

True-Load Enhancements

2022-09-01

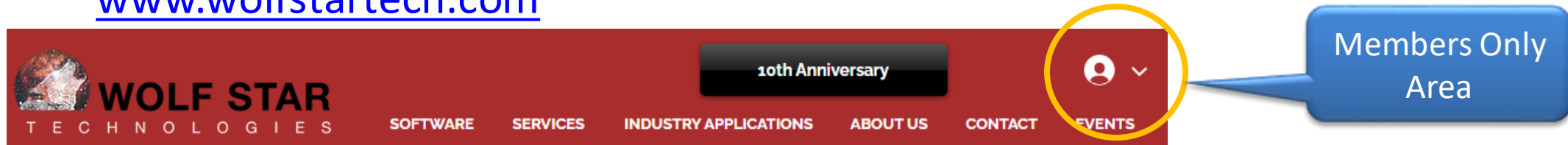


Tim Hunter



Enhancements Overview

- Great updates in this release!!!
- Remember to try True-LDE – LDE to be included with license renewals on a free Promotional basis.
 - Video demonstrations of True-LDE in the Members Only area on www.wolfstartech.com



- Most of the enhancements discussed in this document are updates in performance and usability
- Some new features have been added.
- 48 Enhancements, 2 Bug Fixes





Overview – Major Enhancements

- Great new capability! – TFU Fatigue – This gives the ability to process Durability calculations on Strain Channels (Stress Life, Strain Life, Smith-Topper-Watson, BS-7608)
- GOI / Test Data Compare –New features including the use of a MAP file from Post-Test
- Installer Update – Adds icon definitions for files and open methods.
- 3rd Party Plugins can be installed from True-Load
- Easy access to License Monitoring
- Quick format menu in XY Plots
- Colorbar manager in Results Manager
- Sort & Filter Parts and Groups
- Pick to Hide / Show Parts
- Gauge Transformation Wizard – import gauges onto a FEA model in a new orientation



Enhancements - Overview



Bug Fixes



Details

Update / Install

Major Features

Solver Specific

Install on the App Store	Google Play Store Download	Pythagoras	WOL True-Load Enhancements	Amazon Appstore	Amazon Appstore
Universal Access	Help	Web View	Transfer Data Center	Quick Transfer Mode	Full Screen Mode / Close App
Screen Manager: Color Bar Controls	Screen Manager: Split & View	Screen Manager: Split & View	Screen Manager: Split & View	Image Transfer Mode	Screen Manager: Split & View
Screen Manager: Split & View	Integration: Sydt	Screen Manager: Split & View	Screen Manager: Split & View		



WOLF STAR

True-Load Enhancements
2022-09-01



Tim Hunter





Details

Update / Install

Install Auto File Open and Icons



Secure Software Download



Major Features

TFU Fatigue



GOI / Test Data Compare Updates



Solver Specific

Abaqus Plugins



Ansys Plugin



Utilitarian Improvements

License Status



Help



Bulk Stats



Function Table Editor



Quick Format Menu



Pre-Test Hide / Show Update



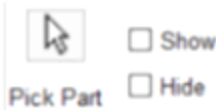
Results Manager Color Bar Controls



Part Manager Sort & Filter



Part Manager Show & Hide w/ Pick



Group Manager Sort & Filter



Gauge Transform Wizard



Post-Test Report Updates



Sort / Reorder Gauges Update



Integrate Functions



Trivial - One Load Case



Pre-Test Report - Matrix Output



Bug Fixes





Bugs

Module	Type	Description
ALL	Bug	group manager remove group not working
Post	Bug	Hybrid Loading / Contact Control crashing when GOI are used

This bug was caught by a user.



Enhancements - Overview





Enhancements – True-Load Environment

Module	Type	Description
ALL	Enhancement	Set icon and open method on(TLD, QSE, TFU, and T3D) files
ALL	Enhancement	Gauge Xform Wizard
ALL	Enhancement	Setup SFTP site on GoDaddy and enable in T-L
ALL	Enhancement	Part Mgr - add ability to sort by part name
ALL	Enhancement	Part Mgr - add ability to filter
ALL	Enhancement	Part Mgr - store partIndex on item.data -- this will facilitate sorting and filtering
ALL	Enhancement	Group Mgr - add ability to sort by part name
ALL	Enhancement	Group Mgr - add ability to filter
INSTALL	Enhancement	Add options to load ABQ, Ansys, etc. plugins
ALL	Enhancement	Results Animator -- Factor changes should be editing finished
DTY	Enhancement	Fix issue with VTFx mode QSE Files
ALL	Enhancement	Max / Min values need to work on displayed eles -- not whole model
ALL	Enhancement	Add Colorbar Controls
ALL	Enhancement	Check CAE2VTFX issues
ALL	Enhancement	Show Only / Hide Parts
DTY	Enhancement	Allow multi QSE select in file browse
ALL	Enhancement	Quick Format Menu in Plot Widget
ALL	Enhancement	Add view license usage if on a network license
ALL	Enhancement	Add ability to add 3rd party tools (Abaqus, Ansys, etc.) from Tools menu
DOC	Enhancement	Change to main help widget

Highlighted Records Documented on Details page





Enhancements – TFU Mgr

Highlighted Records Documented on Details page

Module	Type	Description
TFU	Enhancement	Bulk Stats
TFU	Enhancement	Rainflow -- plot rain drops as one curve with Nones
TFU	Enhancement	TFU Fatigue
TFU	Enhancement	Add table editor for function data
TFU	Enhancement	Add integration of functions
TfU	Enhancement	Improve Crossplot axes

Major new capability –
Durability analysis of
Strain Gauge signals.





Enhancements - Pre

Highlighted Records Documented on Details page

Module	Type	Description
PRE	Enhancement	Allow the trivial, single load case
PRE	Enhancement	In depopulate gauges, curvature and gradient, have color by number just work on displayed eles
PRE	Enhancement	Add delete gauge capability to Sort / Reorder Cabling
PRE	Enhancement	Put a "Do You Want To?" GUI on Report Generation
PRE	Enhancement	Put a copy of the "Strain Sensitivity to Load Btn" in Session Tools
Pre	Enhancement	Add Pmat output to Pre-Test Report generation





Enhancements - Post

Highlighted Records Documented on Details page

Module	Type	Description
POST	Enhancement	Improve stretchiness of form
POST	Enhancement	Cross Plot color options
POST	Enhancement	Fix trimming of test signal names in plot titles
POST	Enhancement	Check Zoom to gauge to make sure it is the right gauge
POST	Enhancement	Add additional error measures to gauge error table (Max Error, Avg Error, RMS Error)

User request





Enhancements - QSE

Module	Type	Description
QSE	Enhancement	For GOI TLD Gauges, name the True-Load gauges as TLG01, TLG02, etc,,, GOIs are GOI01, GOI02, etc.
QSE	Enhancement	Fix issue with parsing GOI names for Best GOI when spaces are in channel names
QSE	Enhancement	Add progress indicator (text prog bar? GUI prog bar?) when doing GOI compare -- 3 prog bars on single tab
QSE	Enhancement	GOI Compare - clear muti table and multi combos on load new TFU or Gauges
QSE	Enhancement	When creating ODS, force save of QSE
QSE	Enhancement	Compare GOIs -- load MAP File
QSE	Enhancement	Fix fe-safe time increment to be based on first / last points

Highlighted Records Documented on Details page

Lots of great enhancements for GOI, GOI Compare



Install Auto File Open and Icons





Install Auto File Open and Icons

WinZip Self-Extractor

True-Load(c), True-QSE(c), True-LDE(c)
are registered copyrights
by Wolf Star Technologies, LLC

Unauthorized use, sale, duplication or derivative work
is strictly prohibited under US Copyright protection

OK

1

WinZip Self-Extractor - True-Load_Installer_2022-08-29.exe

You may need to edit
- <install_dir>/config.py

Setup

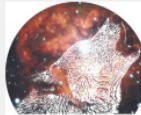
Cancel

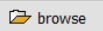
C:\WINDOWS\system32\cmd.exe

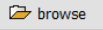
C:\Users\TIMHUN~1\AppData\Local\Temp\WZSE0

Wolf Star Technologies
True-Tools Installer
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Wolf Star Technologies Installer

 **WOLF STAR**
T E C H N O L O G I E S

Destination Directory: C:\TrueLoadApp 

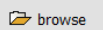
Python 3.6 | Anaconda 4.3.1 (64-bit) Directory: D:\Anaconda3 

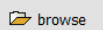
Default FEA: *.odb 

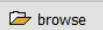
☐ Open as VTFx

☐ Install Abaqus CAE Plugin

☐ Download Ansys WorkBench Plugin

Shortcut Location (e.g. Desktop): C:\Users\TimHunter\OneDrive - Wolf Star Technologies\Desktop 

Default work dir (for shortcut): C:/scratch 

Licensing Path -- Optional
(e.g. port@host; <path to LIC file>): 5053@WST11 

Install

Cancel

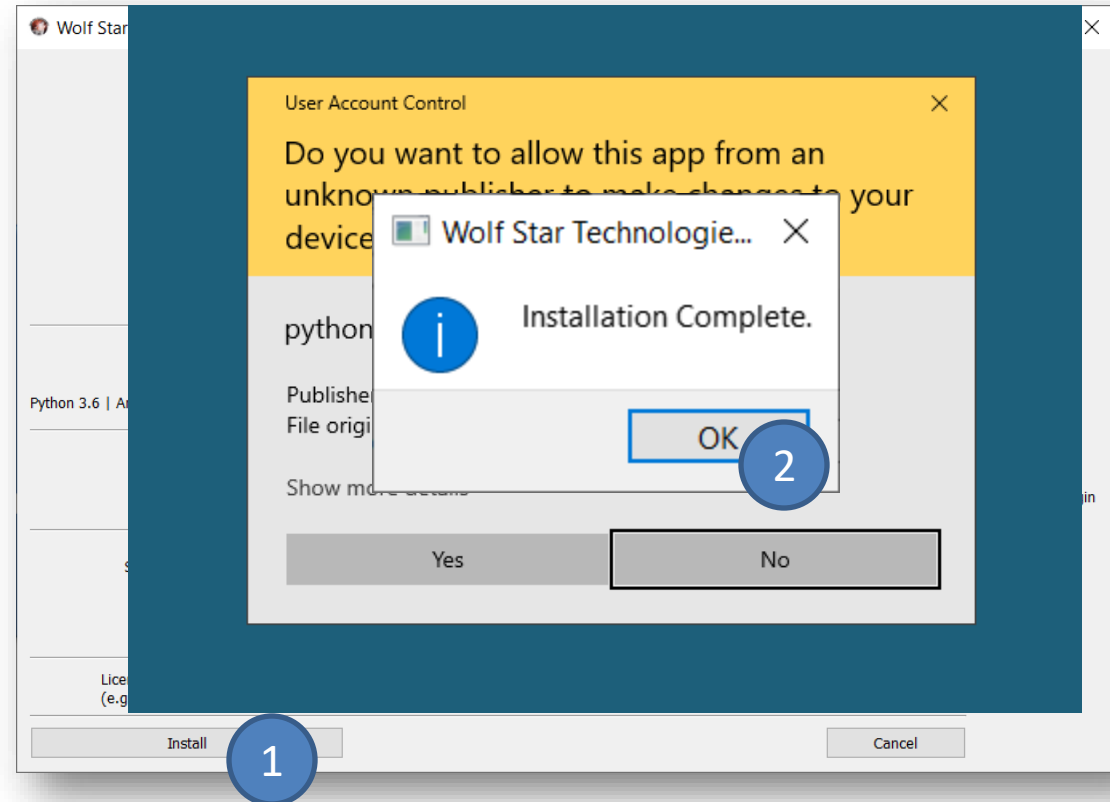
Options to install 3rd Party
Plugins during True-Load install.

These can be installed later
through the Tools Menu.





Install Auto File Open and Icons



Clicking **Yes** with Admin privileges installs file icons and file open methods.

Clicking **No**, or not having Admin privileges completes the install just without file icons and open methods.



Install Auto File Open and Icons

File Icons



*.LDE → True-LDE



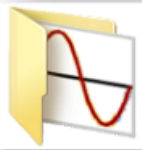
*.QSE → True-QSE



*.TLD → True-Load



*.T3D → ODS (from True-QSE)



*.TFU → TFU File



*.VTFx → VTFx File

Double Clicking Opens
TrueLoadApp and loads file

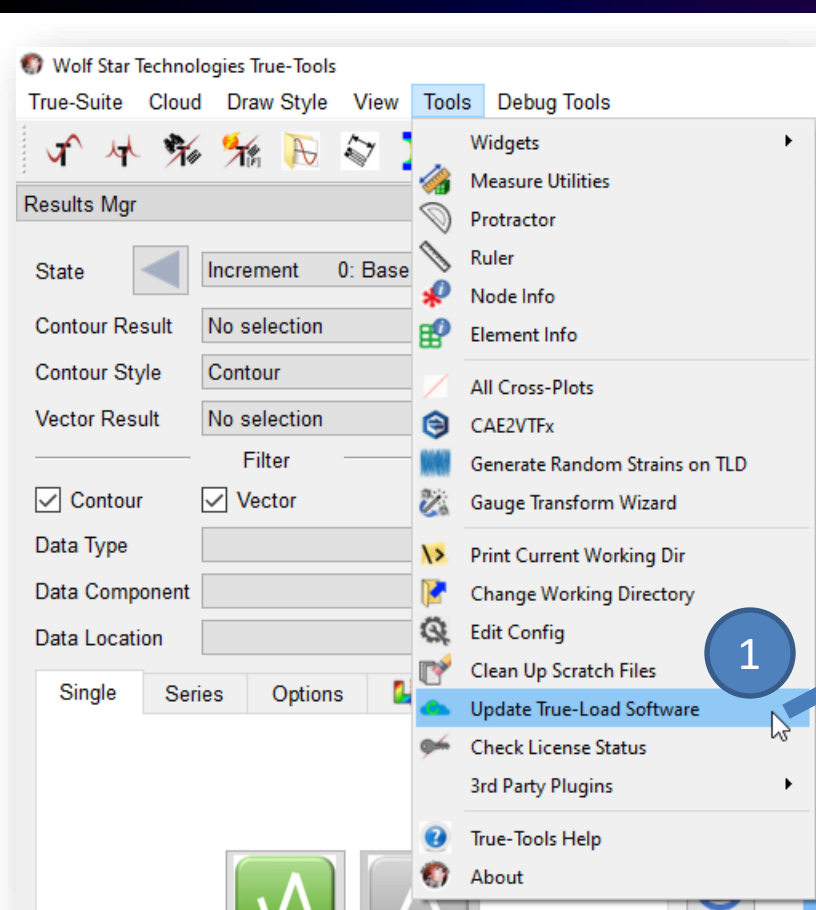
Double Clicking Opens
VTFxViewer and loads file

Secure Software Download





Secure Software Download



Connections to FTP servers is through SFTP and should be able to be accessed through secure firewalls.

If you still cannot download the software, please contact us to provide direct downloads for you.



License Status

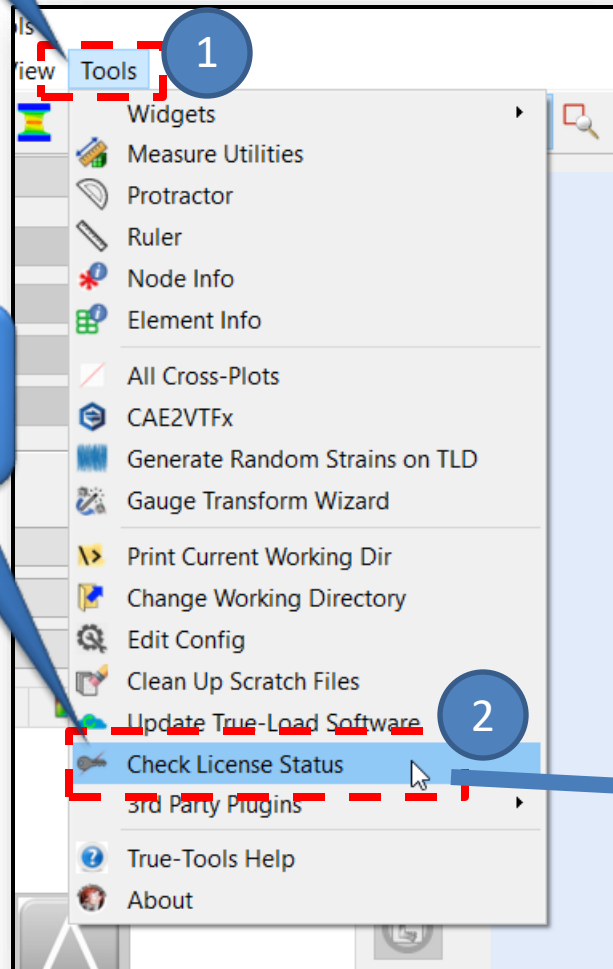




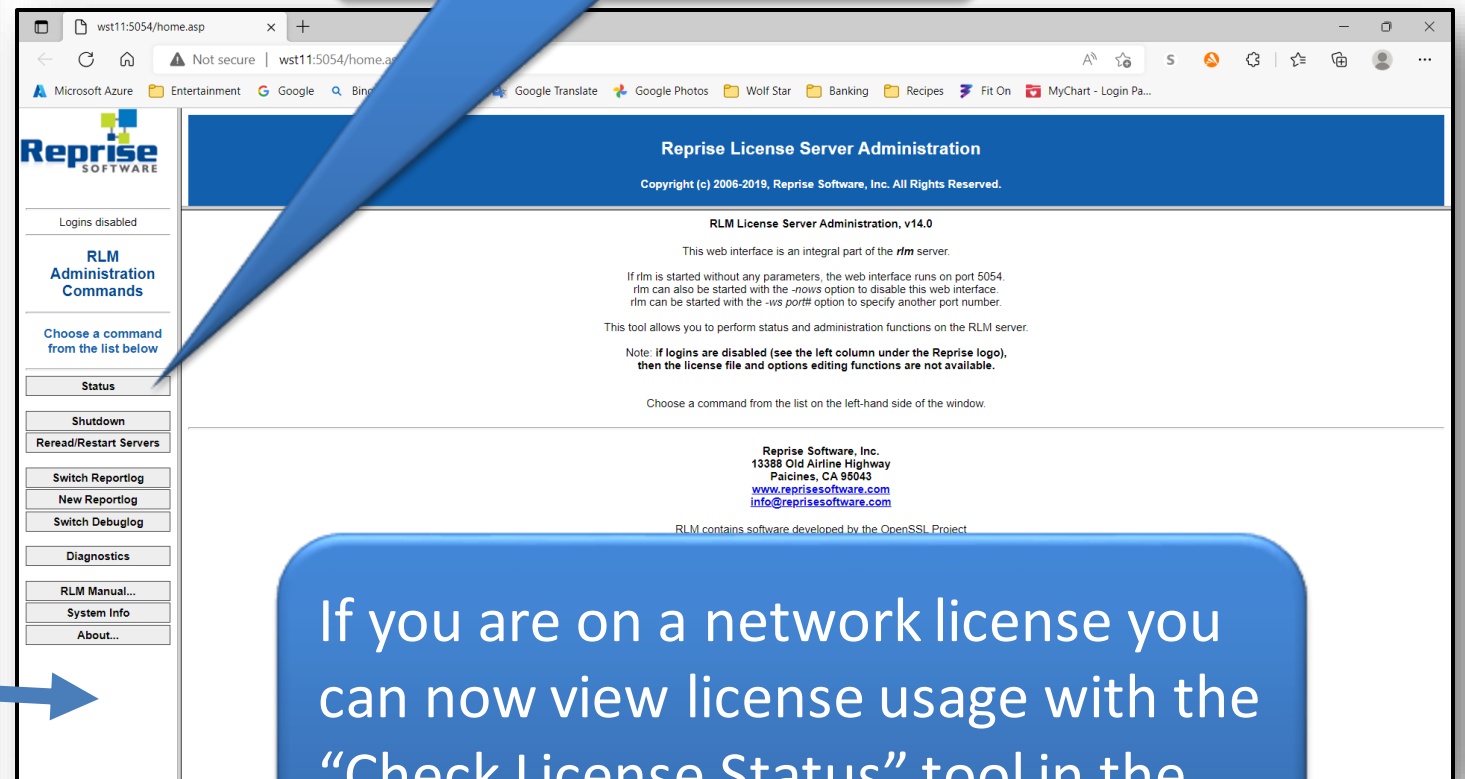
View License Usage

Tools

Check
License
Status



License Server Admin



If you are on a network license you can now view license usage with the “Check License Status” tool in the “Tools” Menu





View License Usage

1

2

3

Independent Software Vendor

Status

GET License Usage

BACK

Reprise Software

License Server Administration

Copyright (c) 2006-2019, Reprise Software, Inc. All Rights Reserved.

ISV: wolfstar

Product:

User:

Host:

License Password:

GET License Usage

BACK

From the license server admin page, navigate to the usage information for the “wolfstar” Independent Software Vendor (ISV).

Reprise License Server Administration

Copyright (c) 2006-2019, Reprise Software, Inc. All Rights Reserved.

License status for ISV wolfstar

Product	Pool	Ver	user	host	PID	req ver	# lic	# res	Out time	Click to REMOVE
trueload	1	1.0	timhunter	wst11	13444	1.0	1	0	08/10 10:15	Remove

In Use

License pool status

Product	Pool	Ver	Expires	count	soft lim	inuse	res	hostid	timeout	share	checkouts	Show Usage
trueload	1	1.0	permanent	40	40	1	0	ANY	0	None	1	usage...
trueqse	2	1.0	permanent	40	40	0	0	ANY	0	None	0	usage...
truelde	3	1.0	permanent	40	40	0	0	ANY	0	None	0	usage...
update	4	1.0	permanent	Uncounted	0	0	0	ANY	0	None	0	usage...

