



# LIVEWORX

A NEW ERA IN PRODUCT LIFECYCLE INNOVATION

SESSION ID: CA1107C

# MAKE IT EASY FOR ENGINEERS TO MANAGE & VERIFY WEIGHT IN CREO

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[LIVEWORX.COM](https://LIVEWORX.COM) | [#LIVEWORX](https://twitter.com/LIVEWORX)



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# THREE QUESTIONS TO PONDER

- Do you provide users a simple check for inclusion of model weight?
- Do you have large assemblies that make it difficult to calculate weight?
- Does your company have weight parameter on drawing as a string?

# Company Profile

50+ Unique Trucks Per Day

Each Truck

- 500-600 Bill of Materials
- 7000-8000 Orderable Parts
- 150,000+ CAD Objects





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## WOULDN'T BE GREAT IF...

- You provided an optional environment where the burden of longer regeneration weight calculations can be minimized.
- Windchill included multiple weight types (Scale or CAD) from the Creo Model.
- A user had an improved user environment for checking weight information in Creo.

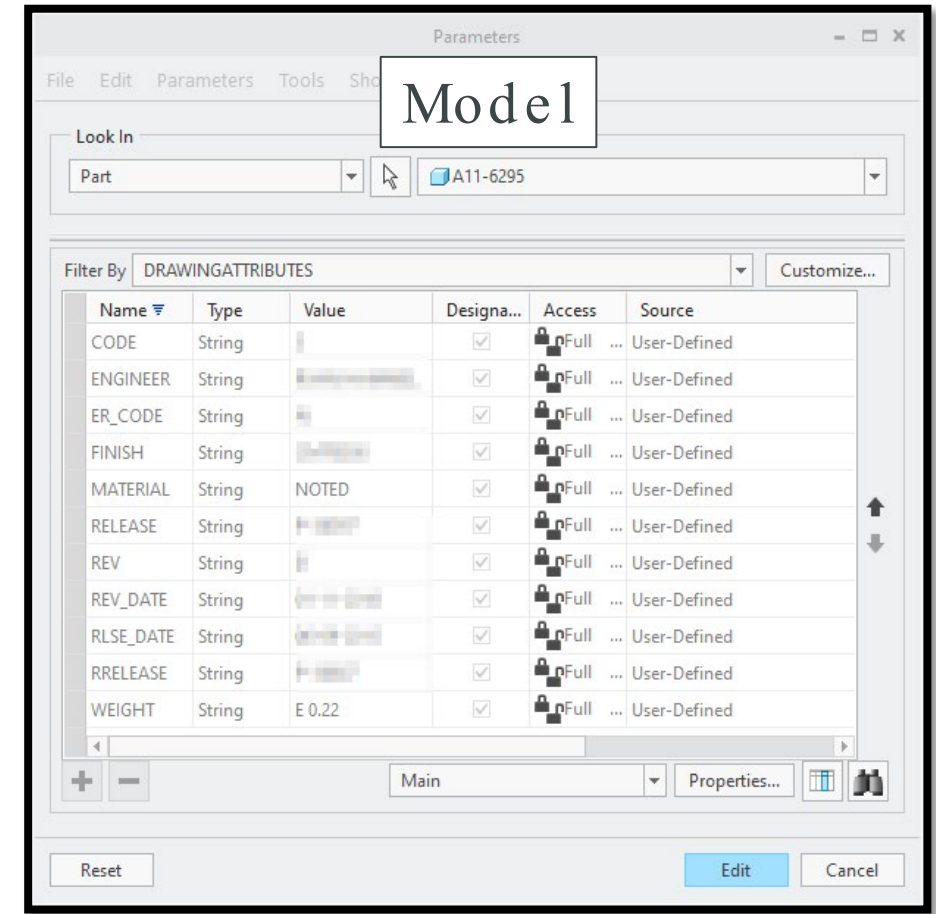
# THE PROBLEM

Manually entered String for weight and material in model for display on drawing

QTY	ITEM	PART NUMBER	PRODUCT D	Drawing		MATERIAL
THIRD ANGLE PROJECTION		3.2 (.125)		NOTED		GA CODE
DO NOT SCALE DRAWING		1. THIS DRAWING AND THE INFORMATION CONTAINED HEREIN IS PROPRIETARY TO PACCAR INC. IT SHALL NOT BE REPRODUCED, COPIED OR DISCLOSED, IN WHOLE OR IN PART, OR USED FOR MANUFACTURE OR FOR OTHER PURPOSE WITHOUT THE WRITTEN PERMISSION OF PACCAR INC.		FINISH		ER CODE
SCALE	UNITS	2. DIMENSIONING AND TOLERANCING PER CP50108.		CMT0030	WEIGHT (KG)	N
1:1	mm	3. REMOVE ALL BURRS, BREAK SHARP EDGES.		TITLE		
TOLERANCES UNLESS OTHERWISE SPECIFIED		4. FOR PART IDENTIFICATION AND TRACEABILITY REQUIREMENTS, SEE CP50098.		BRACKET-XMBR ELEC ROUTING SPRT		
ANGLE = ± 1°		5. THIS DRAWING/SPECIFICATION USES SPECIAL CHARACTERISTICS SYMBOLS. THESE SYMBOLS ARE DEFINED IN THE PACCAR SUPPLIER QUALITY STANDARD.		DRAWING		REVISION
(X) = ± 2		6. SEE CP50374 FOR EMISSION-RELATED REQUIREMENTS.		PACCAR	A11-6295	D
(X.X) = ± 1.0		7. AFTERMARKET SERVICE PARTS SHALL BE PACKAGED ACCORDING TO CPP0498.		SHEET 1 OF 1		
MODEL NUMBER: A11-6295.PRT		MODEL VERSION: D.3		CREO PARAMETRIC 4.0		DRAWING VERSION: D.3

