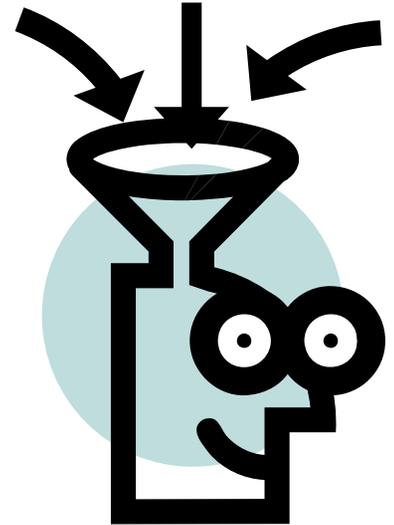
Workflow Audit Report

- Audit is Created for Each Workflow Job to be Released.
 - Intended to reduce Attribute and BOM errors before Job goes to Checking.
 - Checks all the Targets of the Job and all first level BOM Items.
 - Bounces TCe attribute Data against SAP using the Tesis T4S software.

Audit Report				
Preliminary Audit Report : Part Release Process				
WorkFlow Name	D12345			
Job Number	D12345			
Project Number	TEST			
Designer/Drafter ID	lister			
Designer/Drafter Name	SIMON LISTER			
Date And Time Of Audit	Thu Feb 09 13:48:27 CST 2006			
1) List Of Targets:				
Target Id	Target Name	Rev Level	#Of Sheet	Cad Type
40110644	EP RAMP DR GR PKT ASM	-B	1	UG
2) Report For Parts Not Present In SAP:				
Part Id/Name	TargetId/Name			
3) Report Of Released Status/Discontinued Parts In SAP:				
Part Id/Name	Target Id/Name	Status		
4) Report Of Attribute Mismatch:				
Part Id	Target Id	Attribute Value In TcEng	Value In SAP	
5) Report Of Duplicate Part No's in BOM :				
Target Id/Name	Part Id	Item No	No Req'd	
6) Report Of BOM Line Discrepancy :				
Target Id/Name	Part Id	ItemNO-TCE		
40110644 /EP RAMP DR GR PKT ASM	179890	8		
40110644 /EP RAMP DR GR PKT ASM	40016186	0006	SAP	
Close		Print		

Lessons Learned

- Go get trained.
 - BEFORE you start making decisions about how you intend to implement and use the software... LEARN IT!
 - Consider getting training from someone other than the IT Provider who will implement your Software to get a different perspective.
 - Remember the old proverb:
 - The more you know, the more you know.
- Train your IT Provider.
 - If you are leveraging an outside IT Provider be sure they completely understand your current business processes.
 - Assume they have no idea what you have been doing.



Lessons Learned

- **Embrace Change.**
 - Some of your business processes have been developed to accommodate old tools. There is likely a newer, easier, more efficient method.
 - Be prepared to let go of things which are comfortable but offer no long term value.
- **Sequence your Go-Live.**
 - This will allow users to get good at the first steps before you affect the next guy.
- **Offer LOTS of user training.**
 - Give some advanced user training to familiarize workforce with concepts and terminology.
 - Do your official Training immediately after go live.
 - Provide refresher training post go-live.



Thank you for your attention...any questions?



simon.lister@emdiesels.com