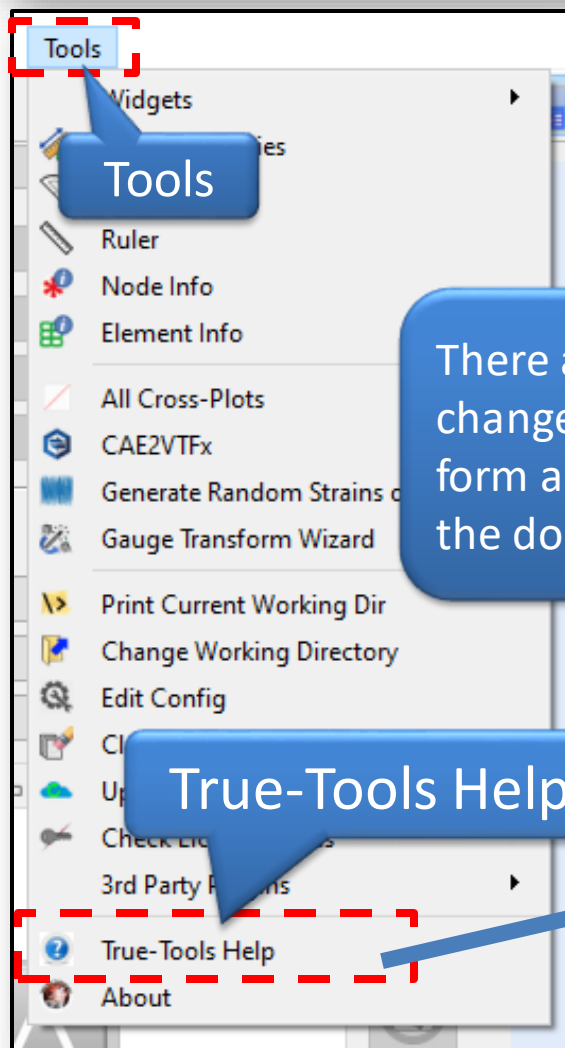
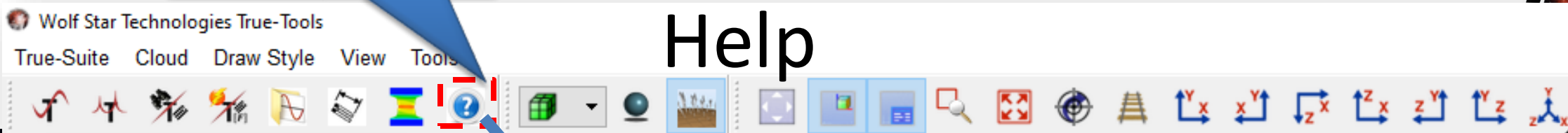
Help





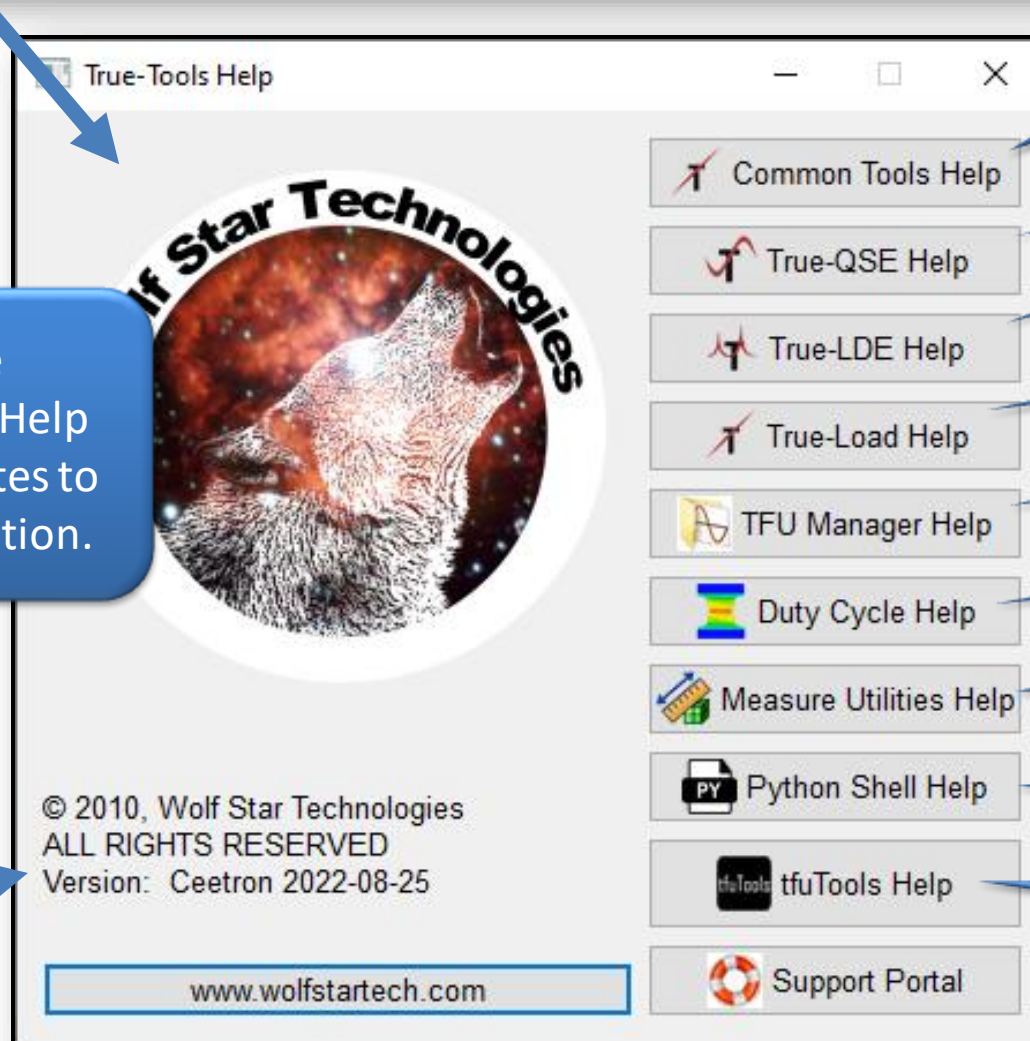
True-Tools Help

Help



There are some changes to the Help form and updates to the documentation.

True-Tools Help



Common Tools

True-QSE

True-LDE

True-Load

Tfu Manager

Duty Cycle

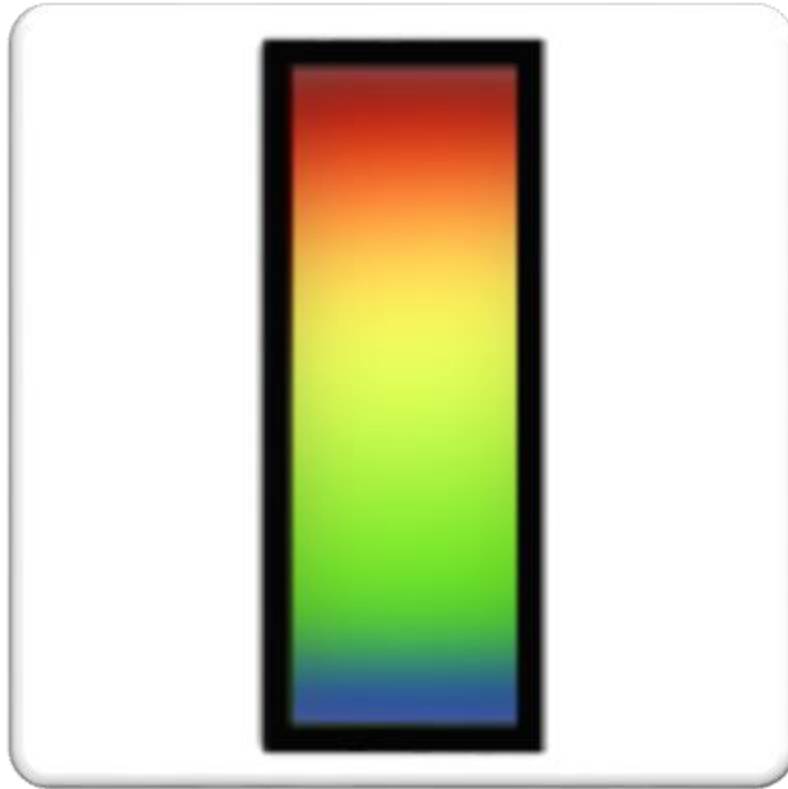
Measure Utilities

Python Shell

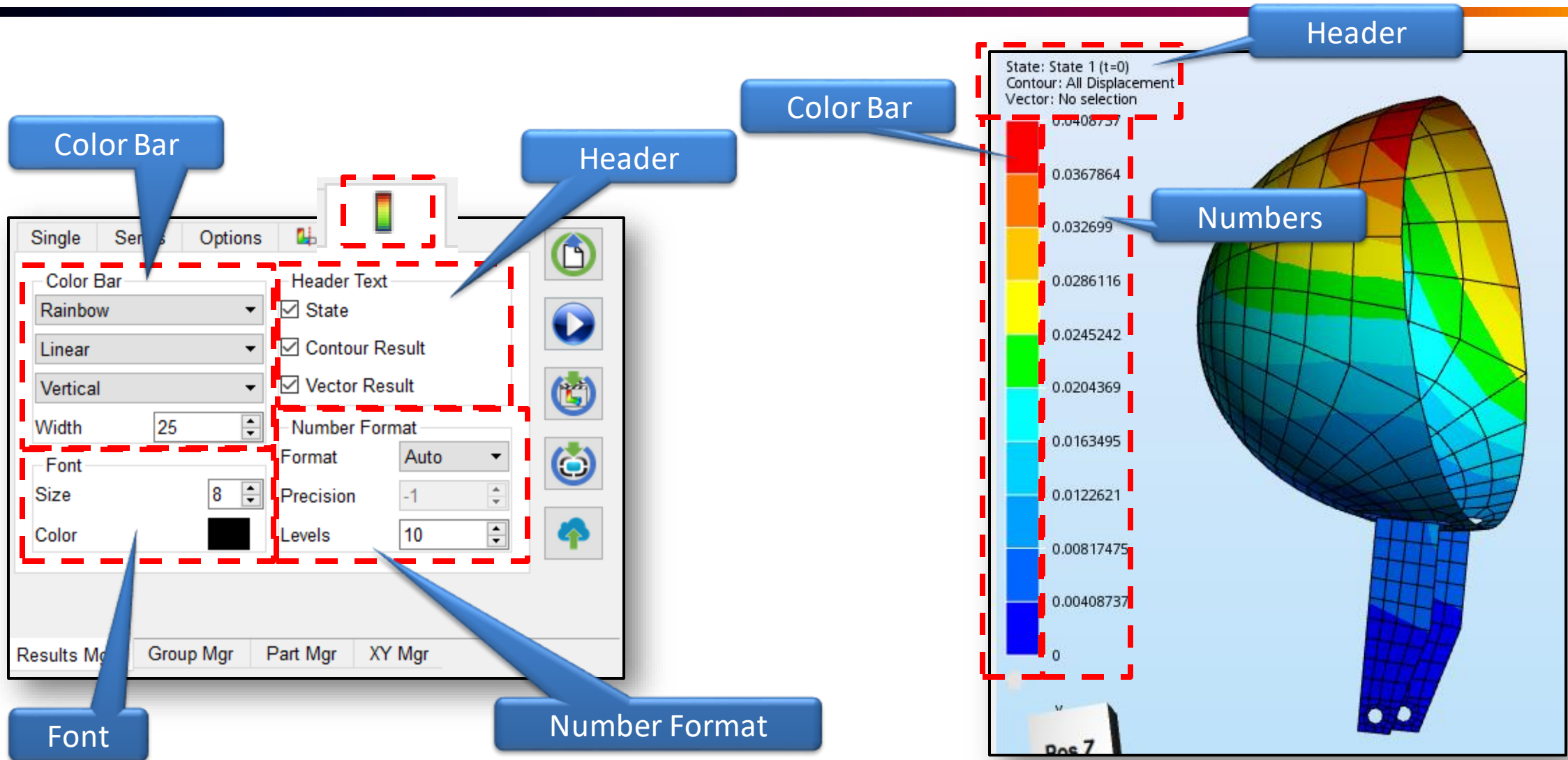
tfuTools



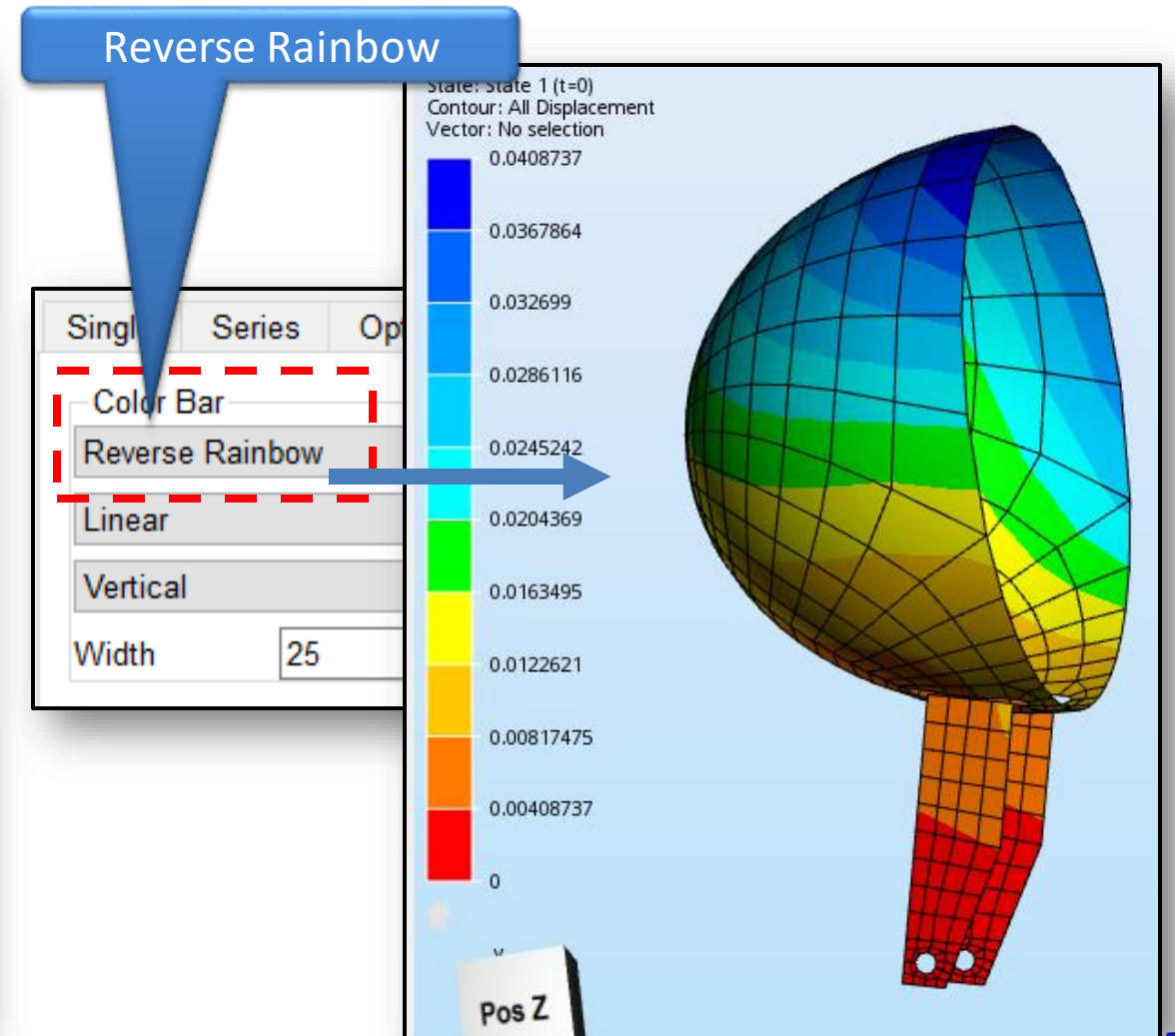
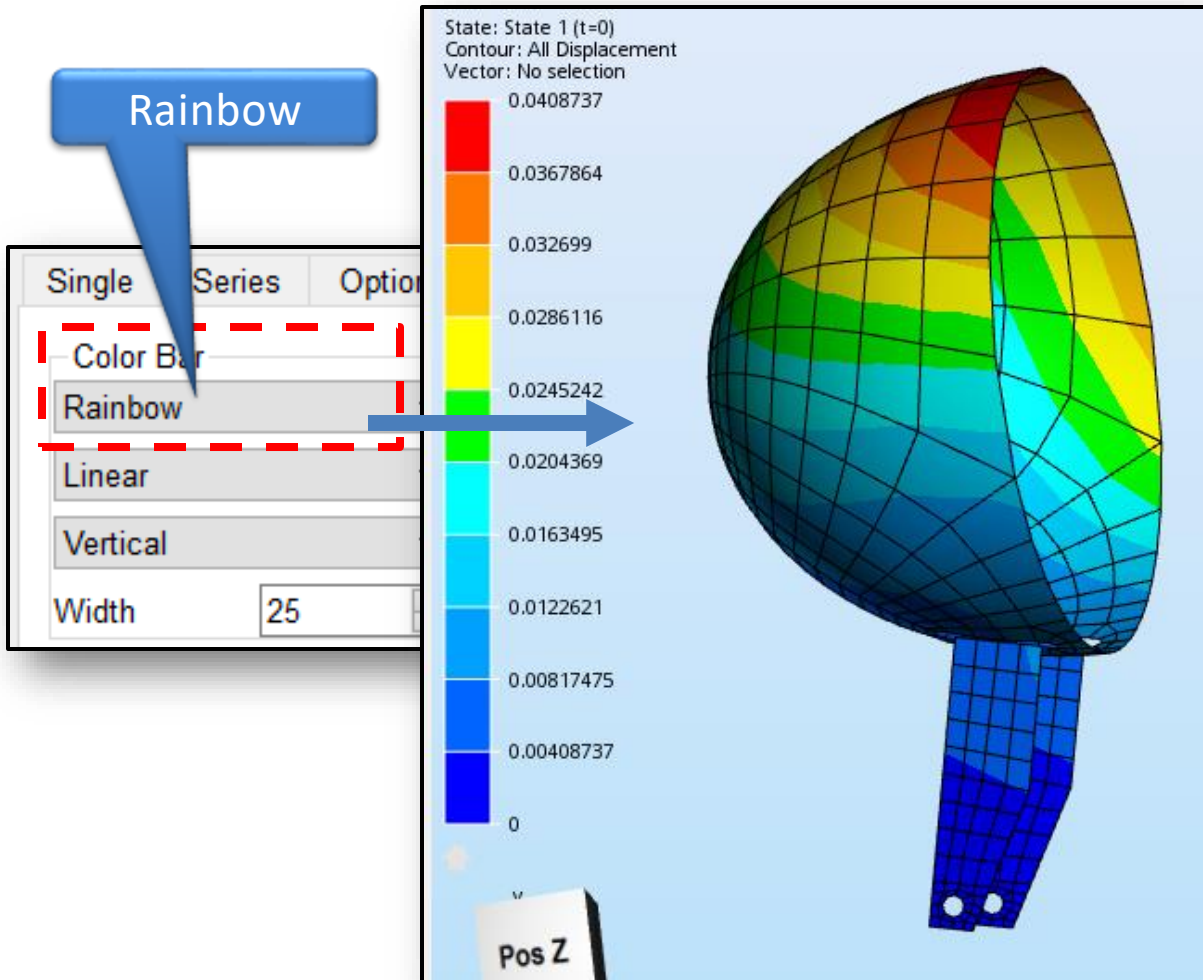
Results Manager Color Bar Controls



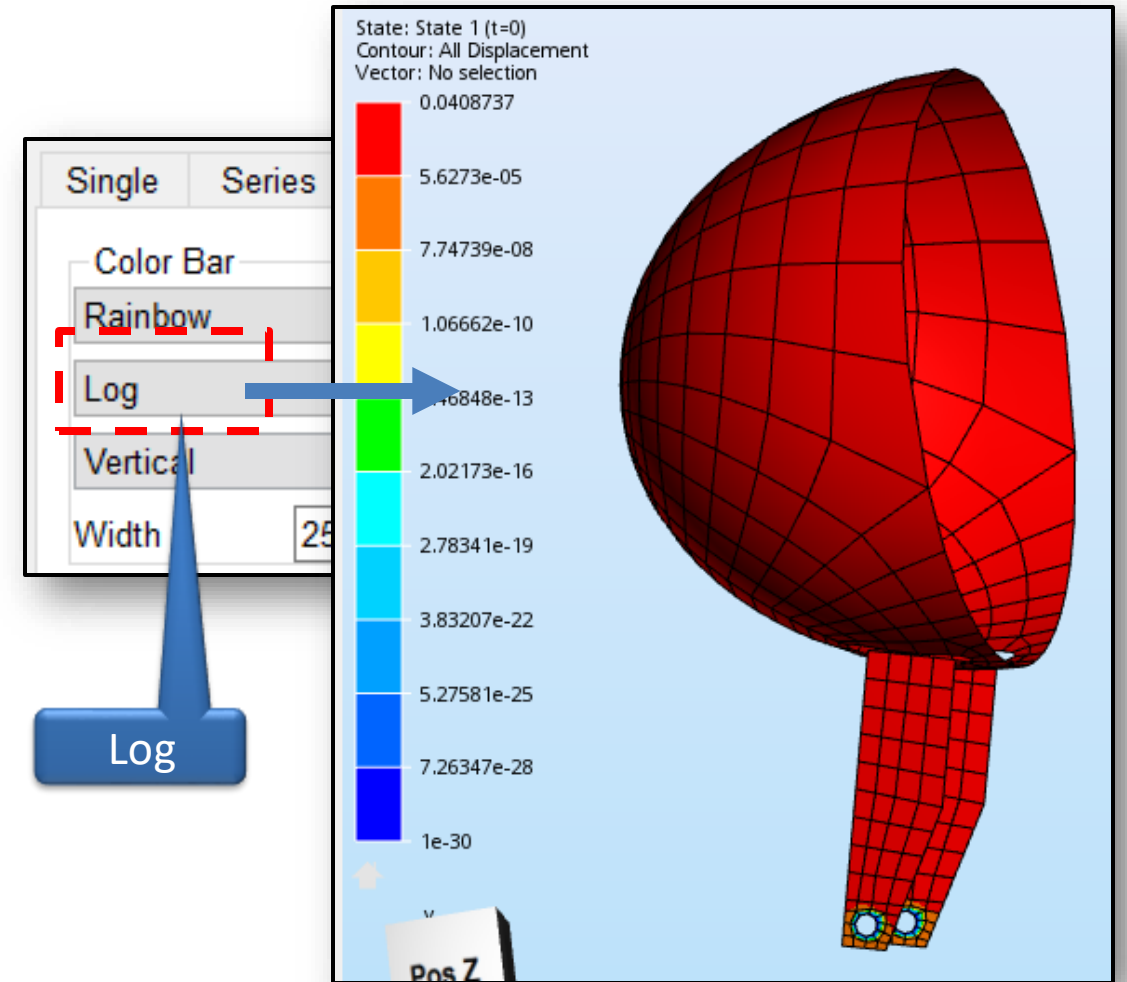
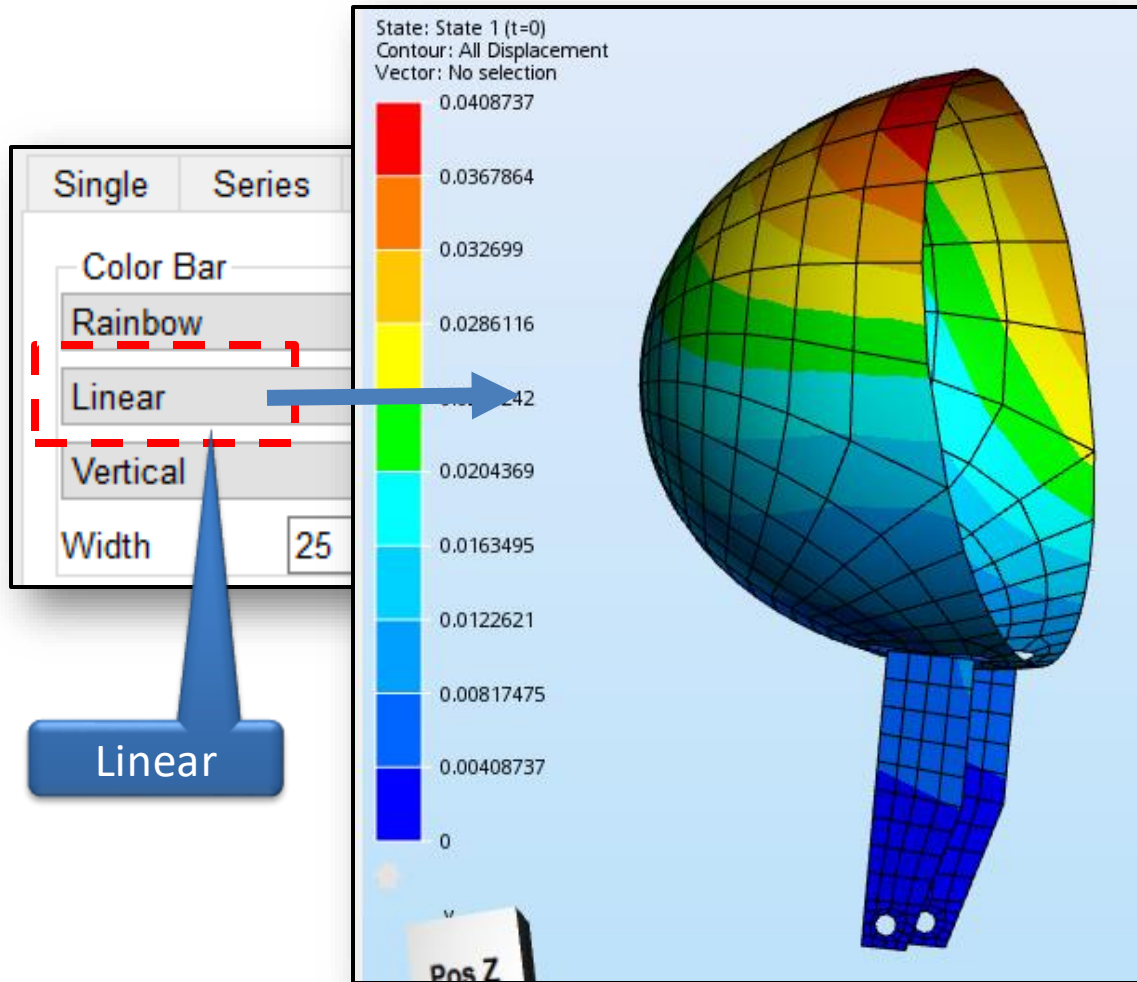
Color Bar Controls - Overview