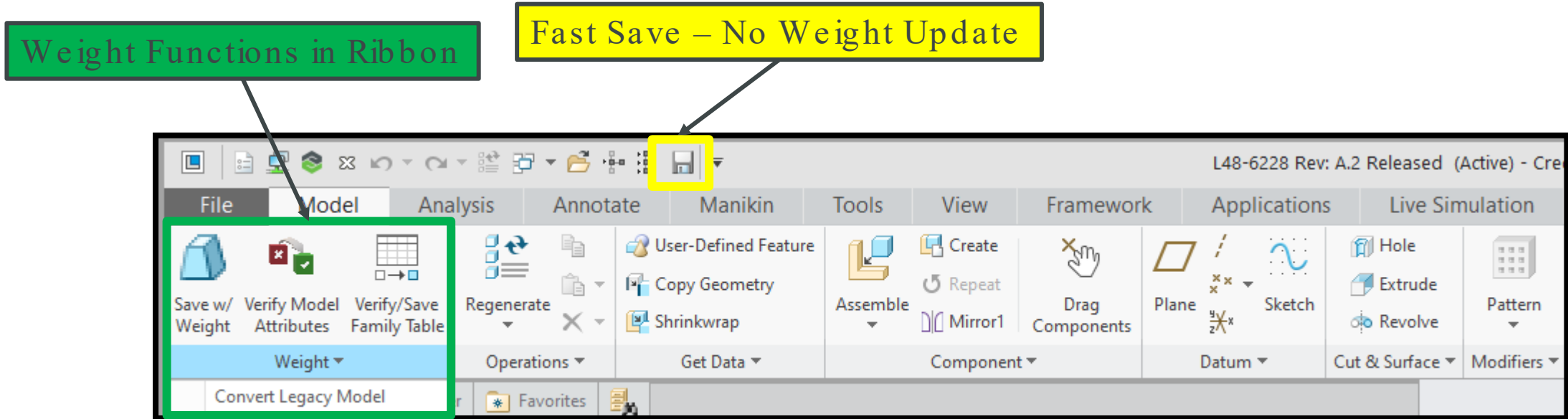
Need to manage 3 weight types:

1. Actual
2. Vendor
3. CAD



# SOLUTION IN PARAMETRIC RIBBON

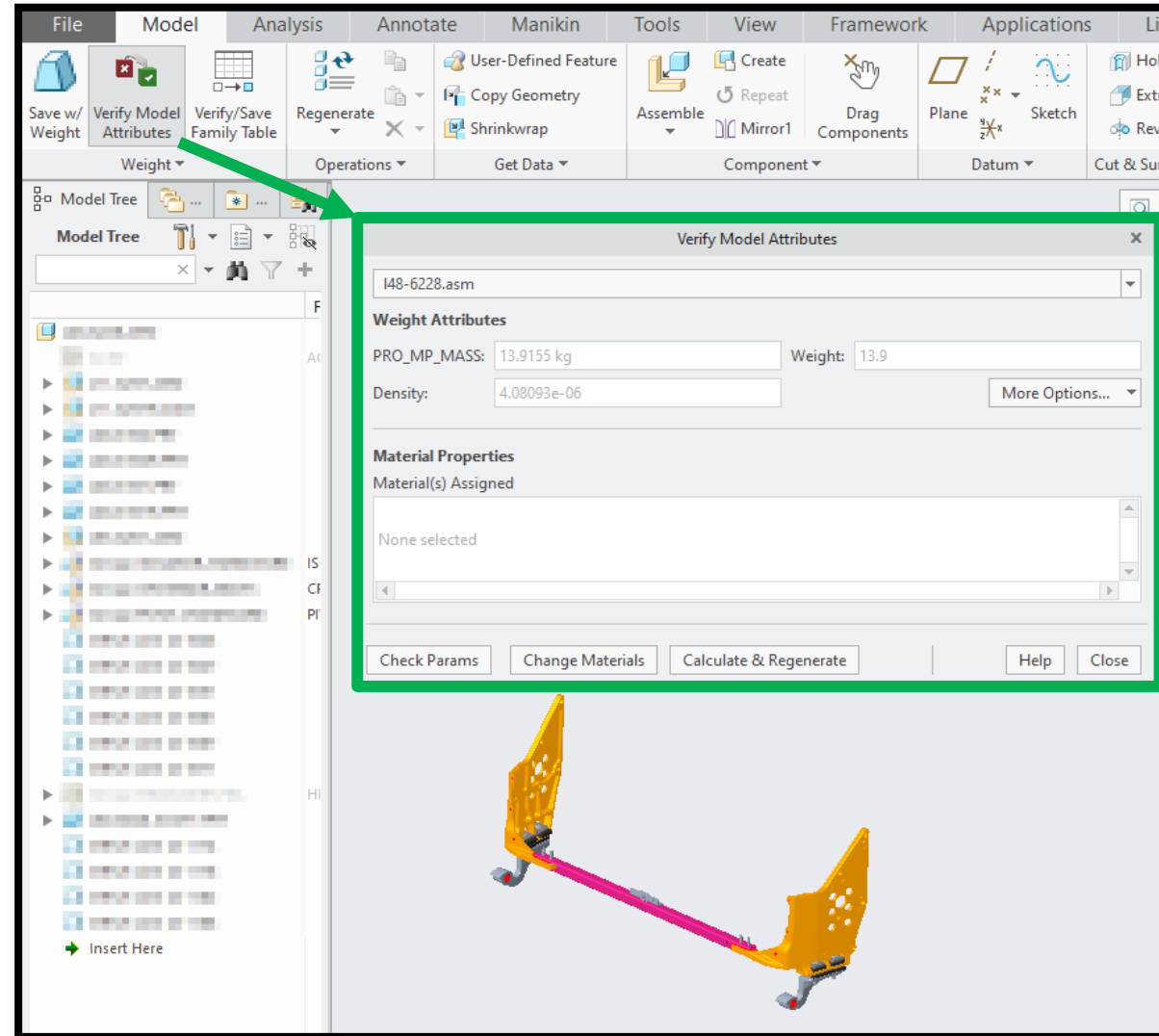
Regenerating with weight calculation config settings cause large performance hits for large assemblies.



# SOLUTION FOR VISUAL WEIGHT CHECK

## Intuitive Interface

- Check weight parameters
- Change material
- Calculate and regenerate weight



# EASY UPDATE AND ASSEMBLY VIEW

The screenshot displays the CAD software interface. On the left is the Model Tree, and on the right is the Verify Model Attributes dialog box. A table within the dialog shows weight attributes for various Master Reps. A green box highlights the table, and a green arrow points from the 'More Options...' dropdown in the dialog to a 'SET VENDOR/ACTUAL' dialog box on the right.

Feat Name	pro_mp_density	pro_mp_mass	WEIGHT	MATERIAL	PRO_MP_ALT_MASS
Def: Exclud	0.000004	13.915517	E 13.9	N/A	0.000000
Master Rep	0.000003	2.958044	E XXX	MATERIAL	
Master Rep	0.000003	2.958039	E XXX	NOTED	
Master Rep	0.000008	1.454479	E 1.45	NOTED	
Master Rep	0.000008	1.454479	E XXX	NOTED	
	0.000008	1.468097	E 1.48	NOTED	
	0.000003	0.507313	E XXX	NOTED	
Master Rep	0.000008	3.171313	E 3.18	NOTED	

Verify Model Attributes dialog box fields:  
File: 148-6228.asm  
Weight Attributes:  
PRO\_MP\_MASS: 13.9155 kg | Weight: 13.9  
Density: 4.08093e-06  
Material Properties:  
Material(s) Assigned: None selected  
Buttons: Check Params, Change Materials, Calculate & Regenerate, Help, Close

SET VENDOR/ACTUAL dialog box with input fields for WEIGHT\_VENDOR and WEIGHT\_ACTUAL, and Apply/Cancel buttons.

**More Options**  
Enable review of important weight in model tree  
Quick entry of Vendor or Actual weight



# BENEFITS– DOWNSTREAM APPLICATIONS

Model Number: [0005671](#) Build Plant: Denton Cost Roll Up: | Weight Roll Up: 688 kg (1,518 lb) (WM: 82%) Choose Filter

Chassis Structure View | Flat Component View

Chassis/BOM/Part #	Description	Quantity	Best Weight (kg)	WM
899974		NA	3,681.94	
3C00	REAR AXLE/SUSPENSION	NA	2.83	
3B00	FRONT AXLE/SUSPENSION	NA	126.41	
3A00	FRAME	NA	696.35	
3A00300	FRAME RAILS/HARDWARE	NA	559.20	
3A00300BAU	FRAME RAILS EXC 320	1	559.20	
<a href="#">01-47635-08992L</a>	RAIL-10 3/4 273.9.52 3/8	1	279.60	W3

▼ Create Filter

Save Custom Filters | Manage Custom Filters | Manage Saved Items | Save | Download

► Best Weight/Cost > Target Weight/Cost | ► Best Cost | ► Best Weight

**PACCAR Cost / Weight Rollup**  
*In Process Truck Orders & As Built Trucks*

Weight in Creo View  
*Select Parts from Large Assembly to quickly see weight*

Display Name

- m11-3440.asm, A.32
  - m11-3440-1.prt, A.38
  - m10\_flange\_nut.prt, A.0
  - m20-6000.prt, B.2

m20-6000.prt, B.2 | Bill Of Materials

Item	Qty	Name	WEIGHT	part_WEIGHT_VENDOR	part_WEIGHT_ACTUAL	part_MASS_CAD	part_Reference_Weight
1	1	m11-3440.asm, A.32	E 0.84	0.00000000000000	0.00000000000000	8.4396598863060E-1	
1.1	1	m11-3440-1.prt, A.38	E 0.80	0.00000000000000	0.00000000000000	8.0196985332207E-1	
1.2	1	m10_flange_nut.prt, A.0	NOTED				
1.3	1	m20-6000.prt, B.2	E 0.02				

# START PART REQUIREMENTS

1) Define Material Strategy

The screenshot displays the CAD software interface with three key areas highlighted by green callouts:

- Model Tree:** Shows the 'STARTPART.PRT' file with a 'Materials' folder containing 'START\_PART\_MATERIAL'.
- Relations Window:** Shows the 'Look In' dropdown set to 'Part' and 'STARTPART'. The 'Relations' section contains a list of revision notes and a 'Post Regeneration' button.
- Local Parameters Table:** A table with columns for Name, Type, Value, Designa..., Access, Source, and D. The table is filtered by 'WEIGHT'.