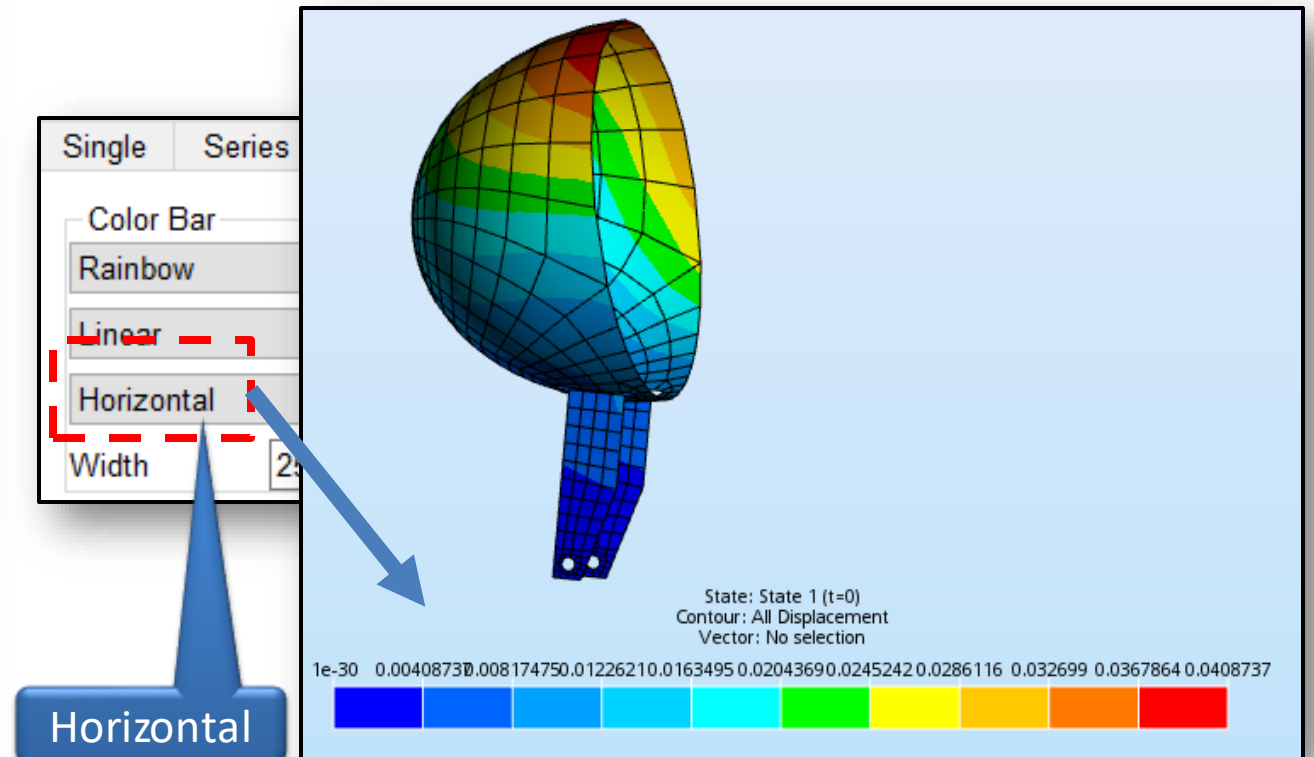
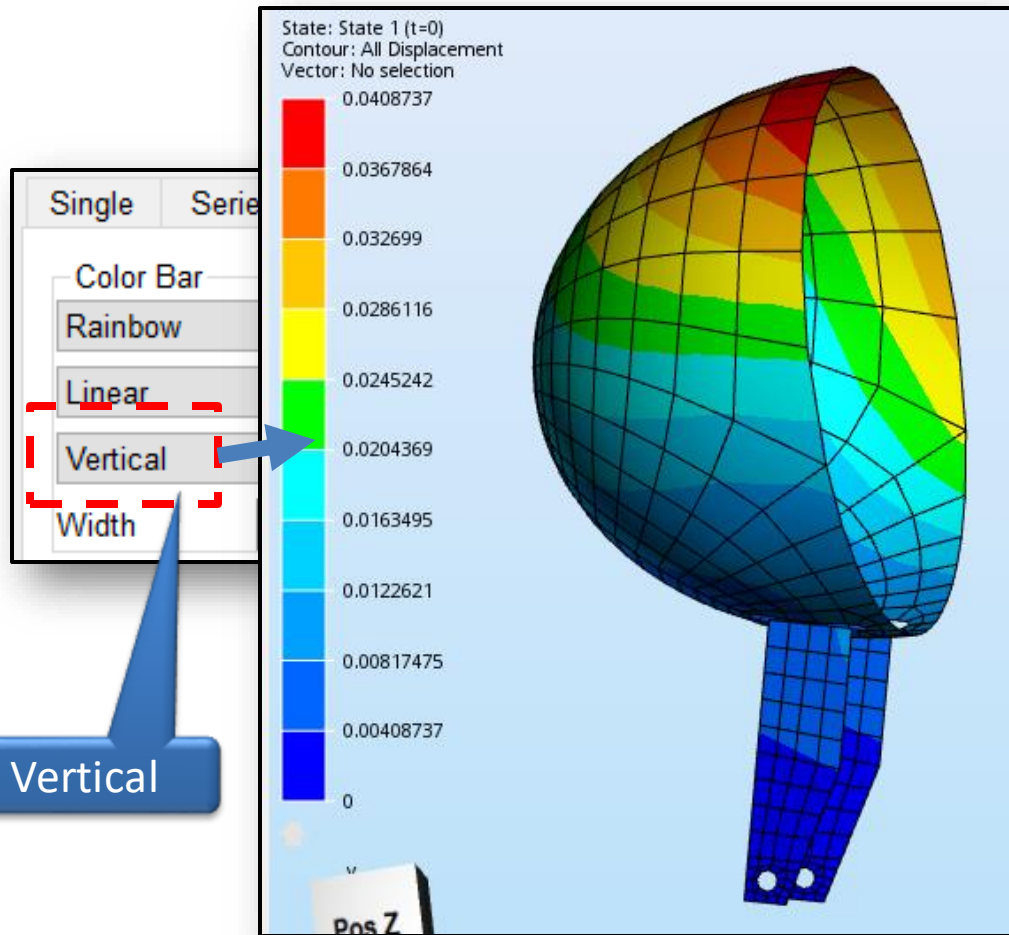
Color Bar Controls – Color Scheme



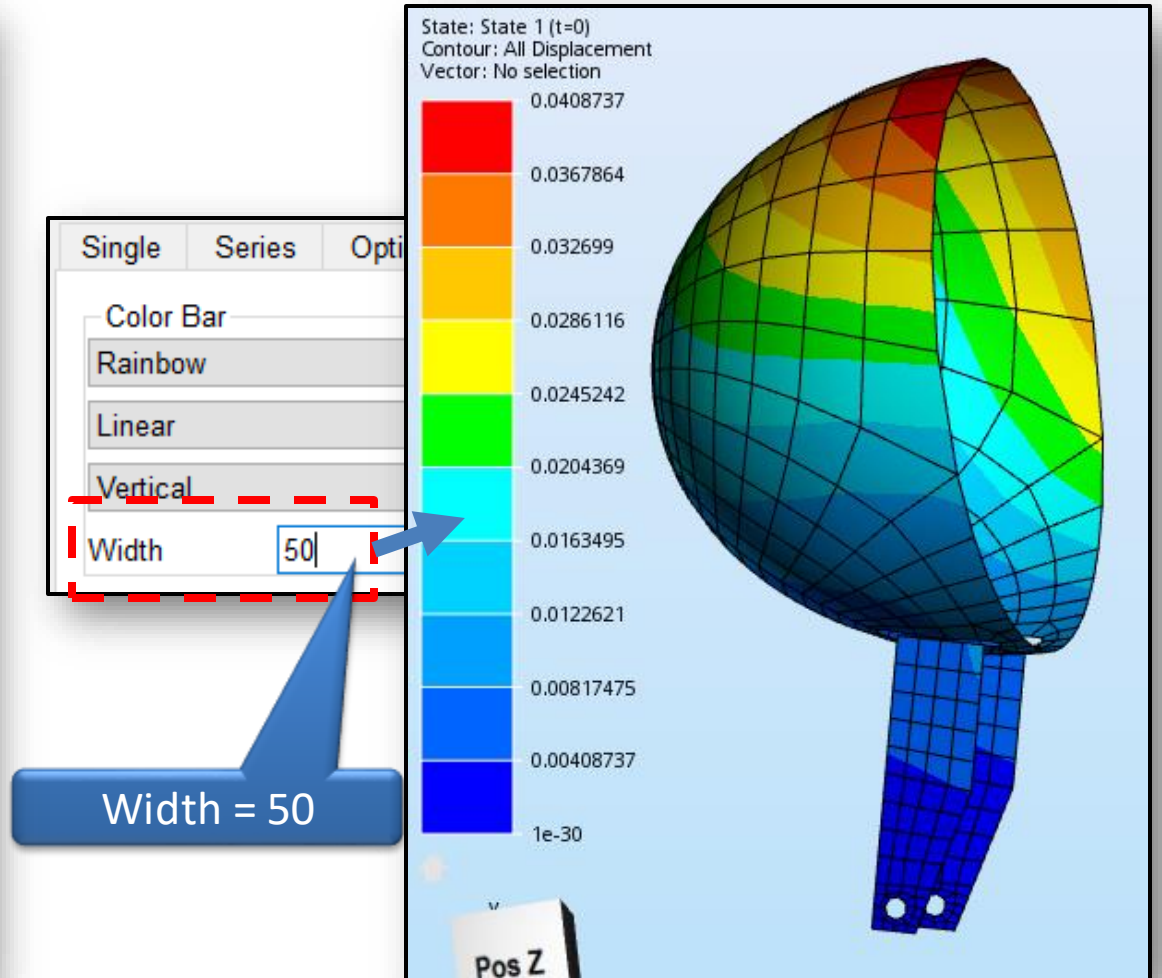
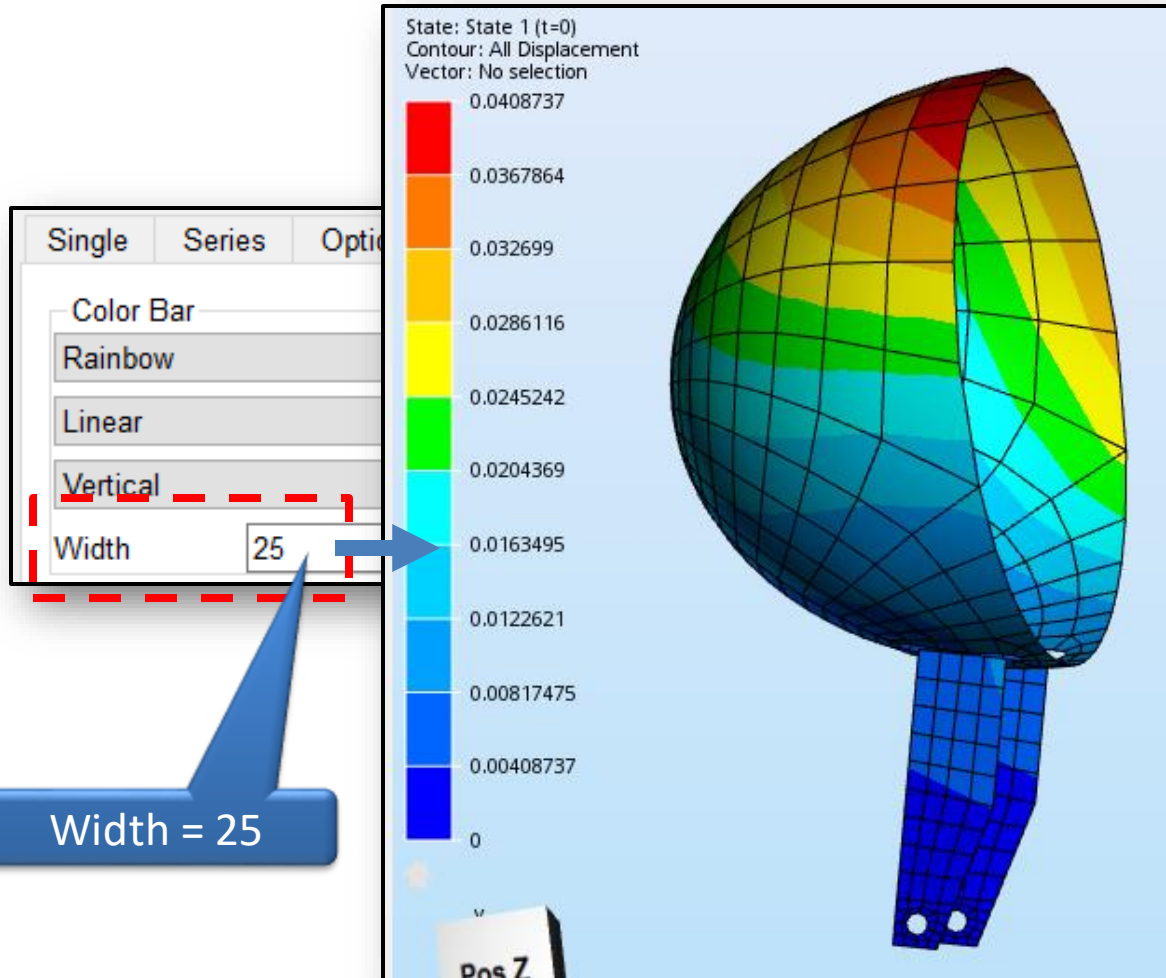
Color Bar Controls - Scale



Color Bar Controls - Orientation

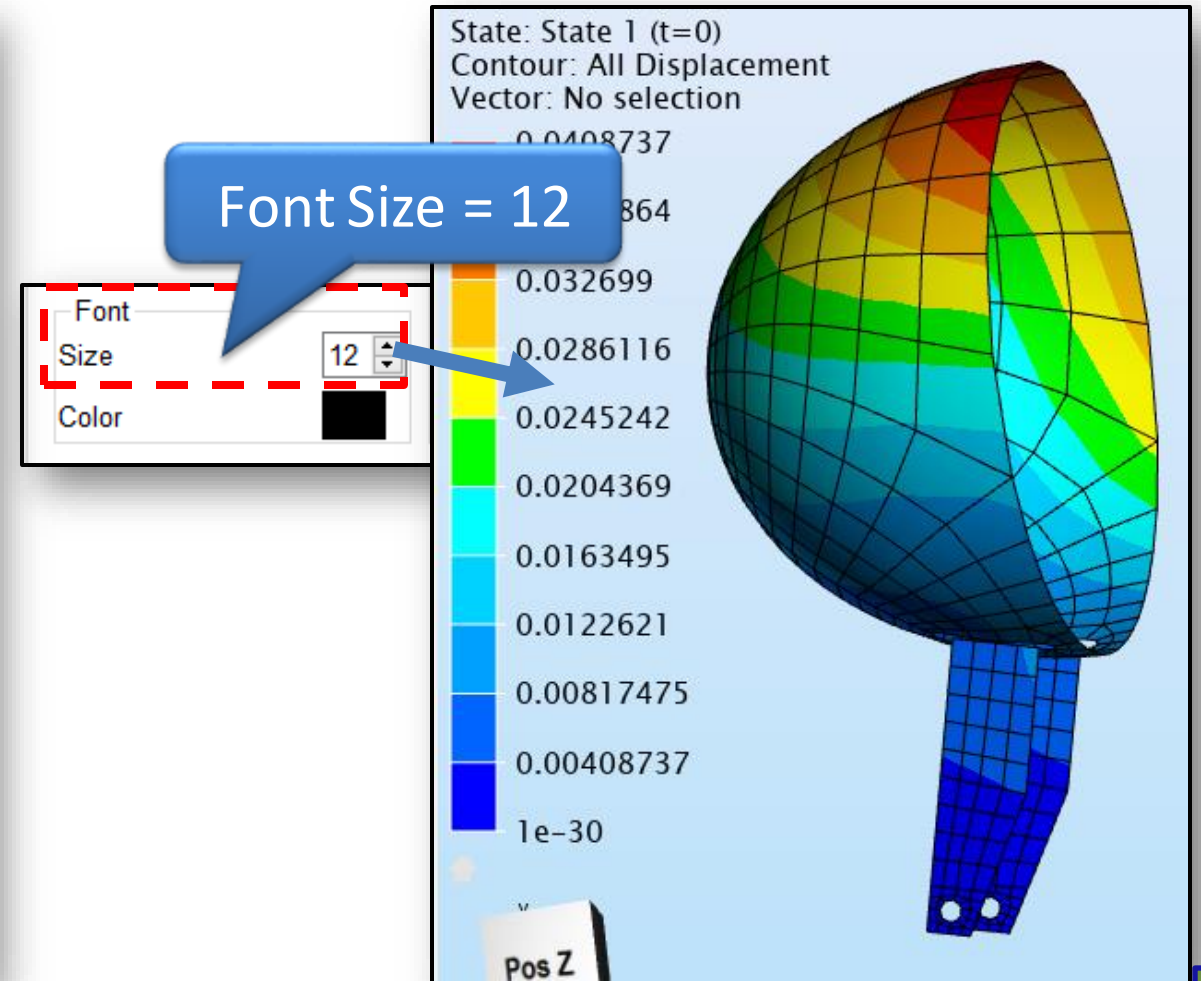
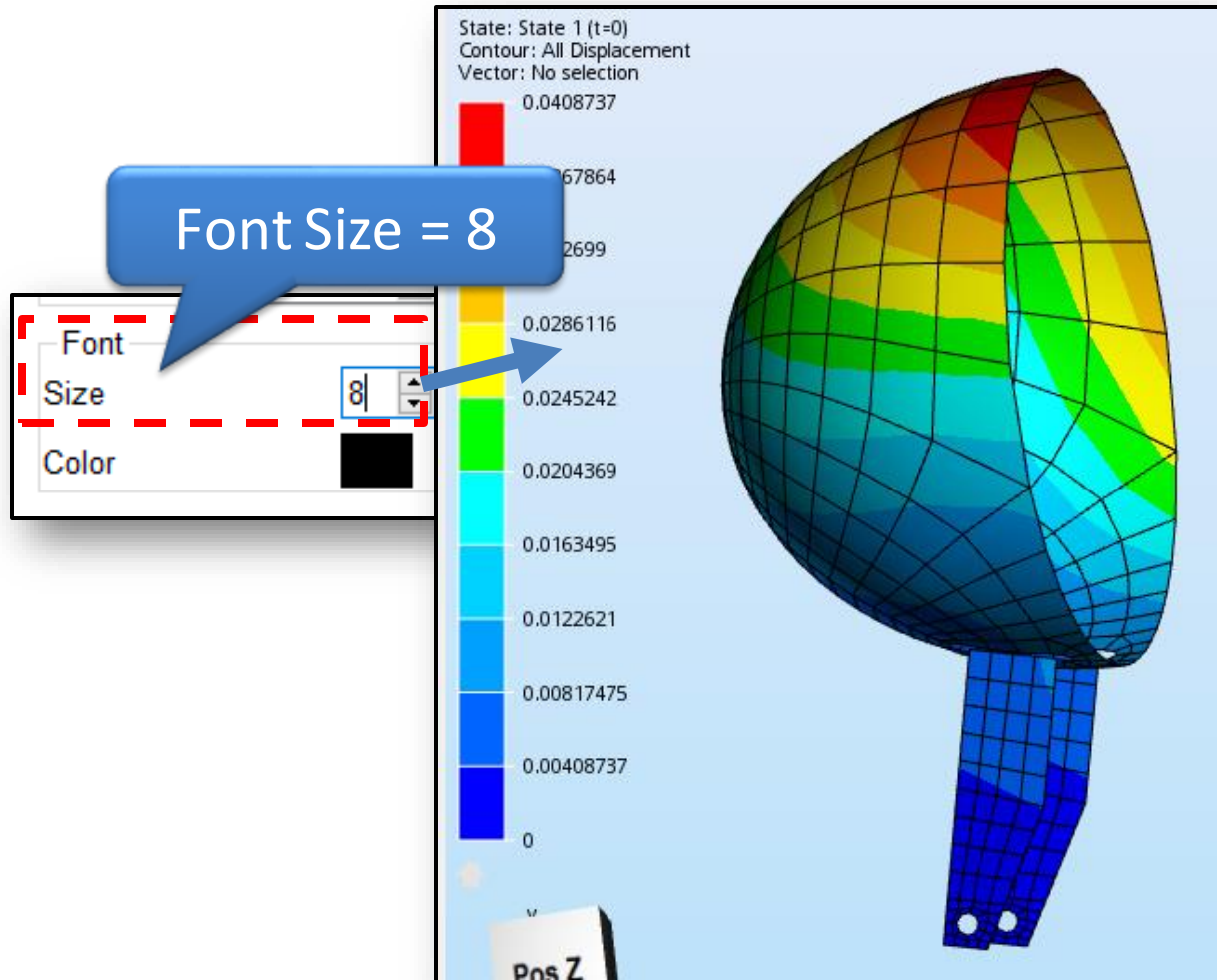


Color Bar Controls - Width





Color Bar Controls – Font Size



Color Bar Controls – Font Color

Font Color

State: State 1 (t=0)
Contour: All Displacement
Vector: No selection

0.0408737
0.0367864
0.032699
0.0286116
0.0245242
0.0204369
0.0163495
0.0122621
0.00817475
0.00408737
0

Pos Z

Select Color

Font
Size: 12
Color: [Black]

Format: Auto
Precision: -1
Levels: 10

Click Screen Color

Custom colors

Add to Custom Colors

Hue: 180
Sat: 255
Val: 128

Red: 0
Green: 128
Blue: 128

HTML: #008080

OK Cancel

State: State 1 (t=0)
Contour: All Displacement
Vector: No selection

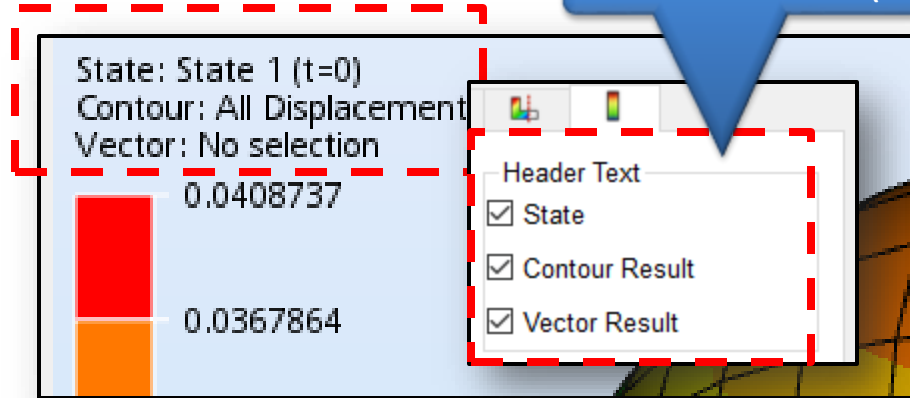
0.0408737
0.0367864
0.032699
0.0286116
0.0245242
0.0204369
0.0163495
0.0122621
0.00817475
0.00408737
0

Pos Z

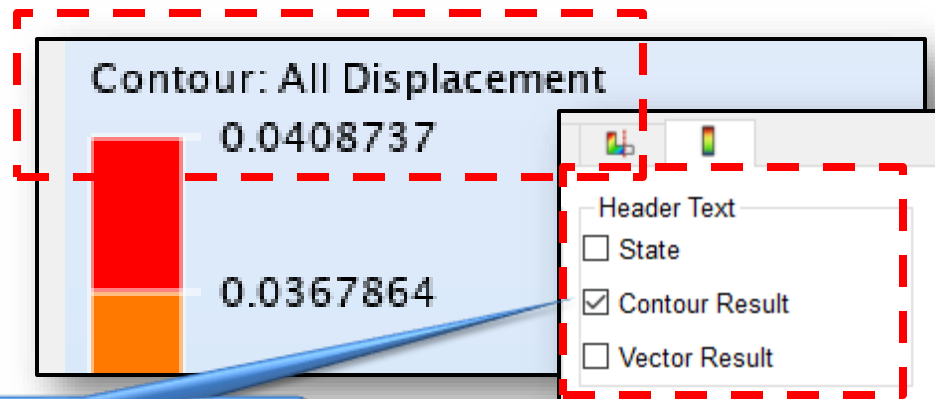
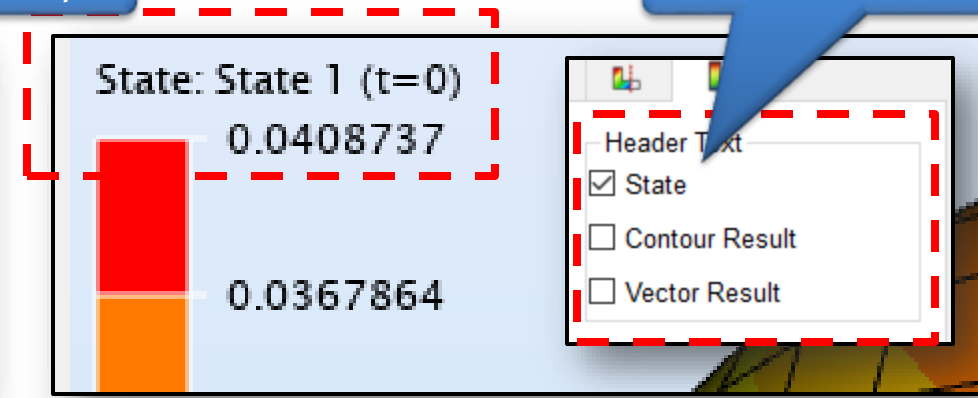


Color Bar Controls - Header

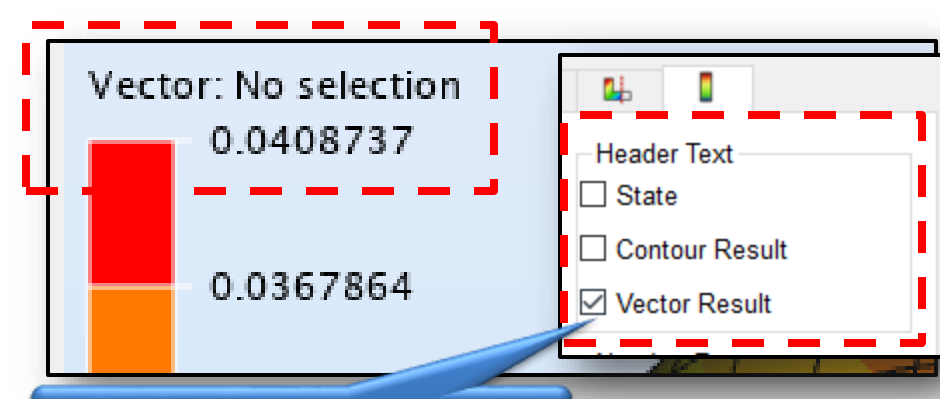
All Selected (Default)



State Selected



Contour Result Selected



Vector Selected



Color Bar Controls – Number Format

Format = Auto

Format = Fixed

Format = Scientific

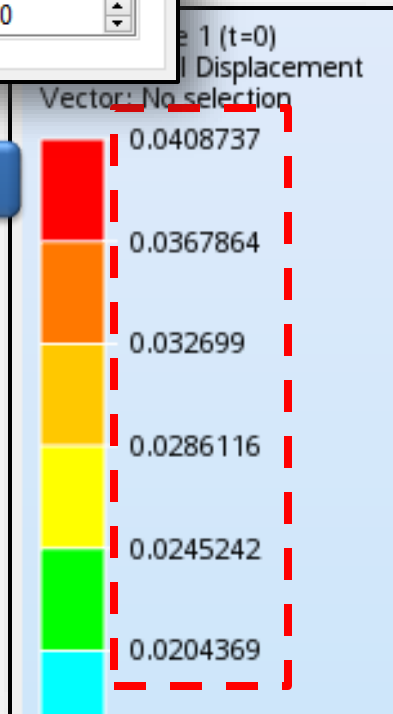
Number Format

Format: Auto

Precision: -1

Levels: 10

Precision auto



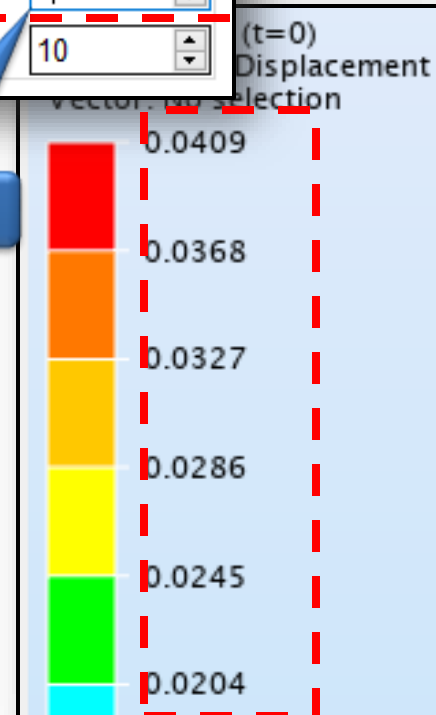
Number Format

Format: Fixed

Precision: 4

Levels: 10

Precision = 4



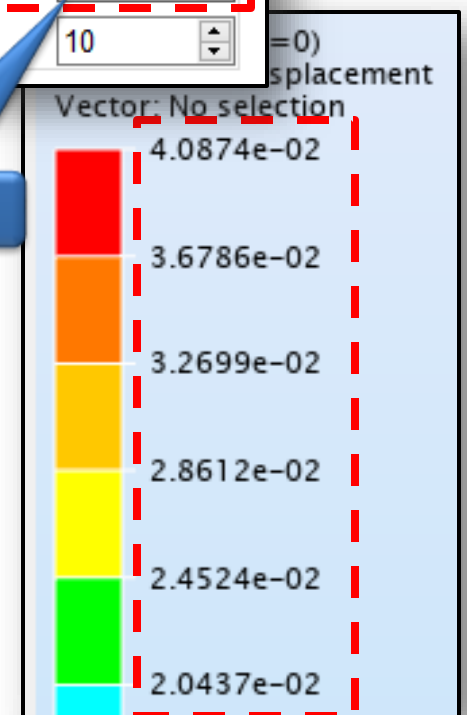
Number Format

Format: Scientific

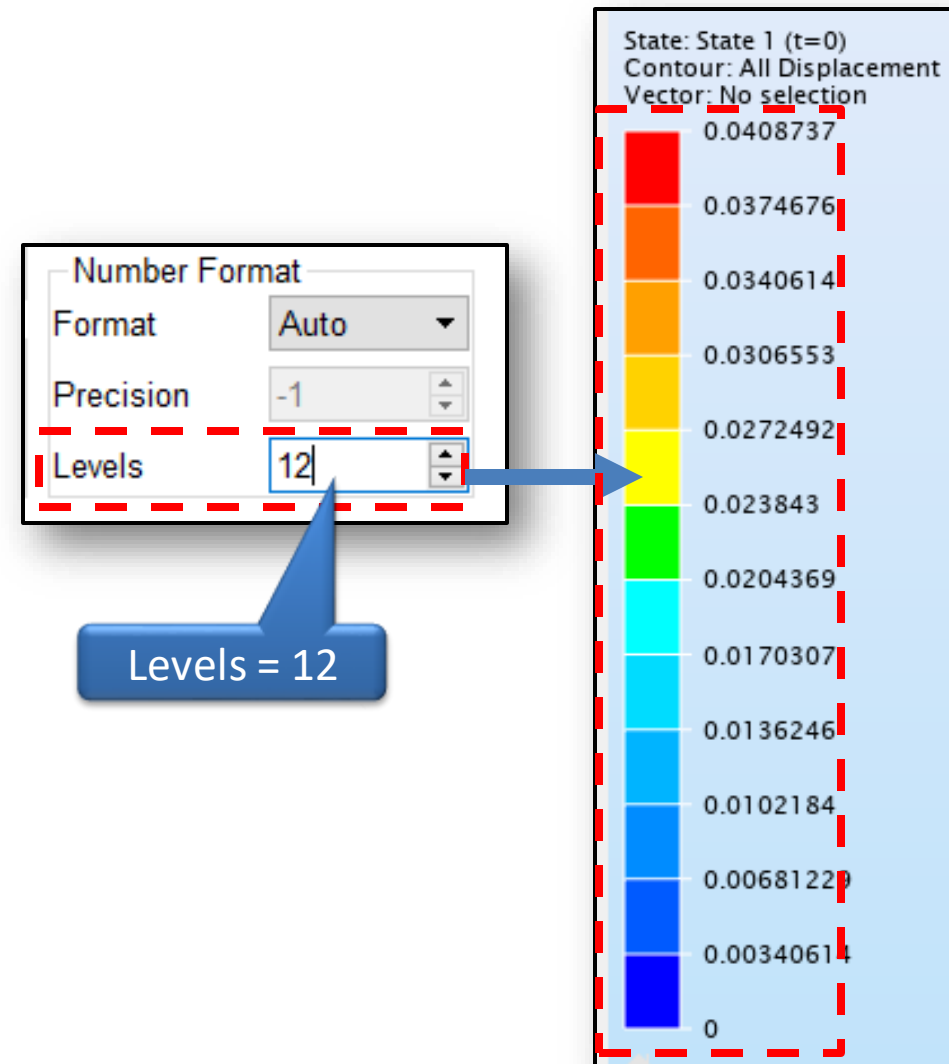
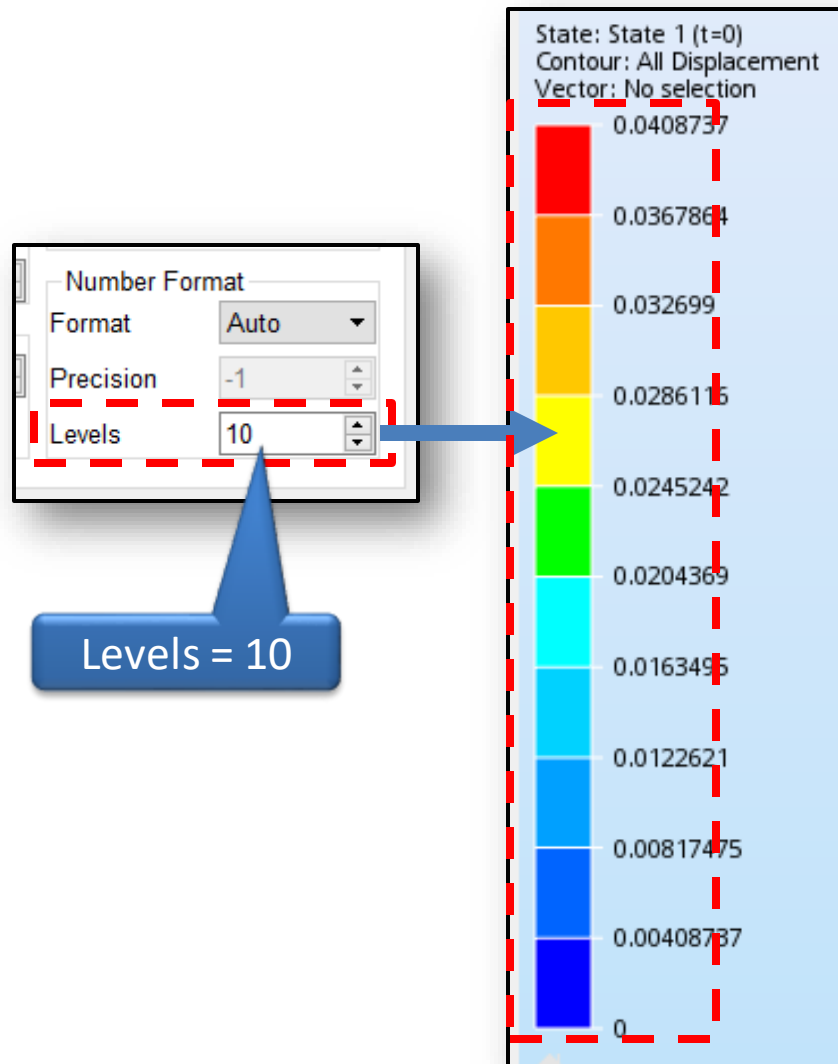
Precision: 4

Levels: 10

Precision = 4



Color Bar Controls - Levels



Pre-Test Hide / Show Update





Pre-Test Hide / Show Update

The image displays two screenshots of the True-Load/Pre-Test software interface, illustrating the process of toggling the Load Table visibility.

Top Screenshot: The "Session Tools" panel is highlighted with a red dashed box. The "Hide Load Table" button is visible, and the "Condition Number" is 3.215. A blue callout bubble points to the "Hide Load Table" button with the text: "Strain Sensitivity to Load" button in Session Tools when Load Table is Hidden.

Bottom Screenshot: The "Session Tools" panel is again highlighted with a red dashed box. The "Show Load Table" button is now visible, and the "Condition Number" remains 3.215. A blue arrow points from the "Hide Load Table" button in the top screenshot to the "Show Load Table" button in the bottom screenshot, indicating the transition.

The interface includes fields for "TLD File" (C:/scratch/ceeTron_dev/Code Test/hLamp_TLandGOI.tld) and "FEA DB" (C:/scratch/ceeTron_dev/Code Test/headlamp-G-loads.odb). The "Gauge Placement" section shows "Number of Gauges" set to 6.



Sort / Reorder Gauges Update





Pre-Test Delete Gauges

True-Load/Pre-Test

TLD File:

FEA DB:

Select elements for candidate gauges: 6 elements picked

Session Tools

Condition Number: 3.215

Hide Load Table

Stationary Loads | Moving Loads

Step	Frame	Scale Factor
1 Time 1.00000 (1)	1000	1.0
2 Time 2.00000 (1)	1001	2.947477610113982
3 Time 3.00000 (1)	1002	1.285251199573817

Scale Options

Choose Scales

☒ Auto E-Scale

☒ Plot Legend

Font Size: 10

Time 1.00000 (1) Scale: 1.0

Shell Surface: ☒ Top SPOS ☐ Bottom SNEG

Gauge Placement

Number of Gauges: 6

☒ Refresh Strain Tensors

Test Simulation

Sort / Reorder Gauges

©2010, Wolf Star Technologies ALL RIGHTS RESERVED Version: Ceetron 2022-08-25

Sort / Reorder Gauges

Gauges	Gauge Names
1 G1: 0 Ele #240 (75 Deg)	Bob
2 G2: 1 Ele #19 (90 Deg)	
3 G3: 1 Ele #16 (72 Deg)	
4 G4: 2 Ele #16 (90 Deg)	
5 G5: 2 Ele #19 (90 Deg)	
6 G6: 0 Ele #71 (0 Deg)	Sue

☐ Fiber Optic Cabling

Draw

☒ Auto Repaint Gauges

Sort / Reorder

Move Gauge

Delete Gauge

Select Gauge(s)

Delete Gauge

Sort / Reorder Gauges

Gauges	Gauge Names
1 G1: 0 Ele #240 (75 Deg)	Bob
2 G2: 1 Ele #16 (72 Deg)	
3 G3: 2 Ele #16 (90 Deg)	
4 G4: 2 Ele #19 (90 Deg)	
5 G5: 0 Ele #71 (0 Deg)	Sue

☐ Fiber Optic Cabling

Draw

☒ Auto Repaint Gauges

Sort / Reorder

Move Gauge

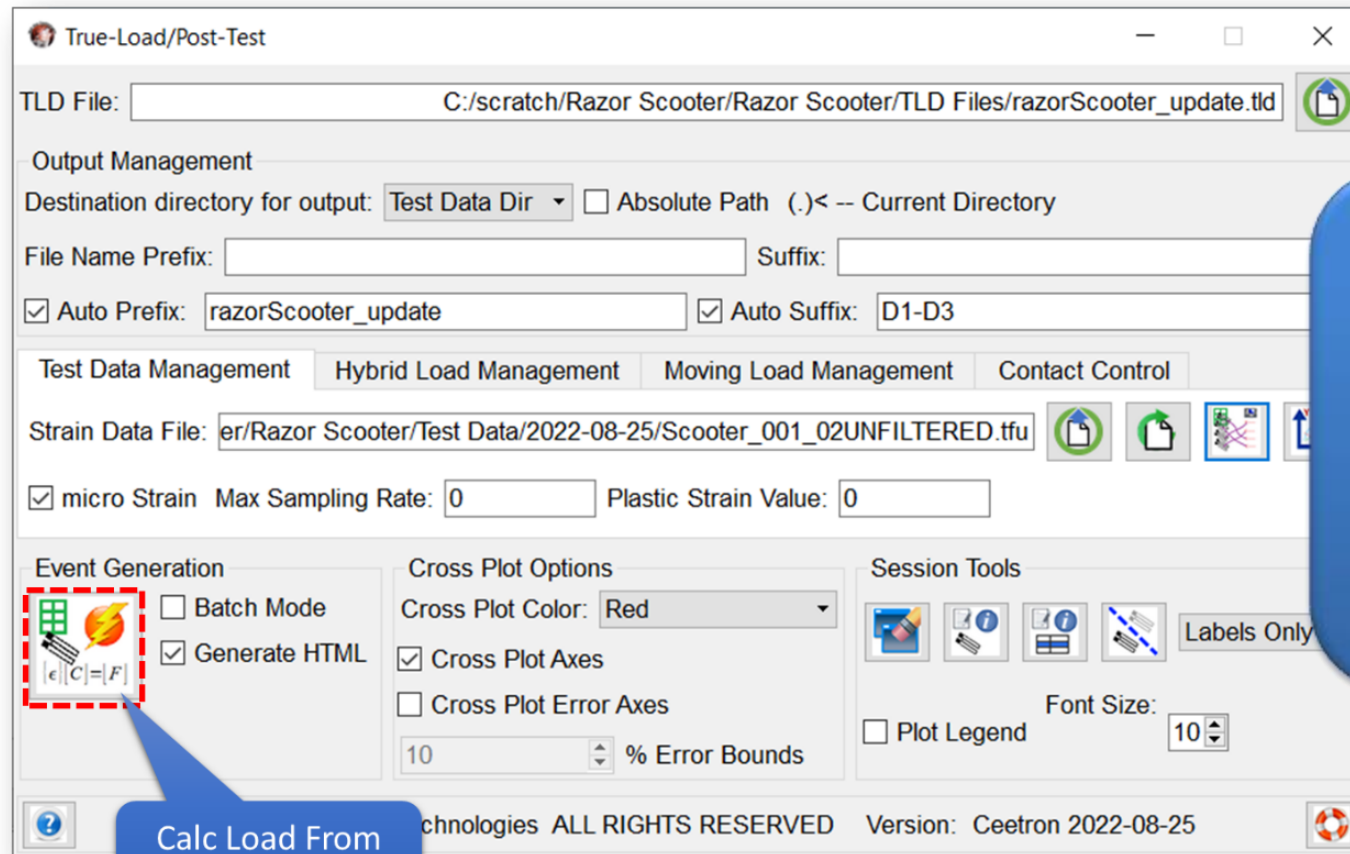
Delete Gauge

Post-Test Report Updates





Post-Test Report Updates



The HTML report generated when the “Calc Load From Strain Data” button is clicked has been updated.