Name	Type	Value	Designa...	Access	Source	D
WEIGHT_VENDOR	Real Number	0.000000	<input checked="" type="checkbox"/>	Full	User-Defined	
WEIGHT_ACTUAL	Real Number	0.000000	<input checked="" type="checkbox"/>	Full	User-Defined	
WEIGHT	String	E 0.01	<input checked="" type="checkbox"/>	Locke...	Relation	
MOD			<input type="checkbox"/>	Full	User-Defined	
MATE			<input checked="" type="checkbox"/>	Locke...	Relation	
MASS_CAD	Real Number	0.000000	<input checked="" type="checkbox"/>	Locke...	Relation	
DRAWING_WEIGHT	Yes No	YES	<input type="checkbox"/>	Full	User-Defined	

3) Define Relations

2) Define Parameters

# PARAMETERS

Internal mass properties  
Use to Drive Relations

Displayed on Drawing  
Title Block  
**\*\*STRING\*\***

	pro_mp_density	PRO_MP_VOLUME	PRO_MP_SOURCE	pro_mp_mass	PRO_MP_ALT_MASS	MASS_CAD	WEIGHT_VENDOR	WEIGHT_ACTUAL	WEIGHT	MATERIAL	DRAWING_WEIGHT	MODEL_BASED_MATERIAL
L48-6228.ASM	0.000004	3409886.613125	PARAMETERS	14.350000	14.350000	13.915517	14.000000	14.350000	A 14.3	NOTED	YES	NO
L11-6257.ASM	0.000003	1102147.841554	GEOMETRY	2.958044					E XXX	MATERIAL		

Parameters for Windchill &  
Weight Rollup  
**\*\*REAL NUMBERS\*\***

Reference Articles CS341830 & CS247208 on PTC Support Site for more information

# PARAMETERS

	pro_mp_density	PRO_MP_VOLUME	PRO_MP_SOURCE	pro_mp_mass	PRO_MP_ALT_MASS	MASS_CAD	WEIGHT_VENDOR	WEIGHT_ACTUAL	WEIGHT	MATERIAL	DRAWING_WEIGHT	MODEL_BASED_MATERIAL
L48-6228.ASM	0.000004	3409886.613125	PARAMETERS	14.350000	14.350000	13.915517	14.000000	14.350000	A 14.3	NOTED	YES	NO
L11-6257.ASM	0.000003	1102147.841554	GEOMETRY	2.958044					E XXX	MATERIAL		

Highest Confidence Value  
Shown in Drawing Title Block

MATERIAL	NOTED	GA CODE	2
FINISH	N/A	WEIGHT (KG)	A 14.3
TITLE ASSY-HOOD PIVOT			
<b>PACCAR</b>	DRAWING	L48-6228	REVISION A
CREO PARAMETRIC 4.0	DRAWING VERSION: A.4	SHEET 1 OF 2	

# PARAMETERS

Toggle for Table or Note Driven Values

	pro_mp_density	PRO_MP_VOLUME	PRO_MP_SOURCE	pro_mp_mass	PRO_MP_ALT_MASS	MASS_CAD	WEIGHT_VENDOR	WEIGHT_ACTUAL	WEIGHT	MATERIAL	DRAWING_WEIGHT	MODEL_BASED_MATERIAL
L48-6228.ASM	0.000004	3409886.613125	PARAMETERS	14.350000	14.350000	13.915517	14.000000	14.350000	A 14.3	NOTED	YES	NO
L11-6257.ASM	0.000003	1102147.841554	GEOMETRY	2.958044					E XXX	MATERIAL		

NOTES:

- 1) [Faded text]
- 2) [Faded text]
- 3) [Faded text]
- 4) MATERIAL FOR ITEM 1 & 2 : 304 STAINLESS STEEL
- 5) [Faded text]
- 6) [Faded text]
- 7) [Faded text]

PART NO.	DESCRIPTION	WEIGHT (G)
L22-1200-111	FENDER GUARD COMPLETE SET	E3.6
L22-1200-110	FENDER GUARD LH	E1.7
L22-1200-101	FENDER GUARD RH	E1.7

**EXPLODED VIEW**  
(LH SHOWN, RH OPPOSITE)  
SCALE 1:4

**ISO VIEW**  
SCALE 1:4

QTY	QTY	QTY	ITEM	PART NUMBER	PRODUCT DESCRIPTION	MATERIAL
2	2	4	4		0.437" X 0.203" X 0.031" STAINLESS STEEL FLAT WASHER	
2	2	4	3		10-32 X 1/2" STAINLESS STEEL CARRIAGE BOLT	
1	0	1	2		FENDER GUARD RH	
0	1	1	1		FENDER GUARD LH	

MATERIAL		NOTED	OK CODE
FINISH	NOTED	WEIGHT (G)	NOTED
TITLE		COVER-FENDER GUARD	
DRAWING		L22-1200-000	REVISION
PACOR			A