Calc Load From
Strain Data





Post-Test Strain Correlation Error Update

Maximum Error

Average Error

Absolute Value
Root Mean
Square Error

Additional error
measures in the Post-
Test HTML Report
Strain Correlation
Quality Table

**Note: All columns are sortable
– click column header**

Strain Correlation Quality Table

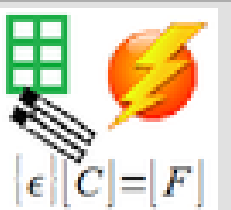
Gauge	Measured Strain	%RMS Error	Max Error	Avg Error	Abs RMS Error	Slope (m)	Intercept	Corollary (r^2)
	Range MicroStrain						(b) MicroStrain	
G1: 1 Ele #5497	313.773	5.927%	36.948	16.679	18.598	1.045	-12.828	0.9947
G2: 1 Ele #2691	304.754	6.137%	37.071	16.768	18.704	0.927	7.421	0.9957
G3: 1 Ele #18696	1.000	555.381%	12.315	4.774	5.554	0.000	0.000	0.0000
G4: 1 Ele #18961	1.000	1182.314%	22.240	9.838	11.823	0.000	0.000	0.0000
G5: 1 Ele #16867	180.546	11.337%	47.081	15.738	20.468	0.718	4.298	0.9923
G6: 1 Ele #18867	138.624	7.717%	26.062	8.823	10.697	0.766	-9.920	0.9809
G7: 1 Ele #18593	479.781	2.324%	30.035	9.566	11.150	1.016	-12.070	0.9993
G8: 1 Ele #17307	483.528	1.292%	20.187	5.332	6.249	0.999	4.158	0.9995
G9: 1 Ele #18494	133.042	16.865%	47.863	20.601	22.438	1.170	-15.784	0.9916
G10: 1 Ele #19022	171.535	7.266%	33.763	10.829	12.464	1.048	-8.538	0.9950
G11: 1 Ele #18574	323.090	1.646%	11.833	4.302	5.318	0.972	-1.401	0.9999
G12: 1 Ele #19116	282.434	0.601%	6.033	1.266	1.697	1.010	-0.558	0.9999
Average:		6.111%	29.688	10.990	12.778	0.967	-4.522	0.9949





Post-Test Cross Plot Options

Event Generation



☐ Batch Mode
☒ Generate HTML

Cross Plot Options

Cross Plot Color: Red

☒ Cross Plot Axes

☐ Cross Plot Error Axes

10

% Error Bounds

Color

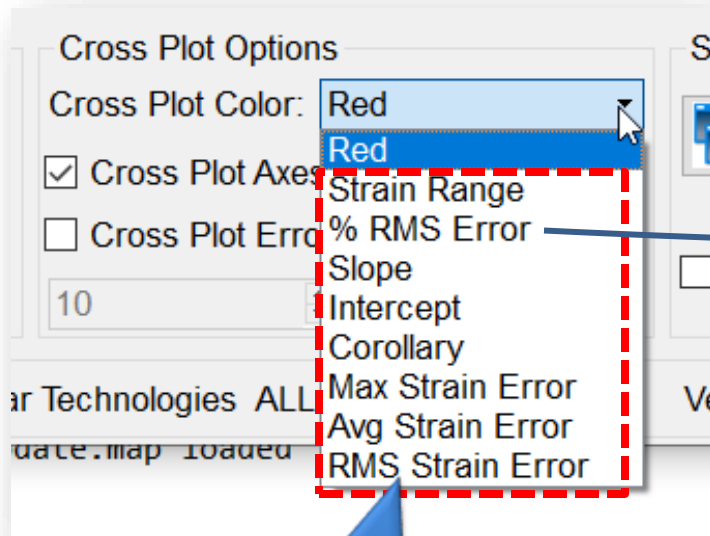
Axes

Error Axes

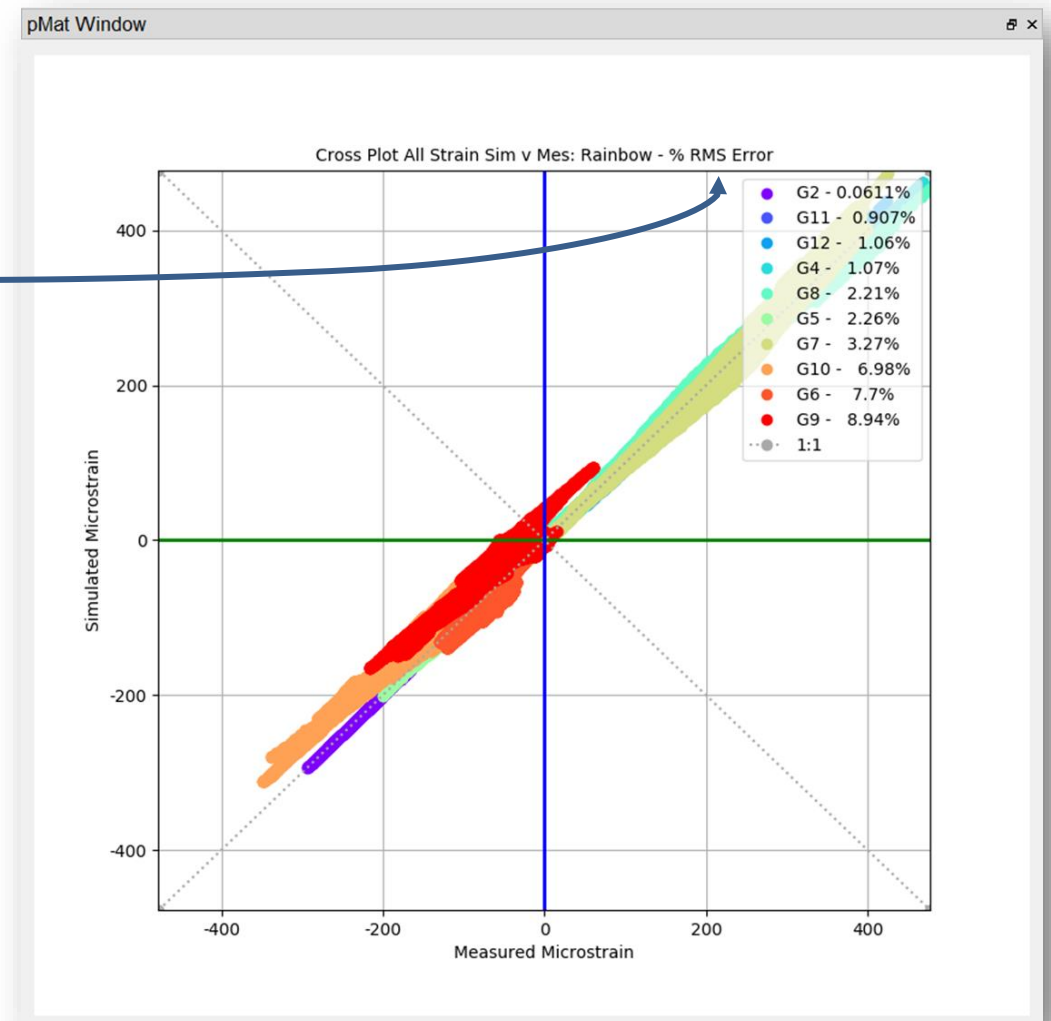
Error Bounds



Post-Test Cross Plot Color



The Cross Plot “Colors” (other than Red) will result in cross plot curves colored in a rainbow gradient corresponding to the parameter chosen.





Post-Test Cross Plot Axes

Cross Plot Options

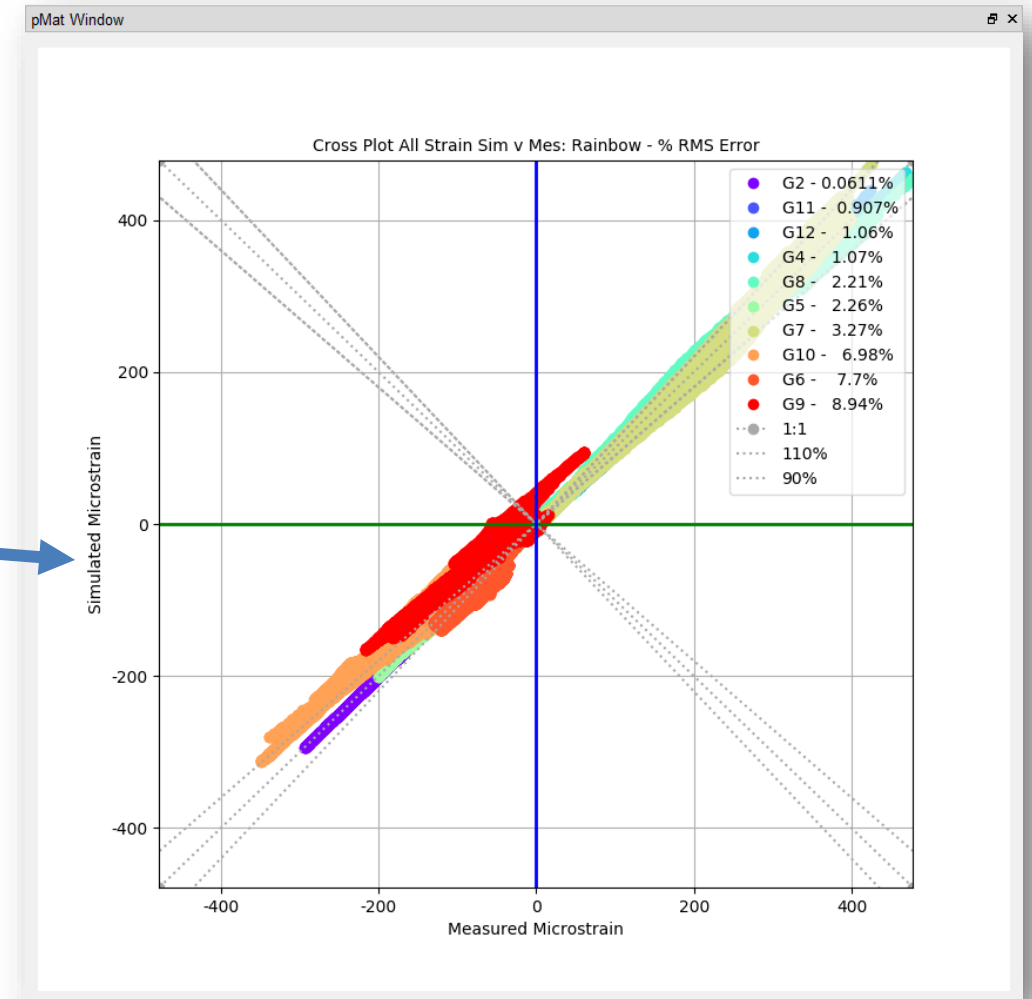
Cross Plot Color: Red

☒ Cross Plot Axes

☒ Cross Plot Error Axes

10 % Error Bounds

By default, the Cross Plot Axes (1:1 line) is turned on. Optionally, Cross Plot Error Axes can be added with a user defined Error Bounds.



Quick Format Menu





Quick Format Menu

The image illustrates the 'Quick Format Menu' in a software application, showing a plot window and its associated menu options.

Plot Window (Left): A window titled 'Function plots' displays a linear graph labeled 'Linear-01'. The x-axis ranges from 0.0 to 1.0, and the y-axis ranges from -4 to 4. The plot shows a straight line passing through the origin (0,0) and the point (1,4).

Quick Format Menu (Right): A callout menu is shown, highlighting the 'Quick Format' option in the top toolbar. The menu includes the following options:

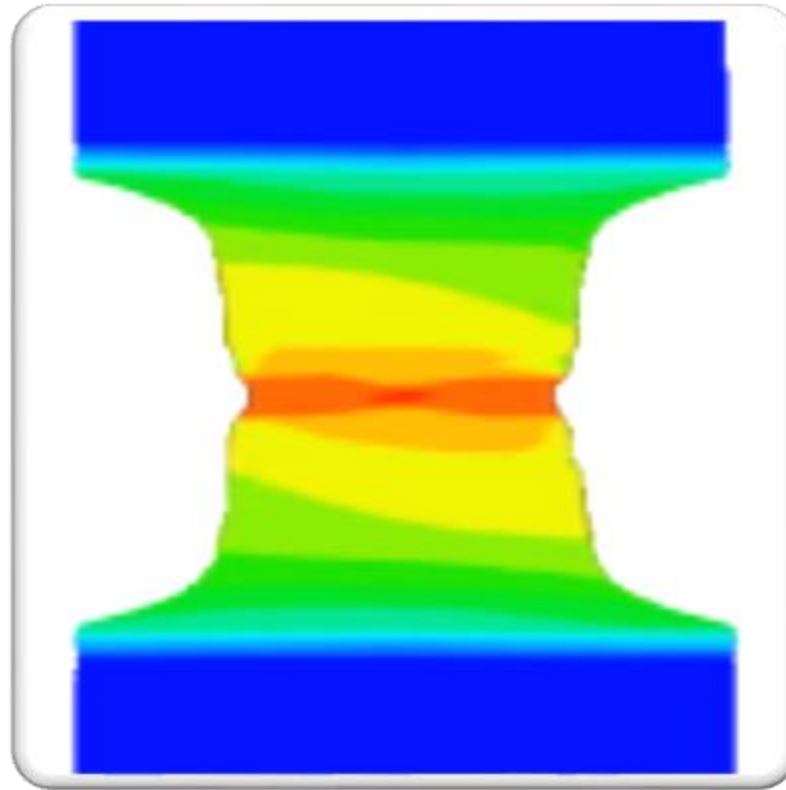
- ☒ Legend
- ☐ X Log
- ☐ X Grid
- ☐ Y Log
- ☐ Y Grid

Blue callout boxes identify the menu items: 'Legend', 'X Scale' (for X Log), 'X Grid', 'Y Scale' (for Y Log), and 'Y Grid'.

A large blue box at the bottom states: "Quickly toggle plot settings in any plot."



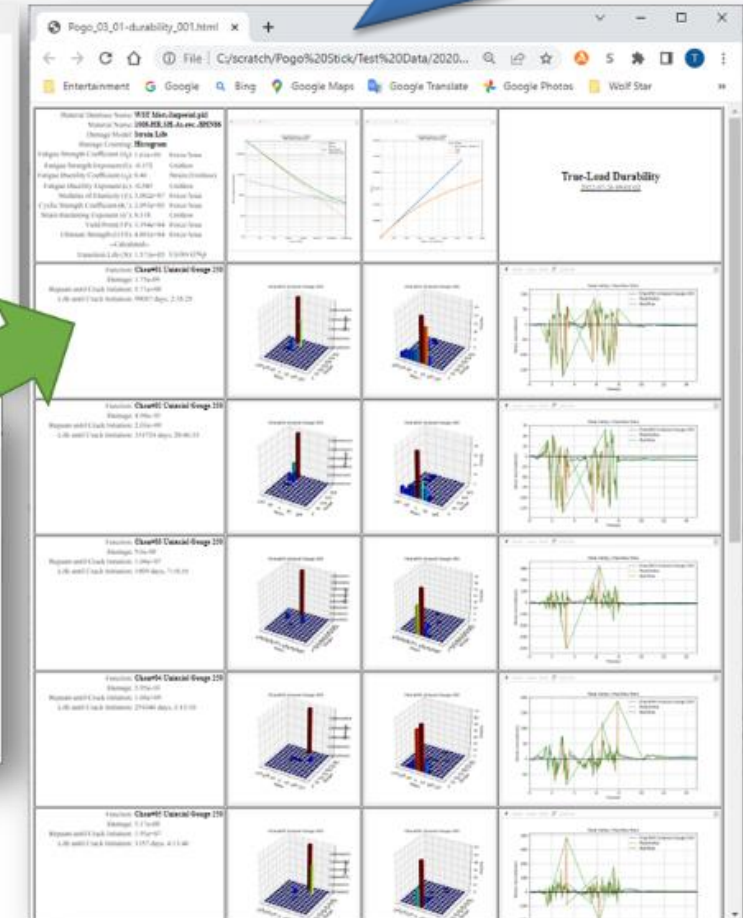
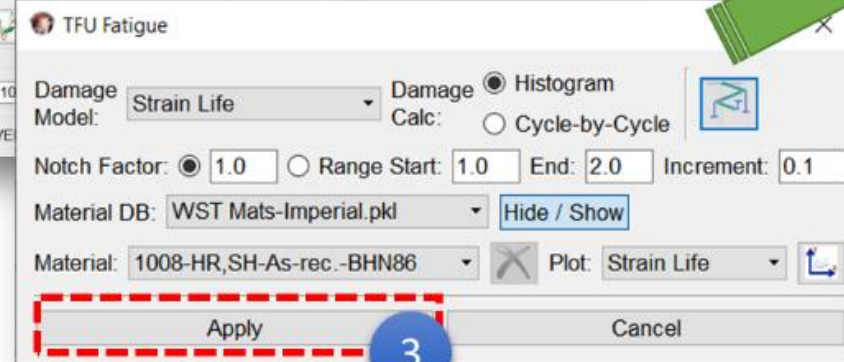
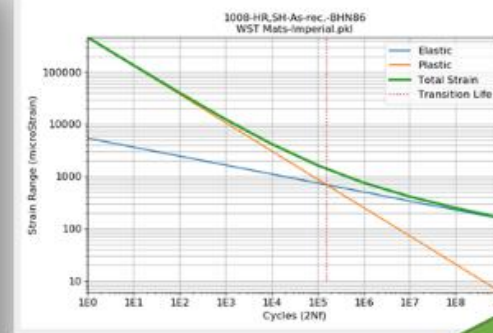
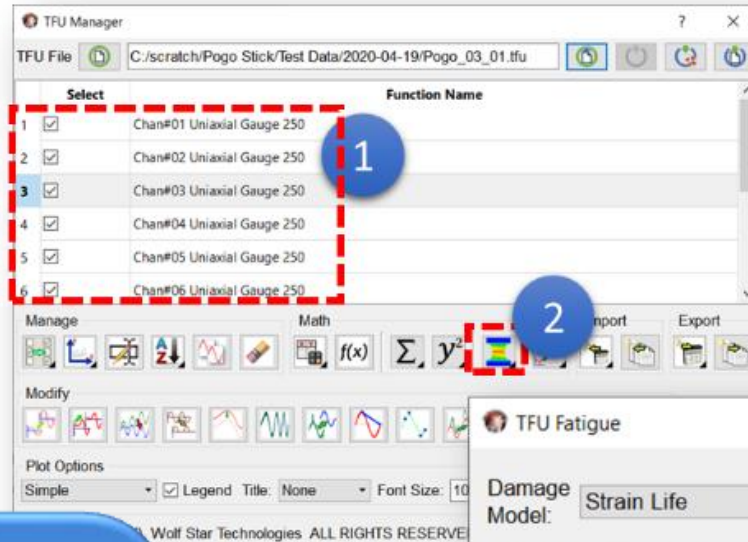
TFU Fatigue





TFU Fatigue

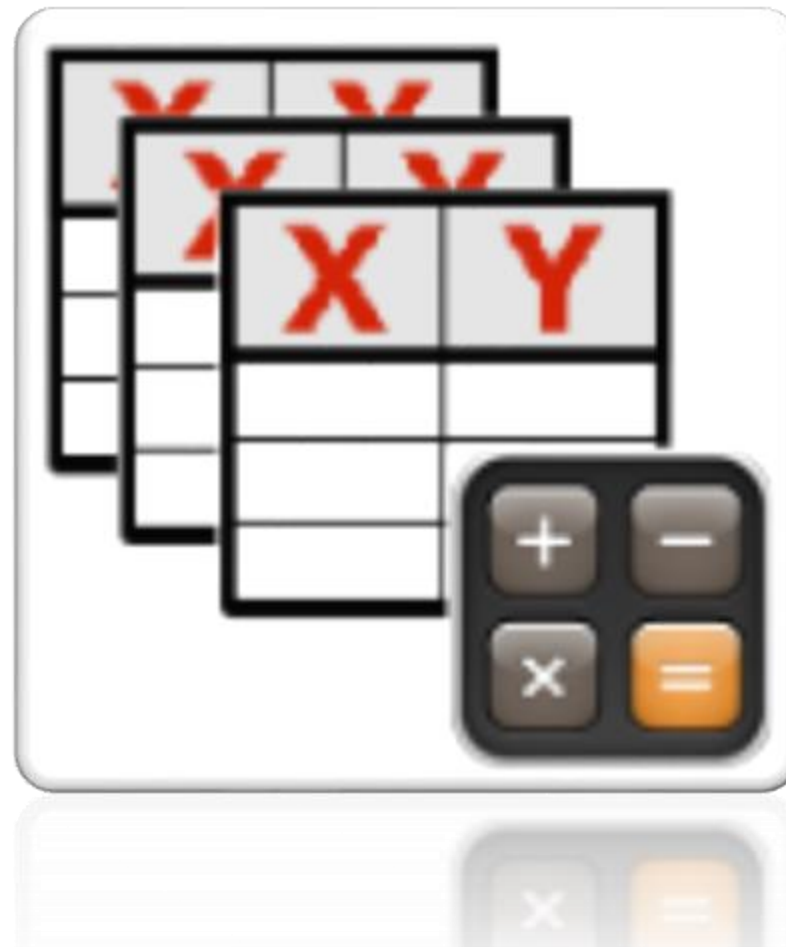
Durability HTML Report



TFU Fatigue is a complete durability analysis tool for strain gauge signals. It supports Stress Life, Strain Life, Smith-Topper-Watson, and BS 7608 durability calculations.



Bulk Stats





Bulk Stats

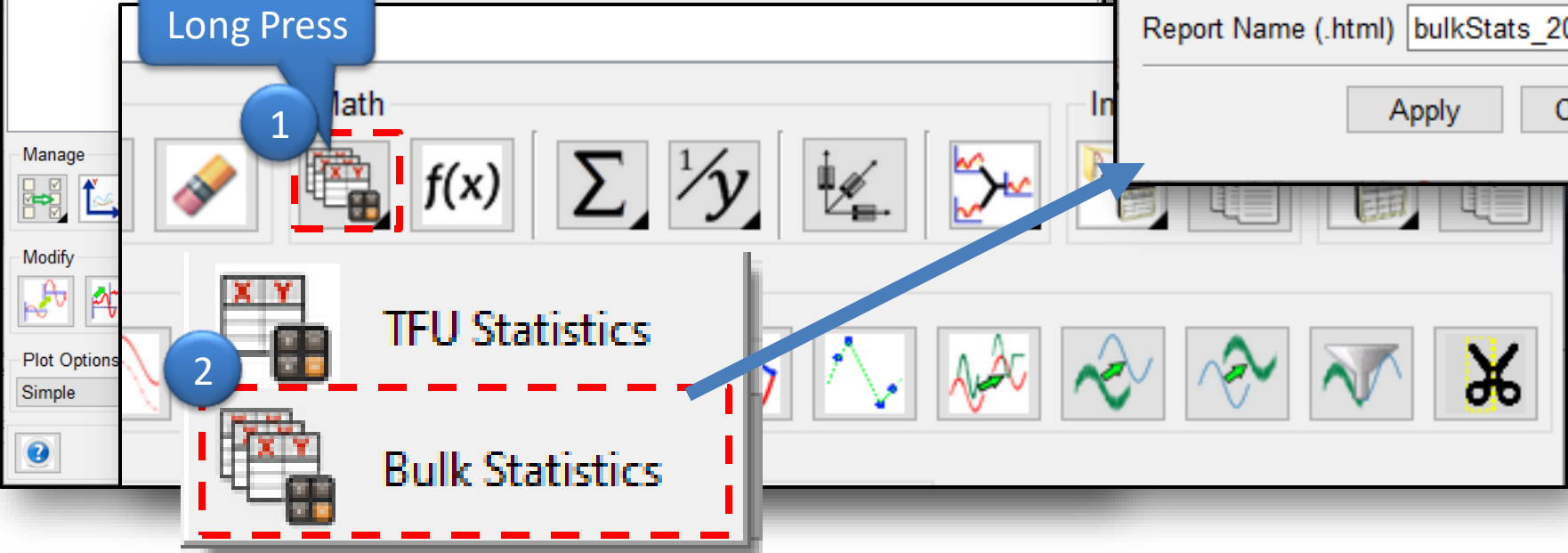
Folder Name

Open Bulk Stats form from TFU Manager



Long Press

1



Bulk Statistics

Search Folder:  

☐ Search Sub-Folders

Contains:

Does Not Contain: 

Report Name (.html)

 ☐ Hide Ba





Bulk Stats

The screenshot shows the 'Bulk Statistics' application window. It includes a search bar, a 'Search Sub-Folders' checkbox, filter fields for 'Contains' and 'Does Not Contain', a 'Report Name' field, and a list of files. Callout boxes provide instructions for various functions:

- Browse and Load Folder**: Points to the folder icon next to the search bar.
- Refresh Folder Listing**: Points to the refresh icon next to the search bar.
- File List**: Points to the list of files on the right.
- Select TFU files to analyze and click Apply**: Points to the list of files on the right.
- Search Sub-Folders**: Points to the 'Search Sub-Folders' checkbox.
- Filters**: Points to the 'Contains' and 'Does Not Contain' filter fields.
- HTML Report File Name**: Points to the 'Report Name (.html)' field.
- Apply**: Points to the 'Apply' button.
- Refresh Filter**: Points to the refresh icon next to the filter fields.
- Delete Rows**: Points to the delete icon at the bottom of the file list.
- Hide Base Directory**: Points to the 'Hide Base Directory' checkbox.

	File Name
1	88367_nohh_TL_gagenodes_no_loc1-ze...
2	88367_nohh_TL_gagenodes_no_loc1.tfu
3	annieTestGaugeName-annieDiffResult...
4	annieTestGaugeName-annieTestGauge...
5	annieTestGaugeName-annieTestGauge...
6	annieTestGaugeName-annieTestRobo-





Bulk Stats

A statistics report for each file is generated

Console Output

```
Processing C:\scratch\ceeTron_dev\Code Test\docFcn.tfu (9 of 9)
C:\scratch\ceeTron_dev\Code Test\docFcn.tfu
```

Function Name	Number of Pts	Start Time	End Time	Time Duration	Sampling Frequency	Max	Min	Range	Avg	Std Dev	RMS
func1-NONE	1024	0	1	1	1023	1	-1	2	0.0009766	0.7075	0.7075
Min	1024	0	1	1	1023	1	-1	2	0.0009766	0.7075	0.7075
Max	1024	0	1	1	1023	1	-1	2	0.0009766	0.7075	0.7075
Range	0	0	0	0	0	0	0	0	0	0	0
Avg	1024	0	1	1	1023	1	-1	2	0.0009766	0.7075	0.7075
RMS	1024	0	1	1	1023	1	1	2	0.0009766	0.7075	0.7075

```
Saving C:\scratch\ceeTron_dev\Code Test\docFcn-Stats.csv
Done.
```

Generating Max Plot

```
Saving my_bulkStats_2022-07-15.html
Done.
Opening my_bulkStats_2022-07-15.html...
```

A CSV report for each file is generated

One summary HTML report containing statistics and for all files is generated





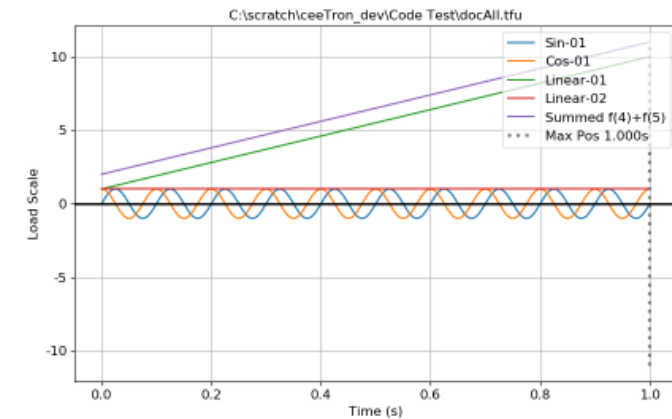
Bulk Stats

Excerpt of summary HTML report showing information for a single file

C:\scratch\ceeTron_dev\Code Test\docAll.tfu - Max at 1.000
C:\scratch\ceeTron_dev\Code Test\docAll-Stats.csv

Function Name	Number of Pts	Start Time	End Time	Time Duration	Sampling Frequency	Max	Min	Range	Avg	Std Dev	RMS
Sin-01	1024	0	1	1	1023	0.999999	-0.999999	2	1.38778e-17	0.706761	0.706761
Cos-01	1024	0	1	1	1023	1	-0.999995	2	0.000976562	0.707451	0.707452
Linear-01	1024	0	1	1	1023	10	1	9	5.5	2.60061	6.08385
Linear-02	1024	0	1	1	1023	1	1	0	1	0	1
Summed f(4)+f(5)	1024	0	1	1	1023	11	2	9	6.5	2.60061	7.00094
Summary											
Min	1024	0	1	1	1023	0.999999	-0.999999	0	1.38778e-17	0	0.706761
Max	1024	0	1	1	1023	11	2	9	6.5	2.60061	7.00094
Range	0	0	0	0	0	10	3	9	6.5	2.60061	6.29418
Avg	1024	0	1	1	1023	4.8	0.400001	4.4	2.6002	1.32309	3.0998
RMS	1024	0	1	1	1023	6.69328	1.26491	5.83095	3.83406	1.70449	4.19586

Graph for a single file



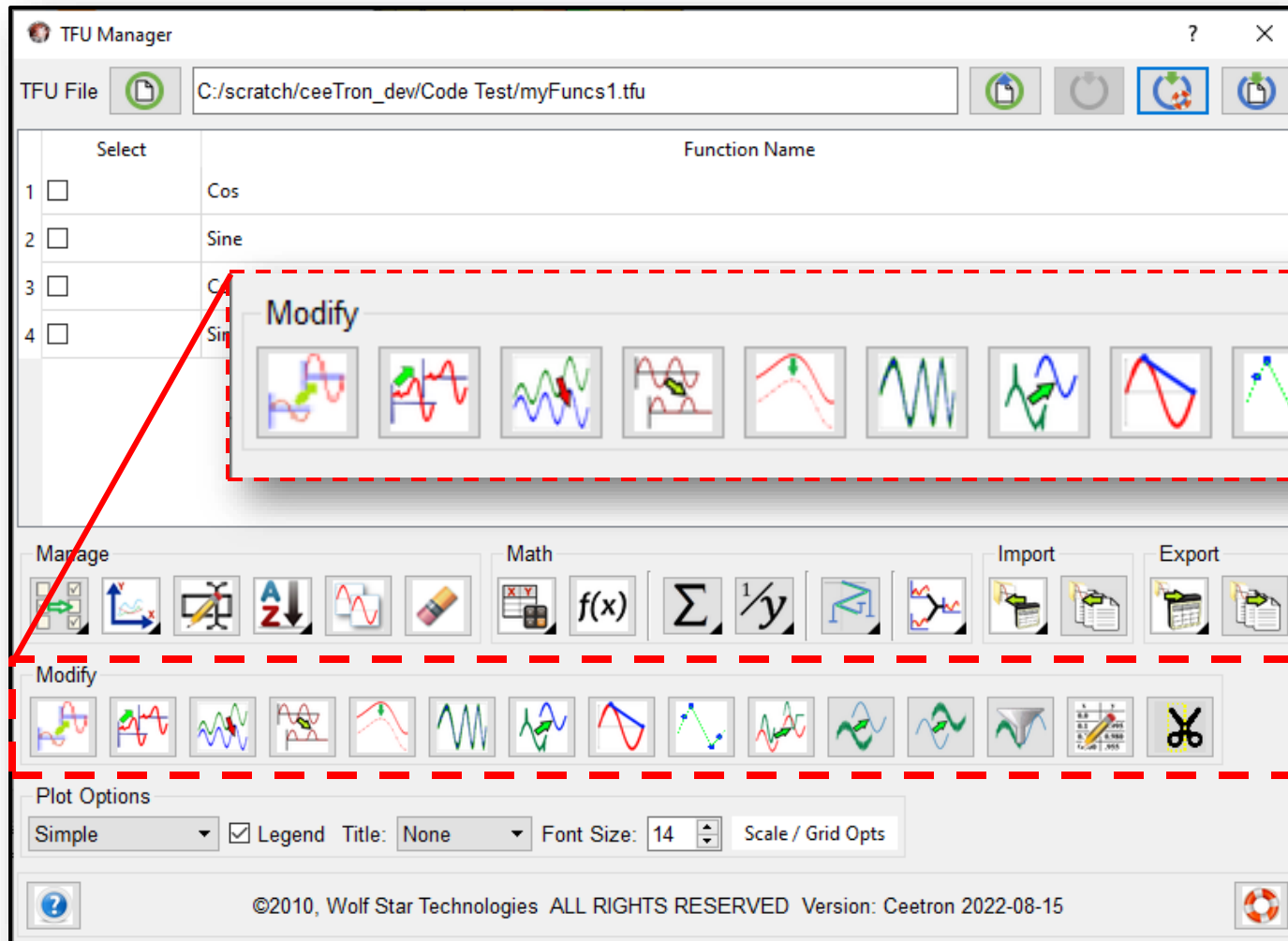
Function Table Editor

x	y
0.0	
0.1	.995
0.2	0.980
0.3	.955

0.4	.922
-----	------



Function Table Editor



Edit Functions





Function Table Editor

Function Selection

Save As name

Number of Points

**XY Table
Edit like spreadsheet**

Load Function for Editing

**Function naming rules
and overwrite switch**

Plot Function

Edit Functions

Modify

Save **Cancel**

	x	y
1	0.0	1.0
2	0.1	0.9950041652780258
3	0.2	0.9800665778412416
4	0.30000000000000004	0.955336489125606
5	0.4	0.9210609940028851
6	0.5	0.8775825618903728

The interface includes a 'Function Selection' dropdown menu currently set to 'Cos', a 'Load' button, a 'Save as' text field containing 'Cos_edited_2022-08-23', and checkboxes for 'Overwrite' (unchecked) and 'Edited Date' (checked). A 'Number of Points' input field is set to '1000'. A 'Plot Function' button with a graph icon is located next to the input field. The 'XY Table' is a spreadsheet-like grid with columns 'x' and 'y' containing numerical data. At the bottom, there is a 'Modify' toolbar with various function icons, a 'Save' button, a 'Cancel' button, and a 'Function naming rules and overwrite switch' section with a red dashed border around the 'Overwrite' and 'Edited Date' checkboxes. A 'Plot Function' button is also present in the toolbar area.



Function Table Editor

1 Select Rows

2 Right Click

3 Delete Row(s)

Save as: Cos_edited_2022-08-23 ☐ Overwrite ☒ Edited Date

43 4.2 -0.4902608213406994

44 4.3 -0.40079917207997545

45 4.4 -0.30733286997841935

46 4.5 -0.2107957994307797

47 4.6 -0.11215252693505398

48 4.7 -0.01238866346289056

49 4.8 0.08749898343944727

50 4.9 0.283662180322625

51 5.0 0.377417724817197

52 5.1 0.461781613611205

53 5.2 0.538569090747766

54 5.3 0.605186137361051

55 5.4 0.661317923779803

56 5.5 0.707106781186548

57 5.6 0.742270662990568

58 5.7 0.766243447435141

59 5.8 0.778145554463491

60 5.9 0.777145929542781

61 6.0 0.763426680823882

62 6.1 0.737377014441367

63 6.2 0.699590647579722

64 6.3 0.651328459746807

65 6.4 0.594005057245797

66 6.5 0.529628857447169

67 6.6 0.459697798598136

68 6.7 0.385682482639651

69 6.8 0.309182845157498

70 6.9 0.231839025997204

71 7.0 0.155321631906861

72 7.1 0.0713251404222676

73 7.2 -0.0209191964256015

74 7.3 -0.121825150627561

75 7.4 -0.229815004753558

76 7.5 -0.343219010467114

77 7.6 -0.460476103878927

78 7.7 -0.580032544723425

79 7.8 -0.699540107171056

80 7.9 -0.816692687736587

81 8.0 -0.929980170548266

82 8.1 -0.938091289364181

83 8.2 -0.941354744505859

84 8.3 -0.93977766722725

85 8.4 -0.933477017252568

86 8.5 -0.922673402412986

87 8.6 -0.90769739996104

88 8.7 -0.888972760038959

89 8.8 -0.866973750165803

90 8.9 -0.84227734222656

91 9.0 -0.815559507446818

92 9.1 -0.787507143690167

93 9.2 -0.757925660401671

94 9.3 -0.727625068772157

95 9.4 -0.696425469799997

96 9.5 -0.665245964504089

97 9.6 -0.635005652095225

98 9.7 -0.606633632572745

99 9.8 -0.580068806651605

100 9.9 -0.555250266341601

101 10.0 -0.532127076424803

102 10.1 -0.510759340053548

103 10.2 -0.491110066219681

104 10.3 -0.473154246821188

105 10.4 -0.456868881758881

106 10.5 -0.442132881039259

107 10.6 -0.428937245662196

108 10.7 -0.417174075627671

109 10.8 -0.406836470926781

110 10.9 -0.397820541560568

111 11.0 -0.390135487528014

112 11.1 -0.383782408729118

113 11.2 -0.378763405162881

114 11.3 -0.375081576828211

115 11.4 -0.372741923725118

116 11.5 -0.371751545843601

117 11.6 -0.372120552173655

118 11.7 -0.373860052717181

119 11.8 -0.376982147473181

120 11.9 -0.381499836441601

121 12.0 -0.387427119521601

122 12.1 -0.394780106601601

123 12.2 -0.403577897681601

124 12.3 -0.413840502761601

125 12.4 -0.425599010841601

126 12.5 -0.438885521921601

127 12.6 -0.453733036001601

128 12.7 -0.470185544081601

129 12.8 -0.488290046161601

130 12.9 -0.508097552241601

131 13.0 -0.529560058321601

132 13.1 -0.552637564401601

133 13.2 -0.577290070481601

134 13.3 -0.603490076561601

135 13.4 -0.630200082641601

136 13.5 -0.657390088721601

137 13.6 -0.684940094801601

138 13.7 -0.712830100881601

139 13.8 -0.741040106961601

140 13.9 -0.769550113041601

141 14.0 -0.798350119121601

142 14.1 -0.827430125201601

143 14.2 -0.856780131281601

144 14.3 -0.886400137361601

145 14.4 -0.916290143441601

146 14.5 -0.946450149521601

147 14.6 -0.976880155601601

148 14.7 -1.007590161681601

149 14.8 -1.038580167761601

150 14.9 -1.069850173841601

151 15.0 -1.101400179921601

152 15.1 -1.133230186001601

153 15.2 -1.165350192081601

154 15.3 -1.197760198161601

155 15.4 -1.230460204241601

156 15.5 -1.263450210321601

157 15.6 -1.296730216401601

158 15.7 -1.330300222481601

159 15.8 -1.364160228561601

160 15.9 -1.398310234641601

161 16.0 -1.432750240721601

162 16.1 -1.467480246801601

163 16.2 -1.502500252881601

164 16.3 -1.537810258961601

165 16.4 -1.573410265041601

166 16.5 -1.609300271121601

167 16.6 -1.645480277201601

168 16.7 -1.68185

1 Select Rows

2 Right Click

3 Insert Row(s) Above

Insert Row(s) Above

Comparison of the 'Edit Functions' dialog box between two versions of the software:

- Left Version (Older):**
 - Function: `Cos`
 - Save as: `Cos`
 - Number of Points: `1000`
 - Table values: 0.0, 0.1, 0.2, 0.3000
- Right Version (Newer):**
 - Function: `Cos` (with a dropdown arrow)
 - Buttons: `Load` (highlighted with a blue border)
 - Save as: `Cos_edited_2022-4`
 - Number of Points: `1000`
 - Table values: 0.0, 0, 0.2, 0.30000000000000000000

A blue arrow points from the `0.1` value in the left table to the `0` value in the right table. A blue callout bubble at the bottom states: **Change value in place**.

Integrate Functions

$$\int y dt$$



Integrate Functions

TFU Manager

TFU File

Select	Function Name
☒	Cos
☐	Sine
☐	Cos + j*Sine
☐	Sin-01
☐	Cos_abs()
☐	Linear-01
☐	Linear-01_abs()
☐	Band-01