MODEL NUMBER: L22-1200-000.DRW    MODEL VERSION: A.11    CRED PARAMETRIC 4.0    DRAWING VERSION: A.11    SHEET 1 OF 1

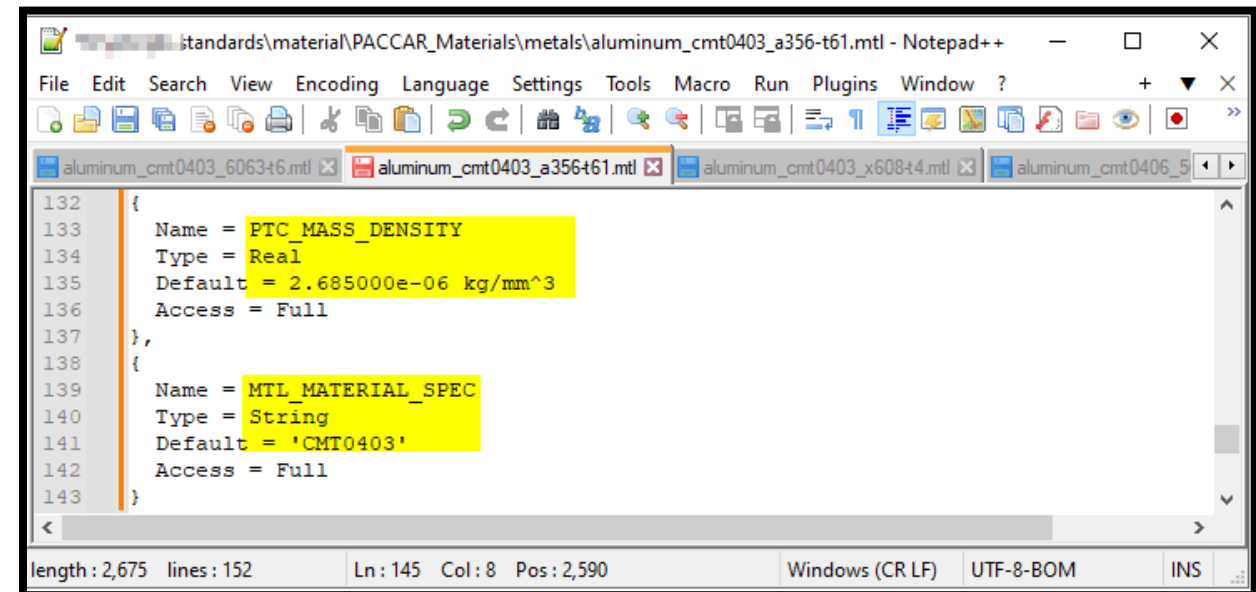
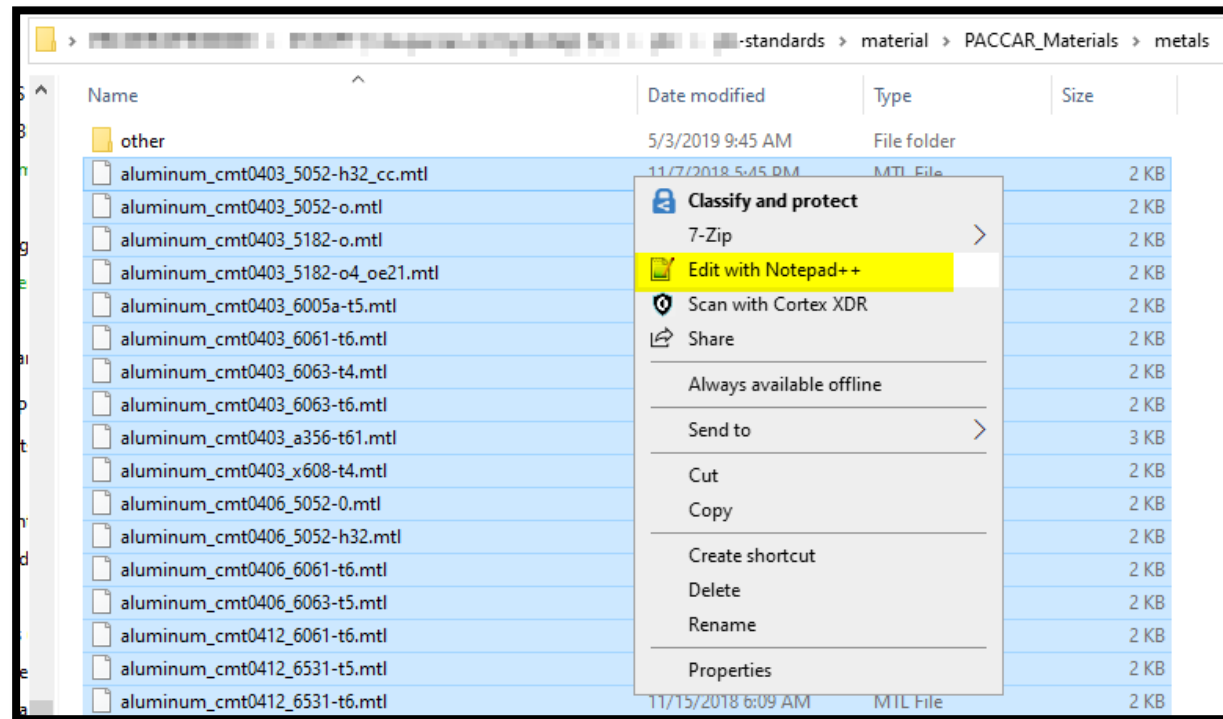


# MATERIAL LIBRARY– USE NOTEPAD++

We used Notepad++to edit 256 material files quickly and easily

Only Density is needed to Calculate Weight in Solid Models

Easy control of Material Parameter using Material Files



# EASY TO IMPLEMENT ENHANCEMENTS

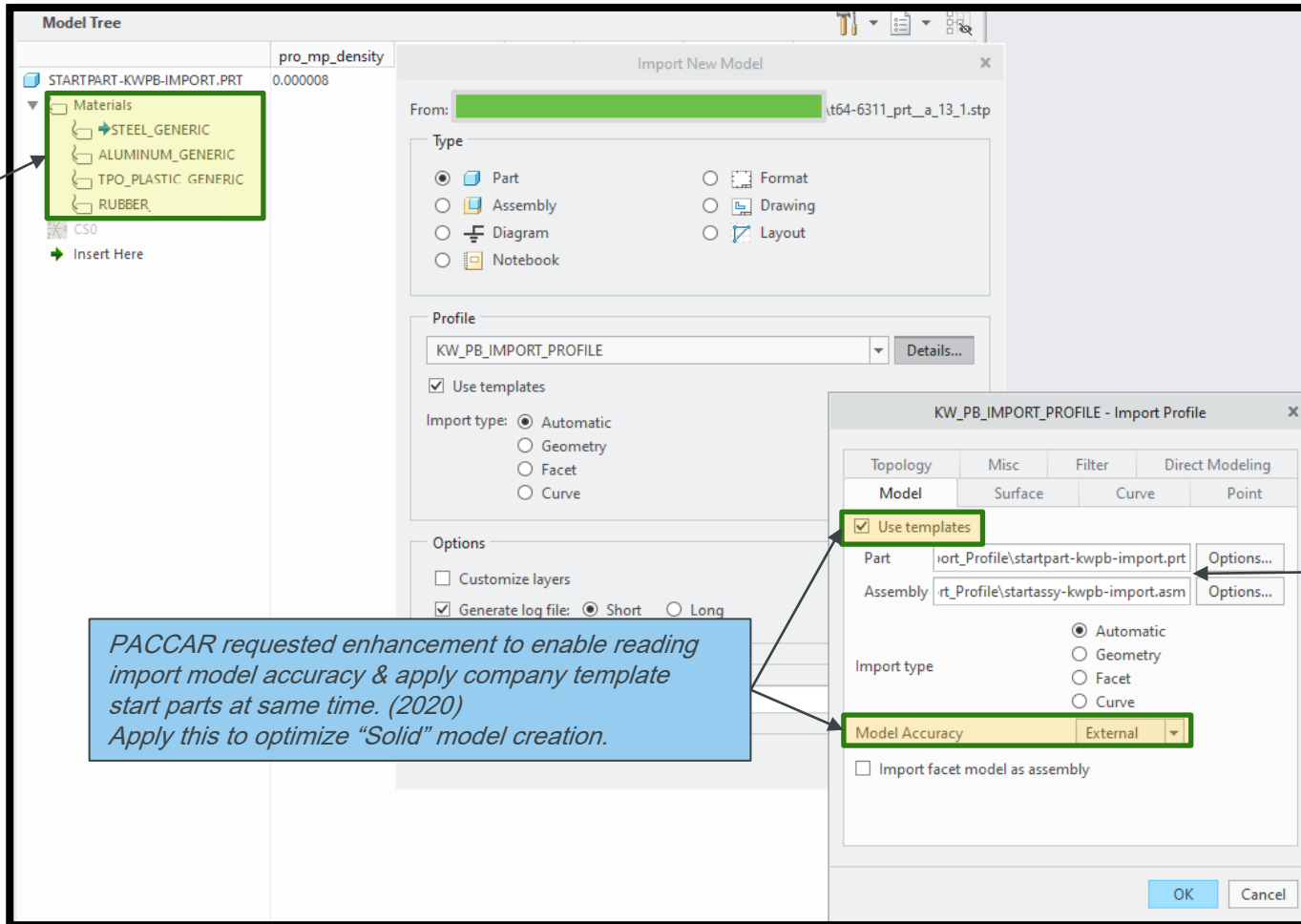
## Material and Import Profile

### Config Setting for Unique Import Start Parts

```
Intf_profile_dir <location>\Import_Profile\
```

```
intf_in_profile_default <location>\Import_Profile\KW_PB_IMPORT_PROFILE.dip
```