1 Select Function(s)

Math

2 Long Press

3

Manage

Modify

Plot Options

Simple ☒ Legend Title: None Font Size: 14

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Math

$f(x)$ Σ $1/y$ $|y|$ y^2 $\sqrt{}$ $\frac{dy}{dt}$ $\int y dt$

Reciprocal

Absolute Value

Square

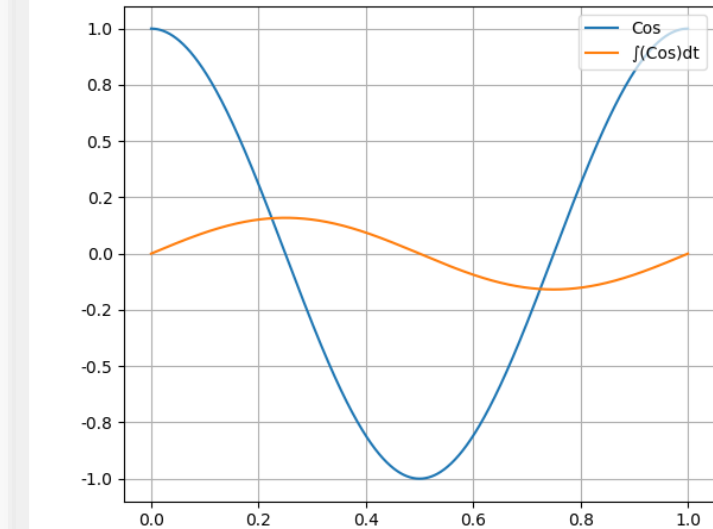
Square Root

Derivative

Integrate

Import

Export

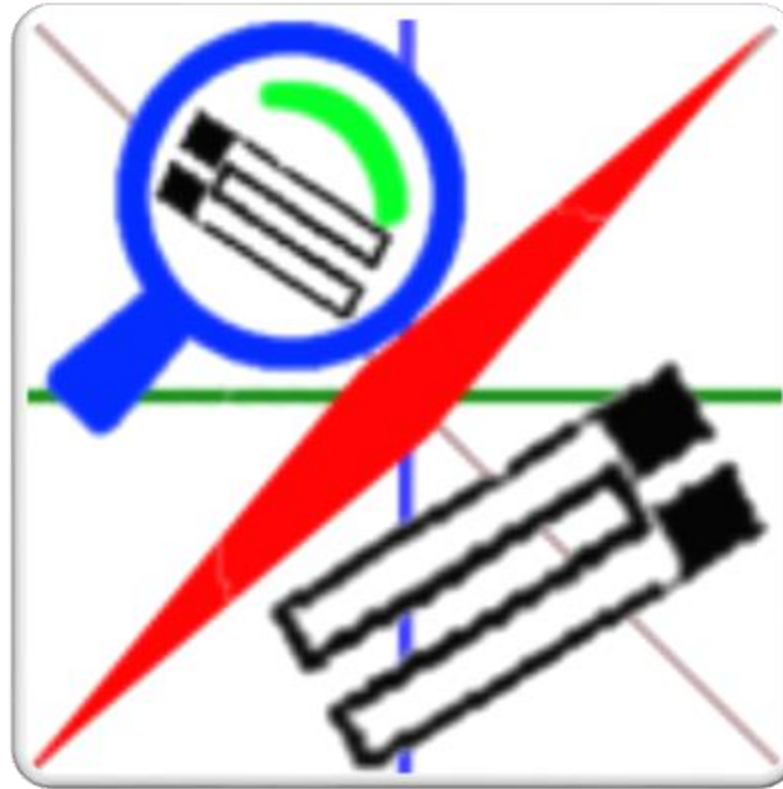


12	☐	$\int (Cos)dt$
----	--------------------------	----------------

Integrate Functions



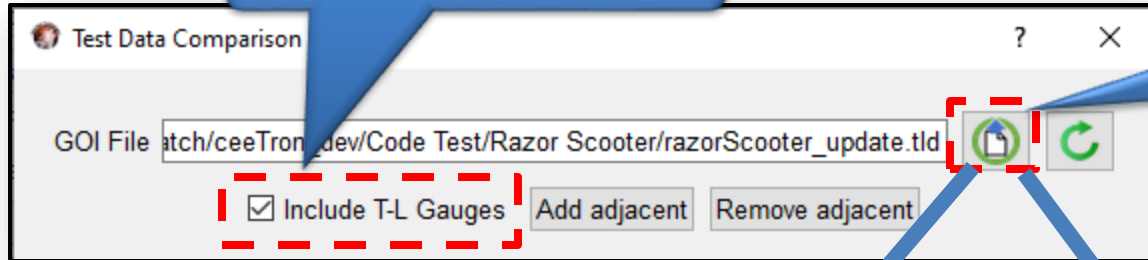
GOI / Test Data Compare Updates





GOI / Test Data Compare Naming

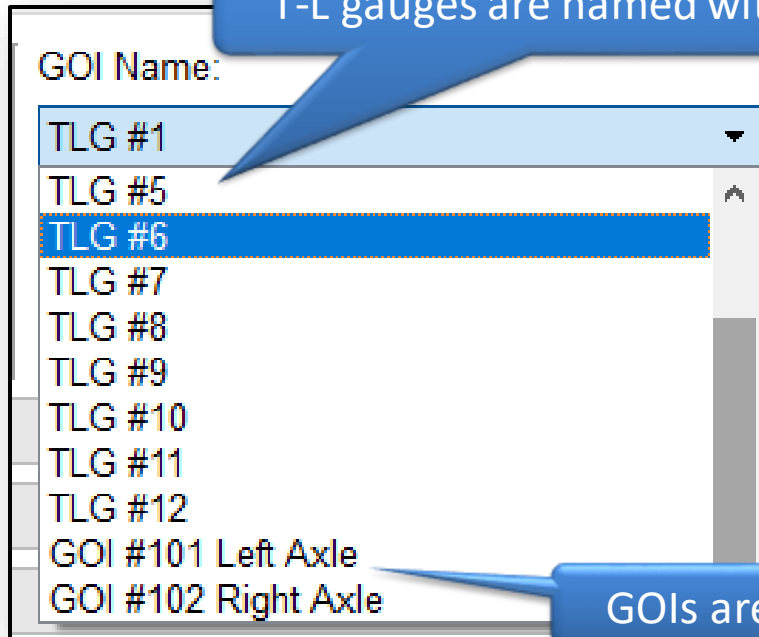
Include T-L Gauges



Browse for and Load TLD file with GOIs and T-L gauges

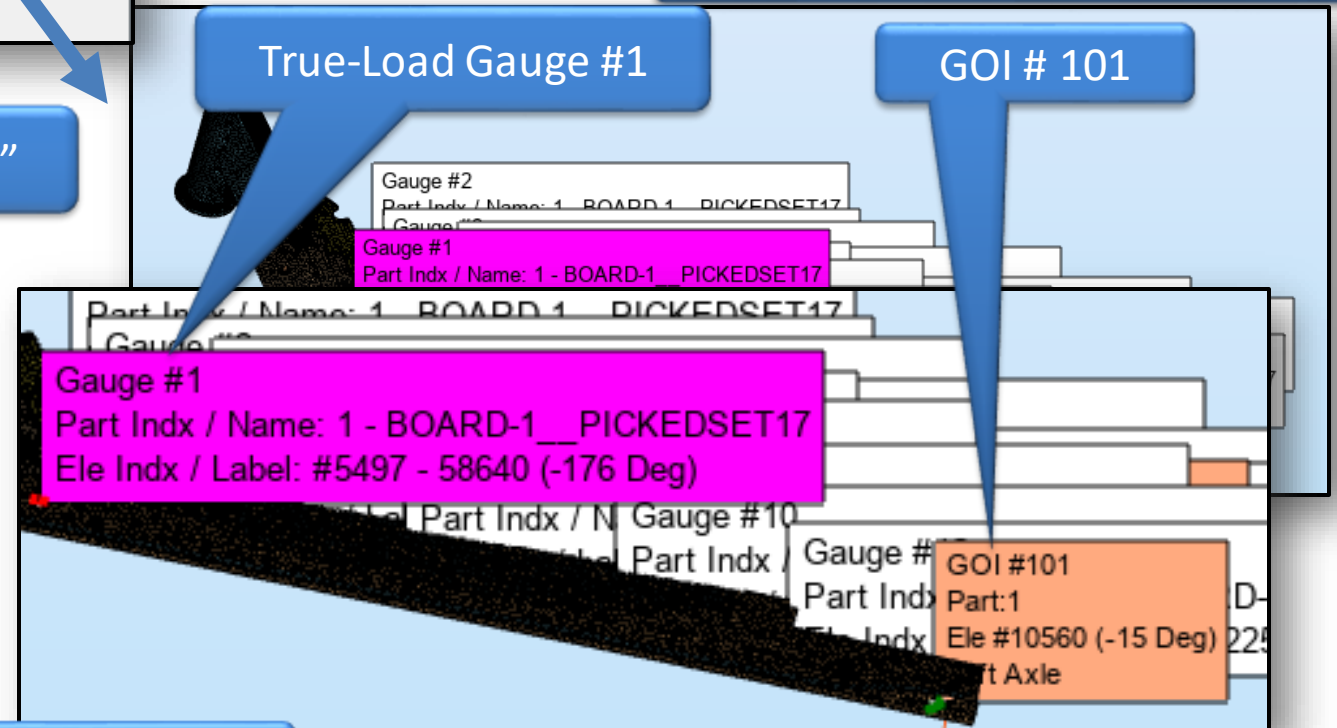
Model with GOIs and T-L Gauges

T-L gauges are named with "TLG"



True-Load Gauge #1

GOI # 101



GOIs are named with "GOI"





GOI / Test Data Compare Progress Bars

Progress Bar for Time History Calculation and Plot

Progress Bar for Error Calculation and Plot

Progress Bar for Cross Plot Calculation and Plot

Single ☒ Multiple

Test Function:

GOI Name:

Time Hist:		100%
Error:		100%
Cross Plot:		100%





GOI / Test Data Compare Map File

Test Data Comparison [?] [X]

GOI File  

☒ Include T-L Gauges

Data Component

Shell Surface: ☒ Top SPOS ☐ Bottom SNEG

 Map File: 

 Test TFU File: 

Browse for and Load GOI File

Browse for and Load Map File

Browse for and Load test data
TFU File





GOI / Test Data Compare Map File

Test Function / Channel

GOI (and T-L gauge if loaded) Name

Single Multiple

Test Function:

GOI Name:

Chan#01 Uniaxial Gauge 250

Chan#02 Uniaxial Gauge 250

Chan#03 Uniaxial Gauge 250

Chan#04 Uniaxial Gauge 250

Chan#05 Uniaxial Gauge 250

Chan#06 Uniaxial Gauge 250

Chan#07 Uniaxial Gauge 250

Chan#08 Uniaxial Gauge 250

Chan#09 Uniaxial Gauge 250

Chan#10 Uniaxial Gauge 250

TLG #1

Apply Cancel

Single Multiple

Test Function:

GOI Name:

Chan#01 Uniaxial Gauge 250

Time Hist:

Error:

Cross Plot:

TLG #1

TLG #2

TLG #3 dropped

TLG #4 dropped

TLG #5

TLG #6

TLG #7

TLG #8

TLG #9

TLG #10

Clear Apply

Dropped gauges labeled

Map File links Test Channel to GOI.
→ Changing the Test Channel changed the GOI.
→ Changing the GOI changes the Test Channel.

Dropped gauges
are not coupled





GOI / Test Data Compare Map File

Multiple Gauge-Function Table

Test Function

GOI Name

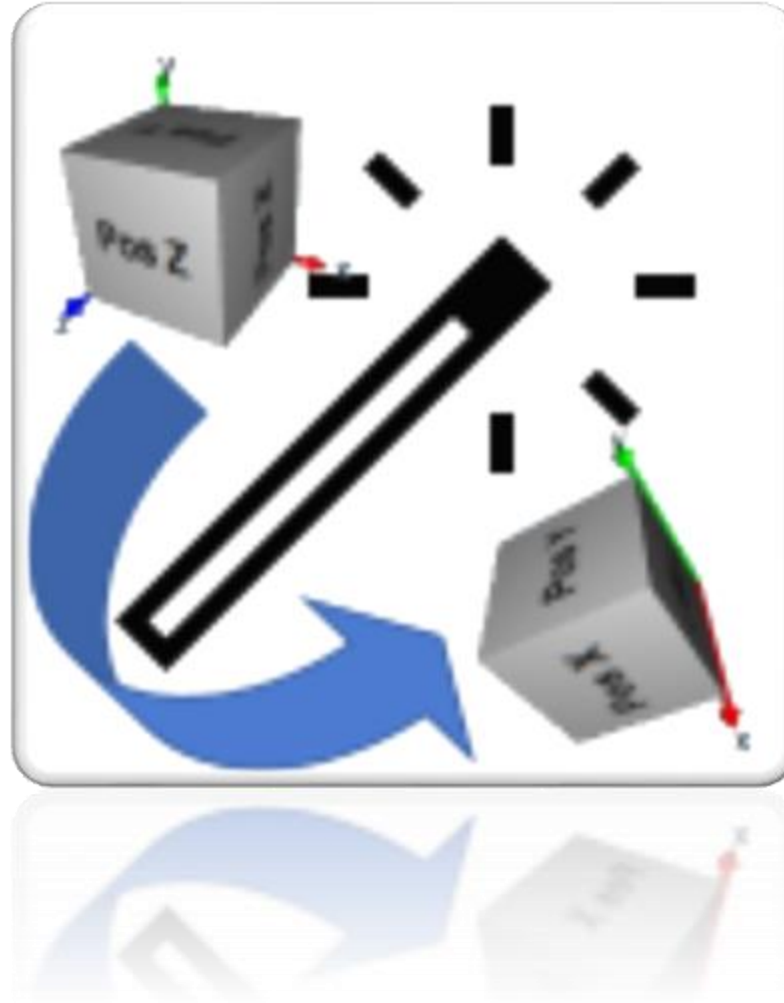
Single		Multiple	
	Test Function	GOI Name	
1	Chan#01 Uniaxial Gauge 250 ▼	TLG #1 ▼	
2	Chan#02 Uniaxial Gauge 250 ▼	TLG #2 ▼	
3	Chan#05 Uniaxial Gauge 250 ▼	TLG #5 ▼	
4	Chan#06 Uniaxial Gauge 250 ▼	TLG #6 ▼	
5	Chan#07 Uniaxial Gauge 250 ▼	TLG #7 ▼	

Channels / GOIs are not coupled in the “Multiple” tab like they are on the “Single” tab.

Channels are mapped to gauges according to the map file by default.



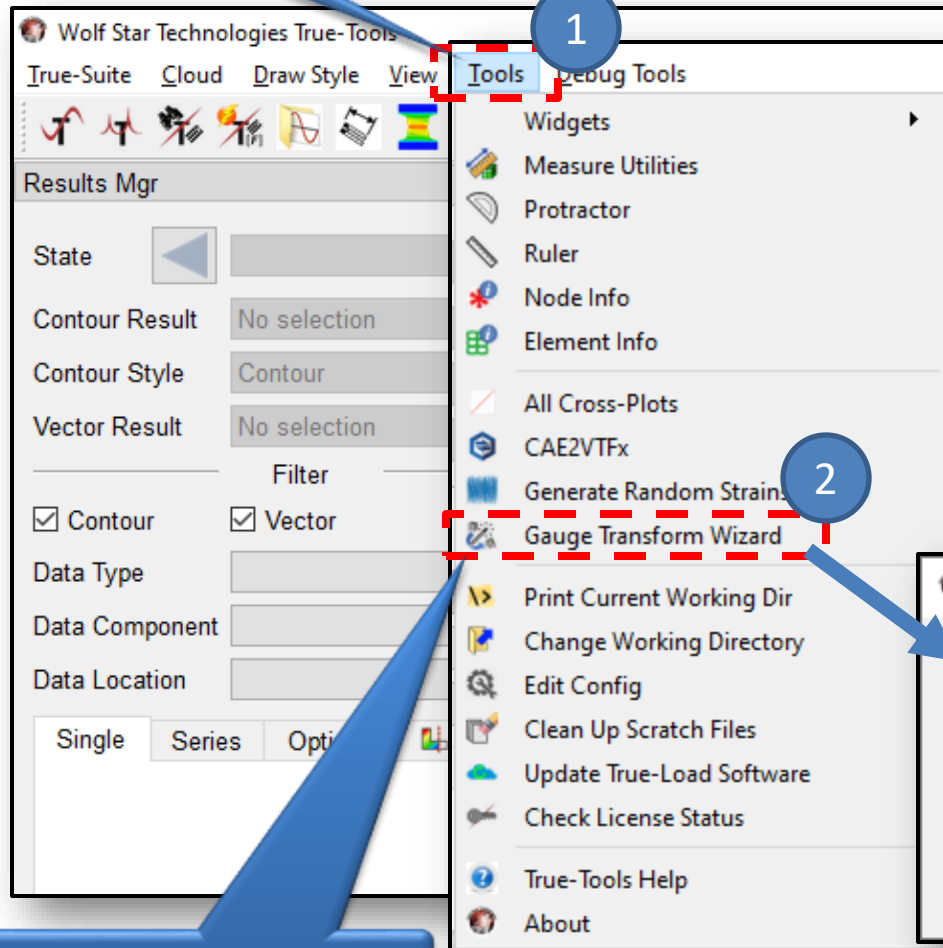
Gauge Transform Wizard





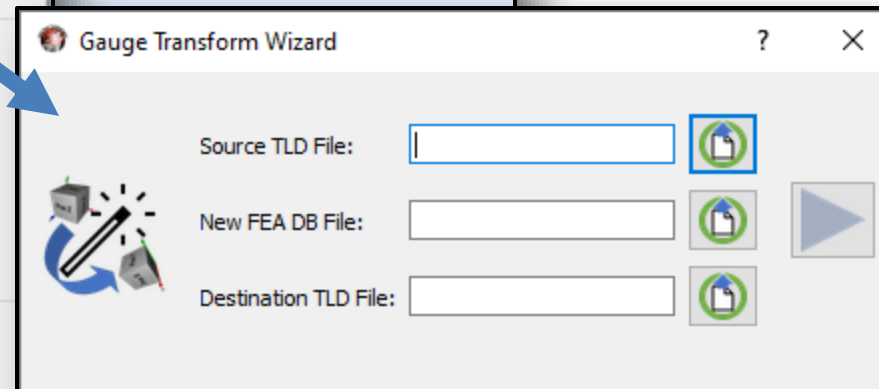
Gauge Transform Wizard

Tools



Gauge Transform Wizard is a new tool that transforms gauges to match a spatially transformed FEA model. For example, a new FEA of a boom in a new position needs to use same gauges.

The next few slides will give an overview of how it works.



Gauge Transform Wizard





Gauge Transform Wizard

1) Select a source TLD file containing gauges to transform.

2) Select a new FEA DB with a transformed model

Gauge Transform Wizard

Source TLD File: Wizard Files/hLamp_GOI.tld

New FEA DB File: amp-G-loads-rotTrans.odb

Destination TLD File: hLamp_GOI-Xform_new.tld

A destination TLD name is automatically generated, but can be renamed

3) Click Next, loads the source TLD file



Define Source Csys – 3 Pts

The screenshot displays the True-Tools software interface. A 'Gauge Transform Wizard' dialog box is open, featuring four numbered steps: 1. Select Source CSYS, 2. Select X-Axis Pt, 3. Select Pt on XY Plane, and 4. Click Next. The background shows a 3D model of a mechanical part with various labels and a console window at the bottom.

Original TLD File is loaded into session

Pre-Test Form Is behind Gauge Transform Wizard

4) Click Next, loads the new FEA model



Define Destination Csys – 3 Pts

Wolf Star Technologies True-Tools

True-Suite Cloud Draw Style View Tools

Results Mgr

State Unit-Loads/Pre-Test

Contour Result

Contour Style

Vector Result

✓ Contour

Data Type

Data Component

Data Location

Single

TLD File: C:/scratch/ceeTron_dev/Code Test/hLamp_GOI-Xform_new.tld

FEA DB: C:/scratch/ceeTron_dev/Code Test/headlamp-G-loads-rotTrans.odb

✓ Load Shells Only ☐ Open as VTfx

Session Tools

Select elements for candidate gauges 6 elements picked

Condition Number 3.253

Hide Load Table

Stationary Loads Moving Loads

Step	Frame	Scale Factor
1 Unit-Loads:Load Case: GRAV-10GX-(1)	1001	1.0

Scale Options

Choose Scales

✓ Auto E-Scale

✓ Plot Legend

Font Size: 10

Labels Only

Gauge Transform Wizard

Destination CSYS Origin Pt:

X-Axis Pt:

Pt on XY Plane:

1 2 3 4

Results Mgr

Console Output

Loading 15 Na

Unit-Loads:In

Unit-Loads:Lo

Unit-Loads:Load Case: GRAV-10GY-(2) 1002

Unit-Loads:Load Case: GRAV-10GZ-(3) 1003

Unit-Loads:Load Case: ZZ-COMBINED-(4) 1004

Parts: 4

Nodes: 627

Elements: 553

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Event File Name

Python

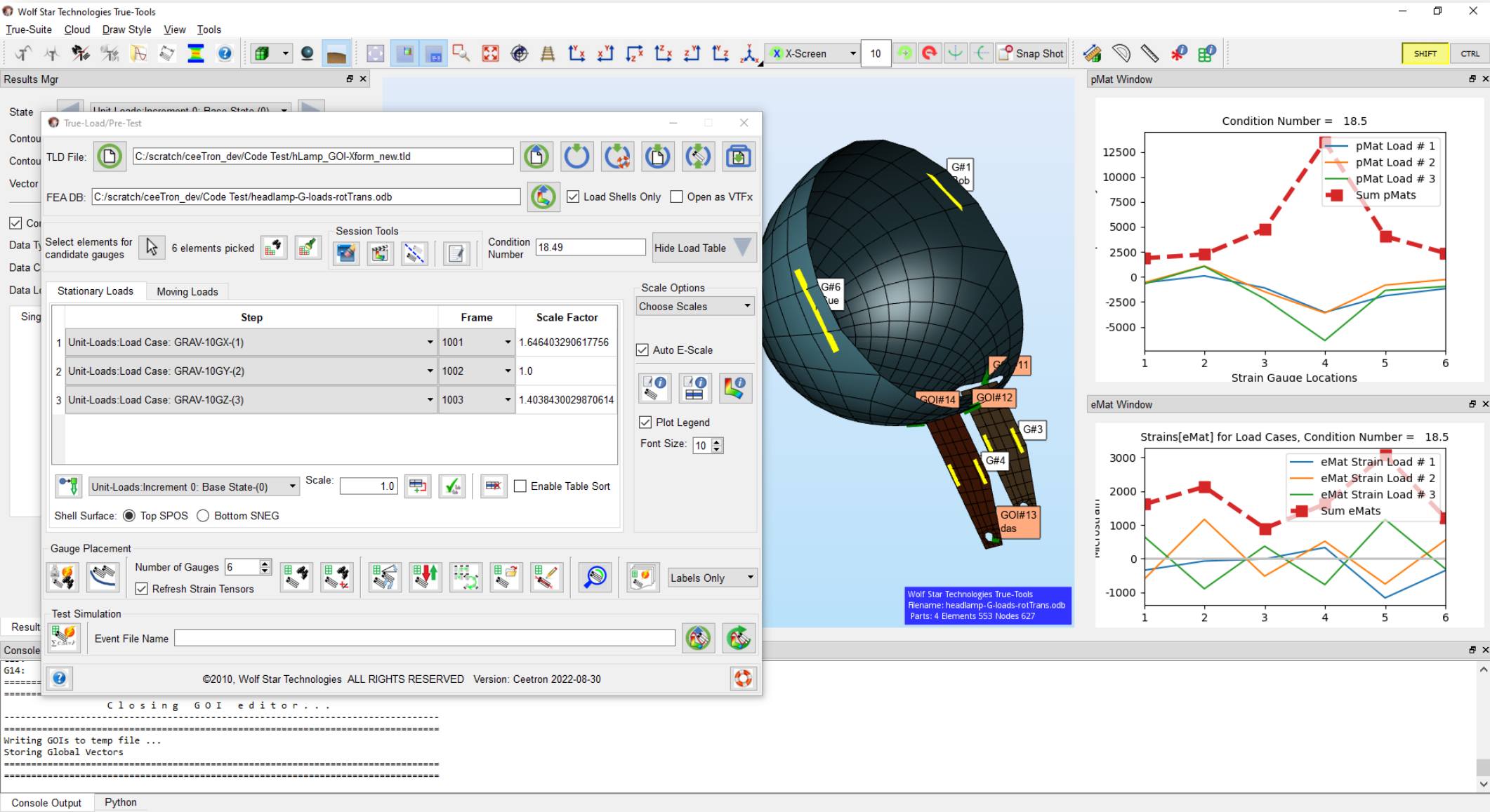
New TLD Name Created

New FEA DB Loaded

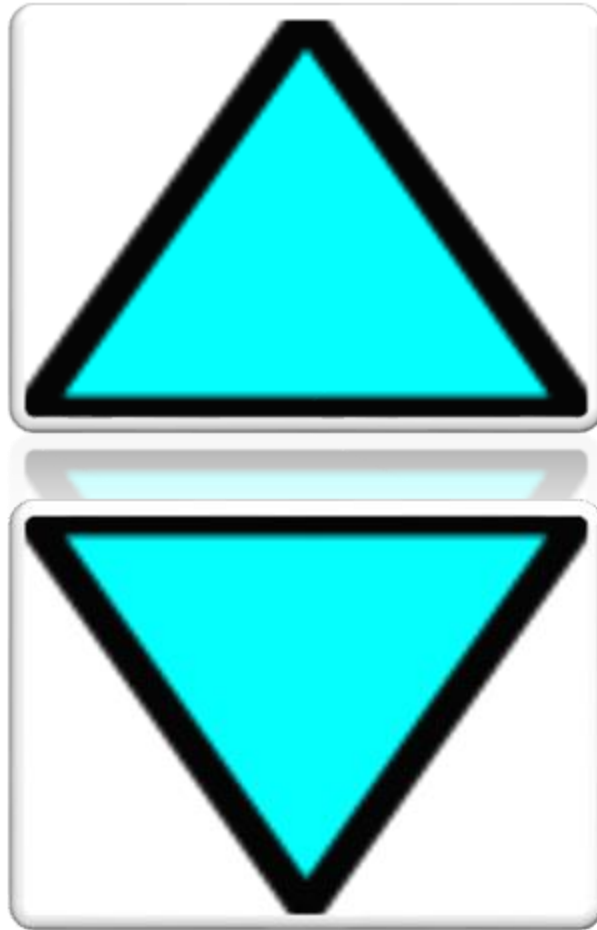
4) Click Next, imports transformed gauges into TLD Model.