Multiple Materials in Import Start Part



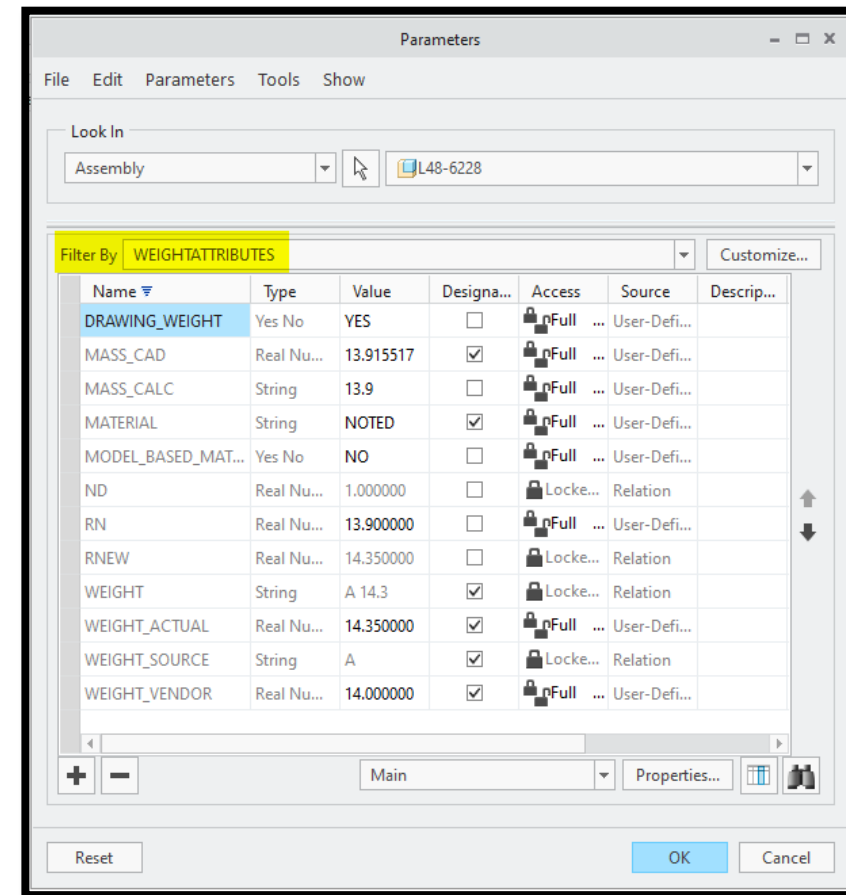
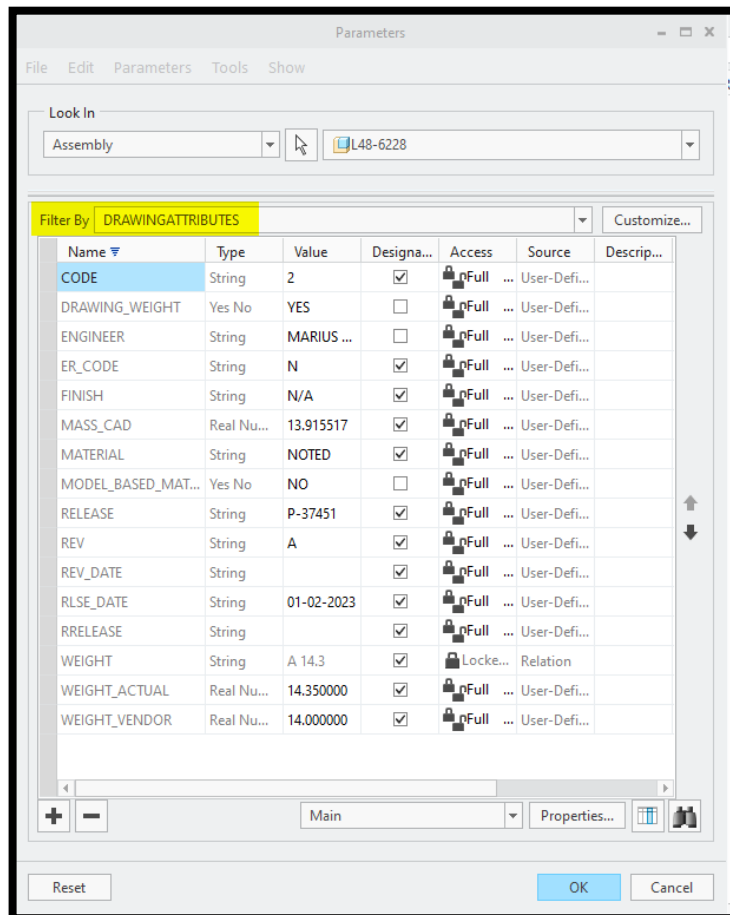
PACCAR requested enhancement to enable reading import model accuracy & apply company template start parts at same time. (2020)  
Apply this to optimize "Solid" model creation.

Import Profile Specific Start Parts

# EASY TO IMPLEMENT ENHANCEMENTS

## Parameter Filter

**Config Option to Filter Attributes in Parameter Table**  
`parameter_dialog_setup_file <location>\rp_config.xml`



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# DEMO VIDEO

High Level Overview of Weight Ribbon  
and Toolkit

# CONFIG OPTIONS

## Reference handout for details

Make it Easy for Engineers to Manage & Verify Weight in Creo  
 Bill Ryan, Engineer

**Weight Management in Creo**

You can easily rollup, manage, and verify weight automatically using Creo. This handout provides some of the details you'll need.

**Config.pro Settings Applicable to Weight**

Note: Default settings will differ depending on company requirements and standards.

Config Option	Setting (default)	Setting (Weight)	Information
mass_property_calculate	by_request	automatic	Automatic calculates on Regen
force_upd_assem_mp_in_simp_rep	no	yes	Calculates weight of components active in simplified rep
dm_auto_conflict_resolution	no	yes	Yes, enables easier management in toolkit with no popups
regenerate_read_only_objects	no	yes	Must be yes to update pro_mp_mass on lower levels
parameter_dialog_setup_file	rp_config.xml	N/A	We used this to create a filter only showing applicable weight and drawing attributes
Creotkdat	Creotk.dat		Setting needed to load the toolit

**Config.pro Settings Applicable to Weight**

Note: Having paths to standards is good to have in config.sup file.

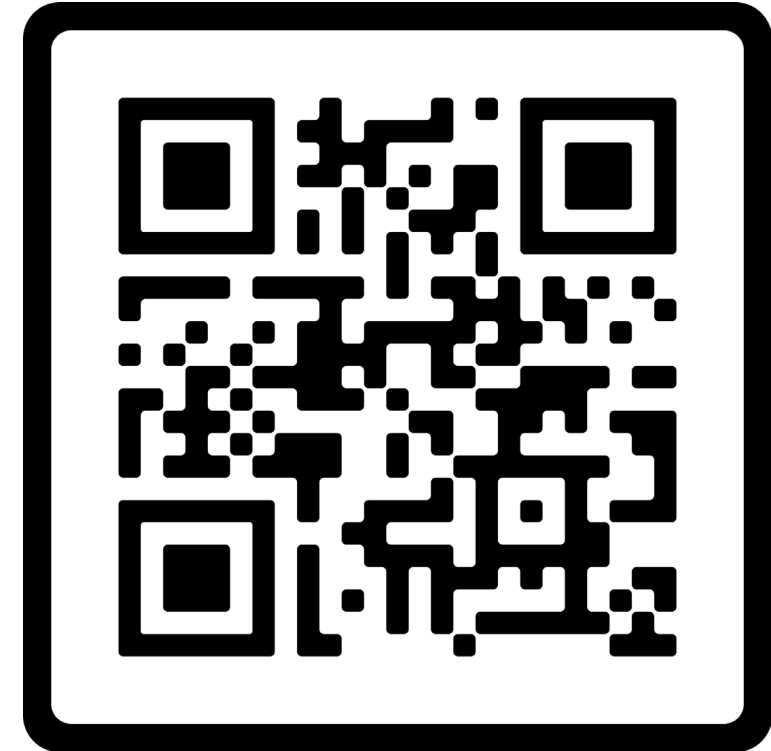
Config Option	Setting Path	Information
pro_material_dir	<location>\material	Material Library Files
start_model_dir	<location>\startmodels\	Place Start Models here
template_designasm	<location>\startmodels\startassy.asm	Name of Start Model for Assembly
template_sheetmetalpart	<location>\startmodels\startshmtl.prt	Name of Start Model for Sheetmetal
template_solidpart	<location>\startmodels\startpart.prt	Name of Start Model for Part
intf_profile_dir	<location>\import_Profile\	Place Import Profile here
intf_in_profile_default	<location>\import_Profile\IMPORT_PROFILE.dip	Name of Import Profile

**Config.pro Settings Applicable to Weight**

Note: Company must develop and test relations. Use as reference.

```

/ ' number of digits
ND = 2
/ ' Force value of RNEW to 0.01 if pro_mp_mass is less than .005
IF WEIGHT_ACTUAL>0.005
  RNEW = FLOOR(WEIGHT_ACTUAL/(5/10^(ND+1)))/ND
ELSE
  RNEW = 0.01
ENDIF
/ ' String Output - weight greater than 100
IF FLOOR(RNEW) > 100
  EW_STRING = ITOS(FLOOR(RNEW))
ELSE
/ ' String Output - weight greater than 5
IF FLOOR(RNEW) > 5
  ND = 1
  EW_STRING = ITOS(FLOOR(RNEW)/10^ND)+EXTRACT(ITOS((RNEW-FLOOR(RNEW)+1)/10^ND),2,ND)
ELSE
  IF FLOOR(RNEW) == 0
    EW_STRING = "0"+EXTRACT(ITOS((RNEW-FLOOR(RNEW)+1)/10^ND),2,ND)
  ELSE
/ ' String Output - weight less than 5
  ND = 2
  EW_STRING = ITOS(FLOOR(RNEW)/10^ND)+EXTRACT(ITOS((RNEW-FLOOR(RNEW)+1)/10^ND),2,ND)
ENDIF
ENDIF
WEIGHT = WEIGHT_SOURCE + "*" + EW_STRING
pro_mp_source = *PARAMETERS*
ENDIF
  
```







# QUESTIONS?

Thank you! You can find me at:



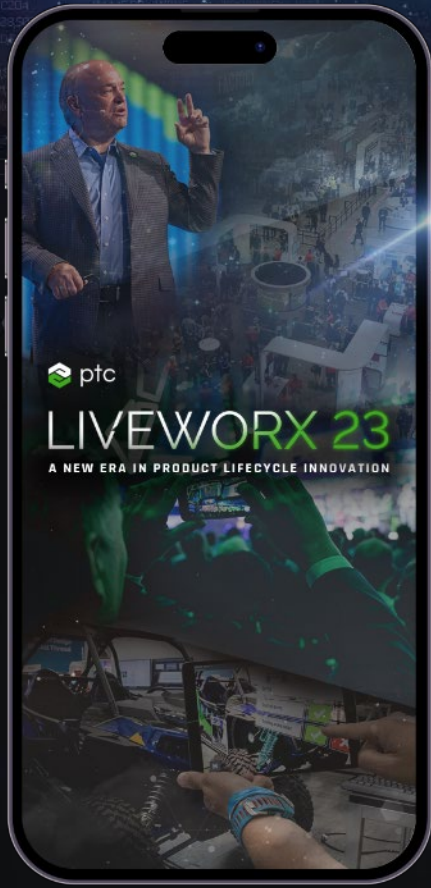
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Your feedback provides us with valuable information on how to shape future content strategy for the event!

PROVIDE SESSION FEEDBACK



# LIVEWORX

A NEW ERA IN PRODUCT LIFECYCLE INNOVATION

# THANK YOU

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