Transformed Gauges Imported



Part Manager Sort & Filter





Part Manager Sort

Default after model load

Sort Descending

Sort Ascending

Part Mgr

Part Names
1 BUCKET-1_PICKEDSET7
2 PART-1-1_PICKEDSET18_INERTIA-1_
3 PART-2-1_PICKEDSET7
4 PART-2-2_PICKEDSET7
5 Part 0

Sort

Replace Add Remove All Sort

Filter

Part Mgr

Part Names
1 Part 0
2 PART-2-2_PICKEDSET7
3 PART-2-1_PICKEDSET7
4 PART-1-1_PICKEDSET18_INERTIA-1_
5 BUCKET-1_PICKEDSET7

Sort

Replace Add Remove All Sort

Filter

Part Mgr

Part Names	Color
1 BUCKET-1_PICKEDSET7	Orange
2 PART-1-1_PICKEDSET18_INERTIA-1_	Light Blue
3 PART-2-1_PICKEDSET7	Orange
4 PART-2-2_PICKEDSET7	Light Blue
5 Part 0	Dark Blue

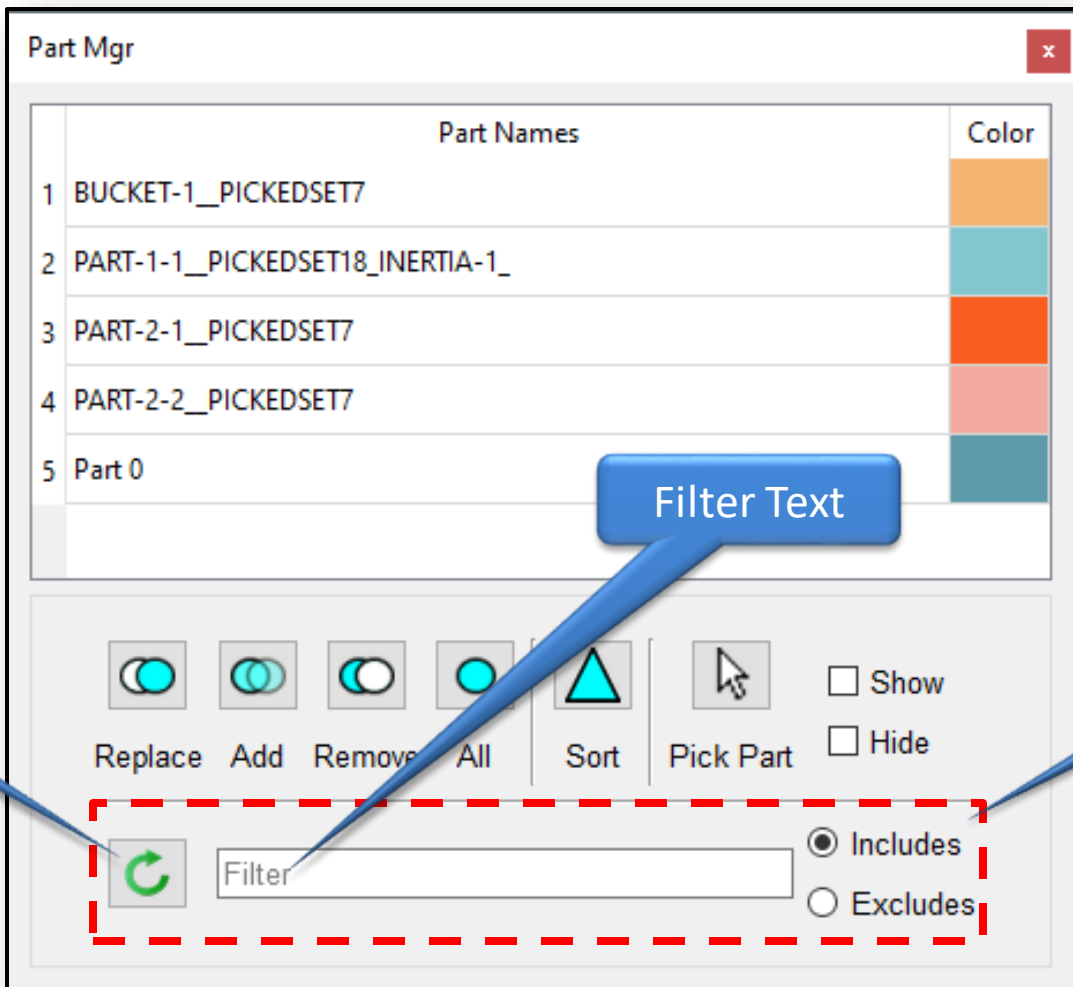
Sort Pick Part

Replace Add Remove All Sort Pick Part

Filter

☒ Includes ☐ Excludes

Part Manager Filter



The screenshot shows the 'Part Mgr' dialog box with a list of parts and a filter section. Annotations highlight key features:

- Clear Filter:** Points to a green circular refresh icon in the filter section.
- Filter Text:** Points to the text input field in the filter section.
- Include / Exclude:** Points to the radio buttons labeled 'Includes' and 'Excludes' in the filter section.

The 'Part Mgr' dialog box contains the following table:

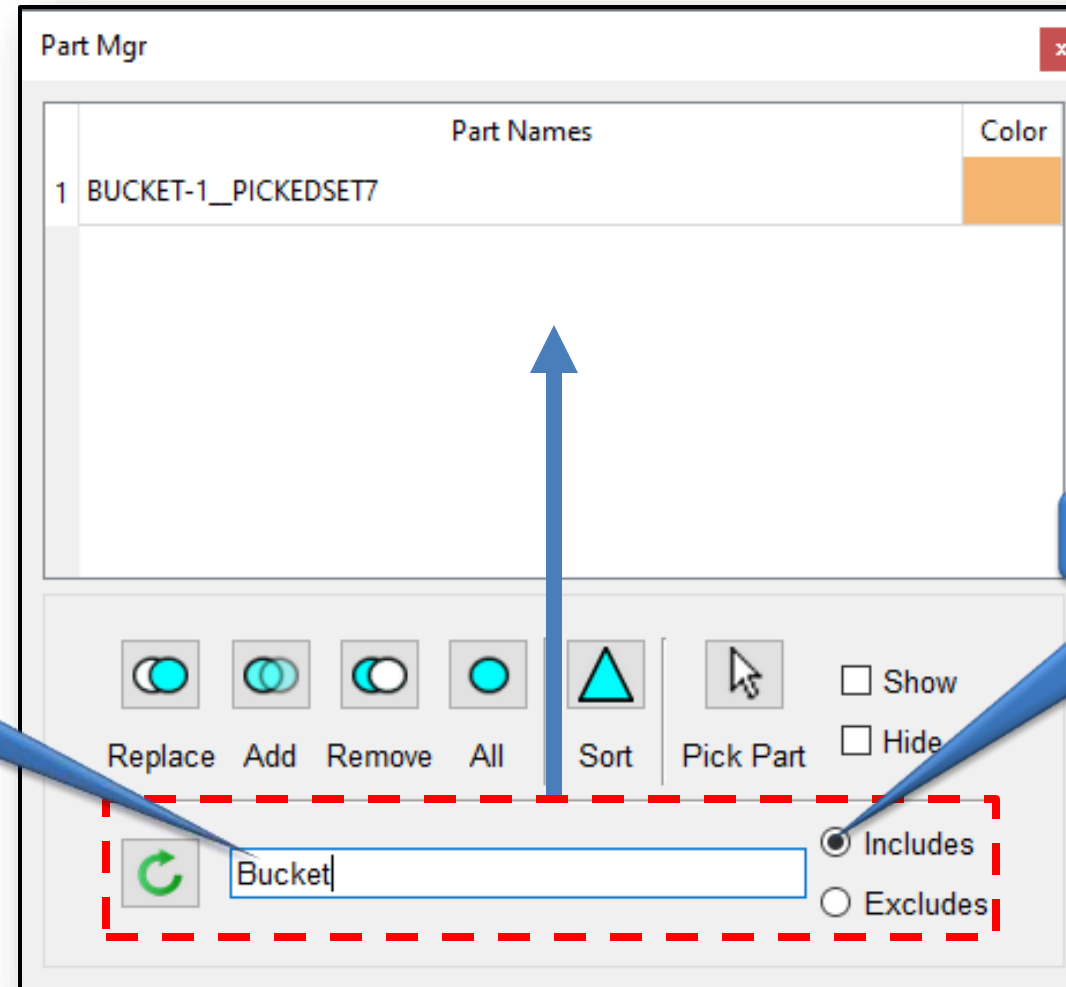
	Part Names	Color
1	BUCKET-1_PICKEDSET7	Orange
2	PART-1-1_PICKEDSET18_INERTIA-1_	Teal
3	PART-2-1_PICKEDSET7	Red
4	PART-2-2_PICKEDSET7	Light Red
5	Part 0	Dark Teal

Below the table, the filter section includes:

- Buttons: Replace, Add, Remove, All, Sort, Pick Part.
- Checkboxes: Show, Hide.
- Filter section (highlighted with a red dashed box):
 - Green circular refresh icon (labeled 'Clear Filter').
 - Filter text input field (labeled 'Filter Text').
 - Radio buttons: Includes (selected), Excludes.



Part Manager Filter

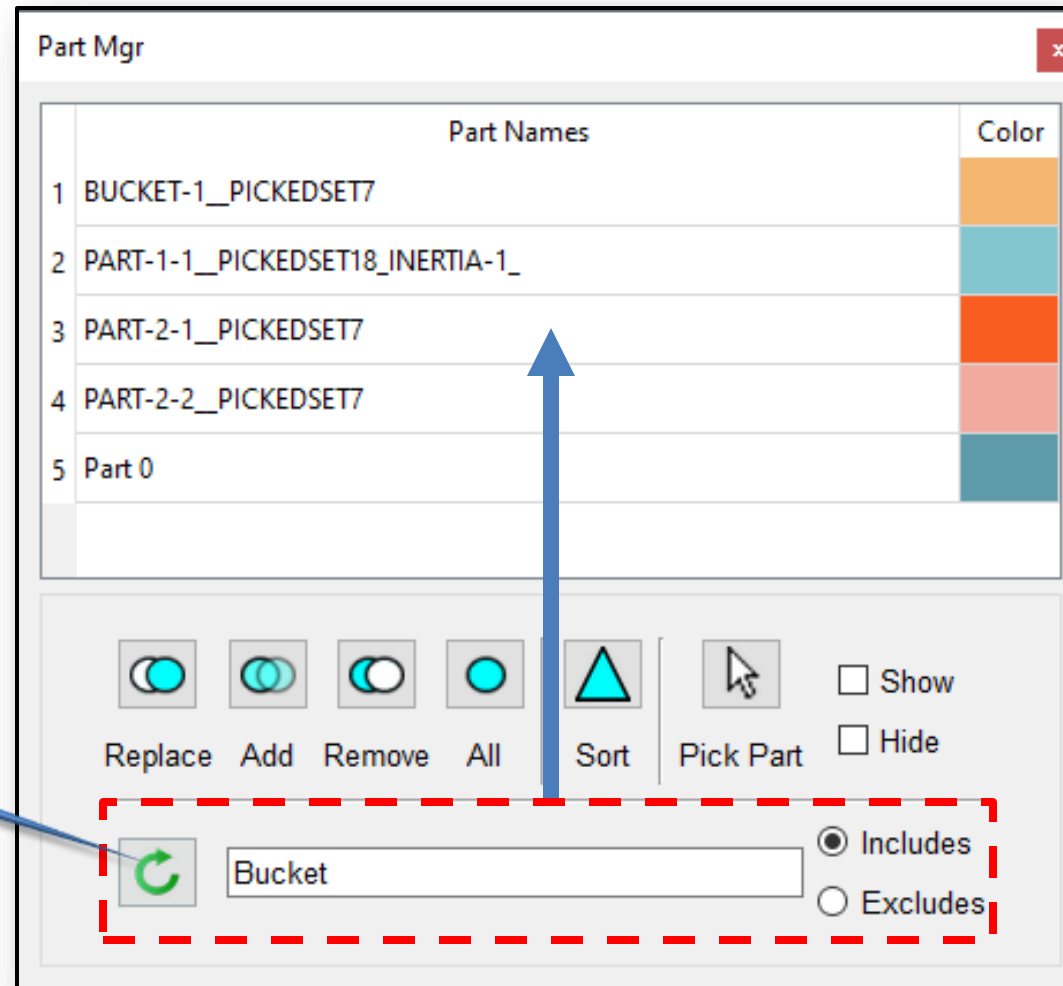


Type filter text, then click ENTER or leave the text box

"Includes" selected



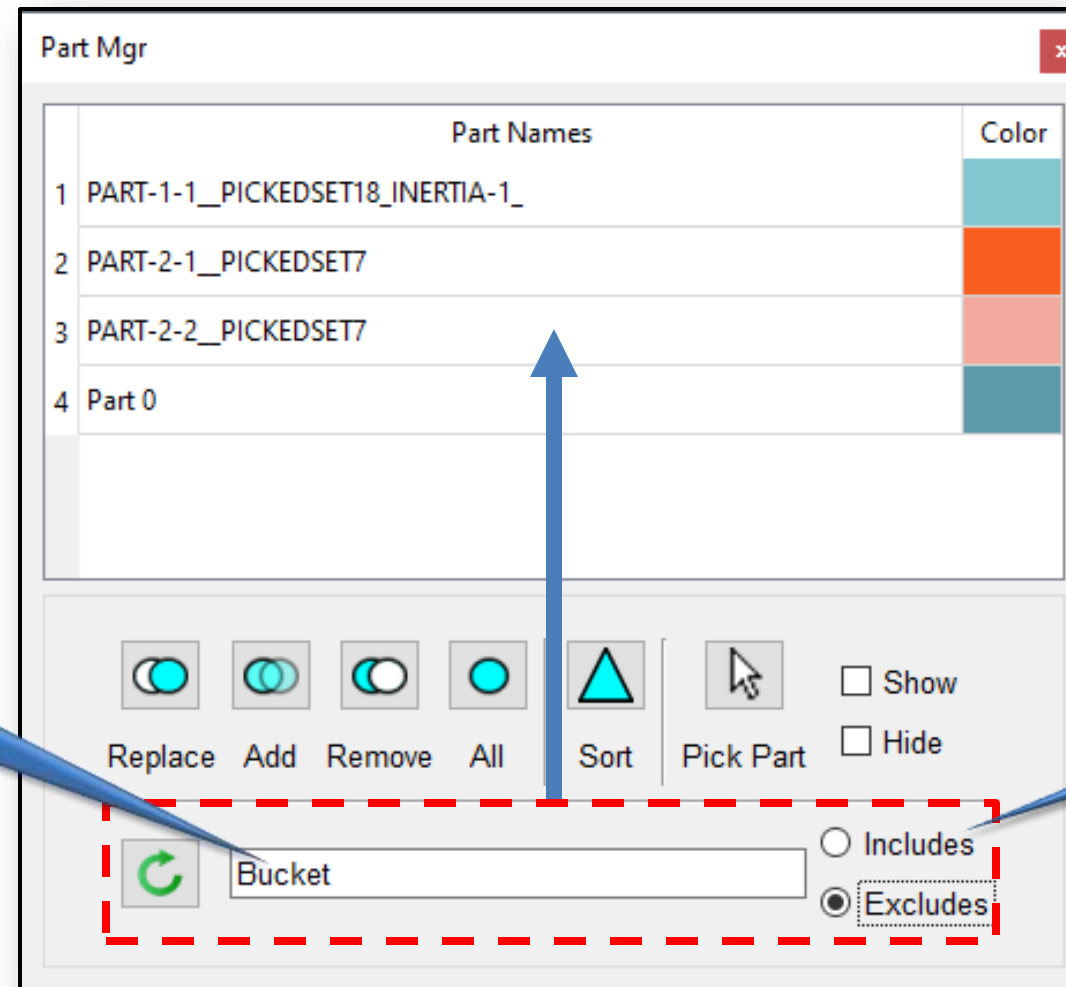
Part Manager Filter



Click Clear Filter



Part Manager Filter



Type filter text, then click ENTER or leave the text box

"Excludes" selected

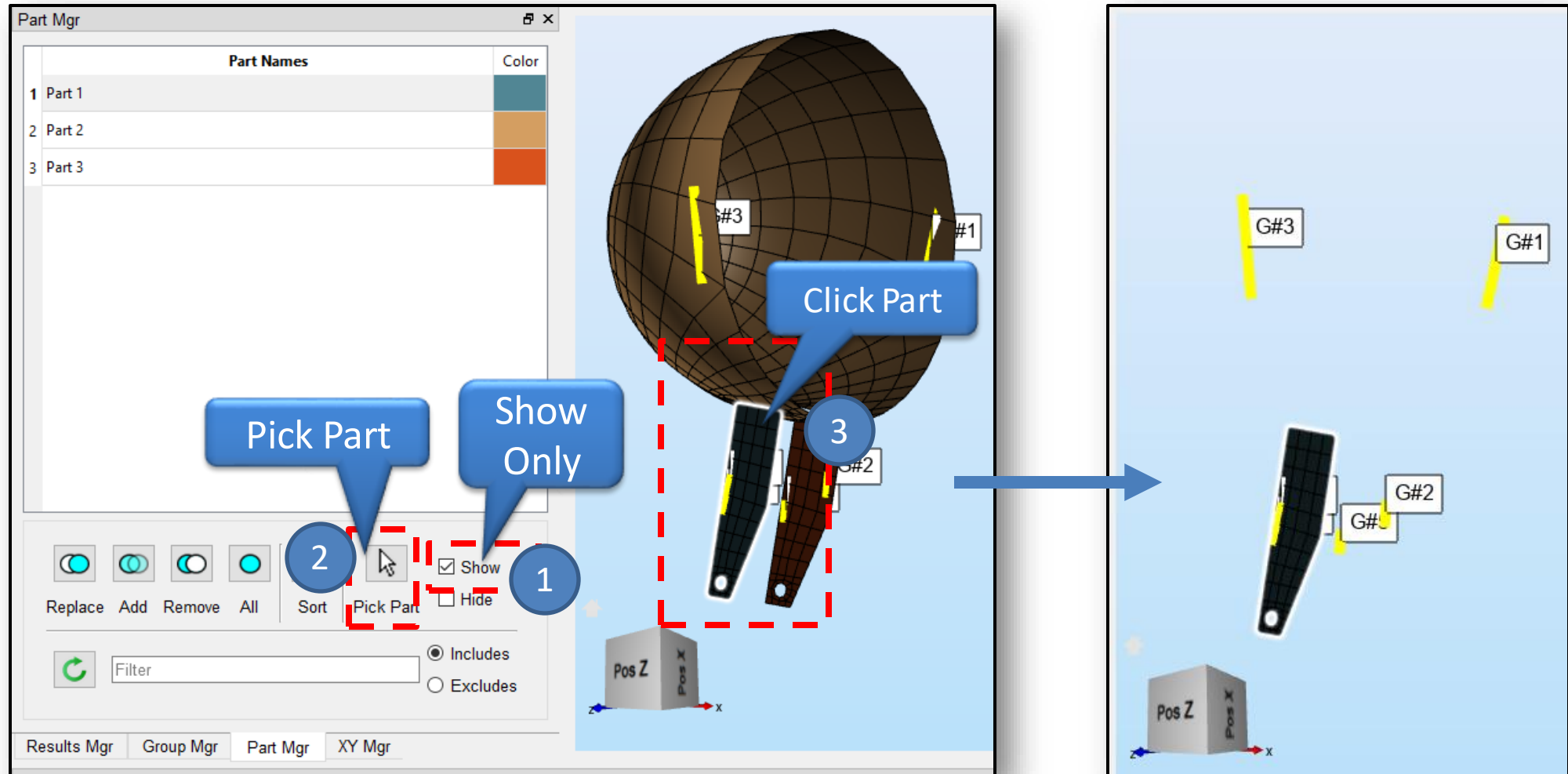


Part Manager Show & Hide w/ Pick

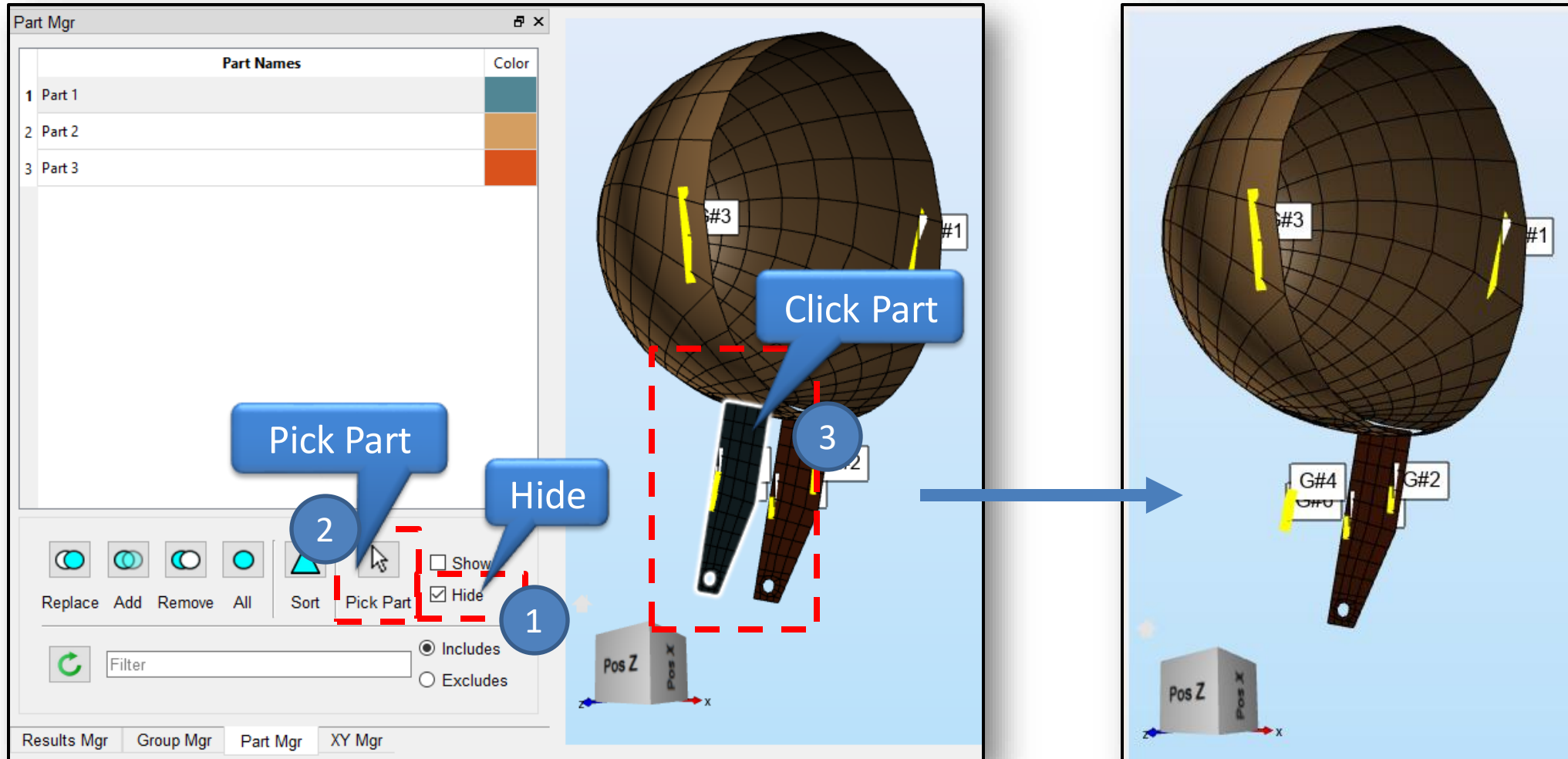
☐ Show

Pick Part ☐ Hide

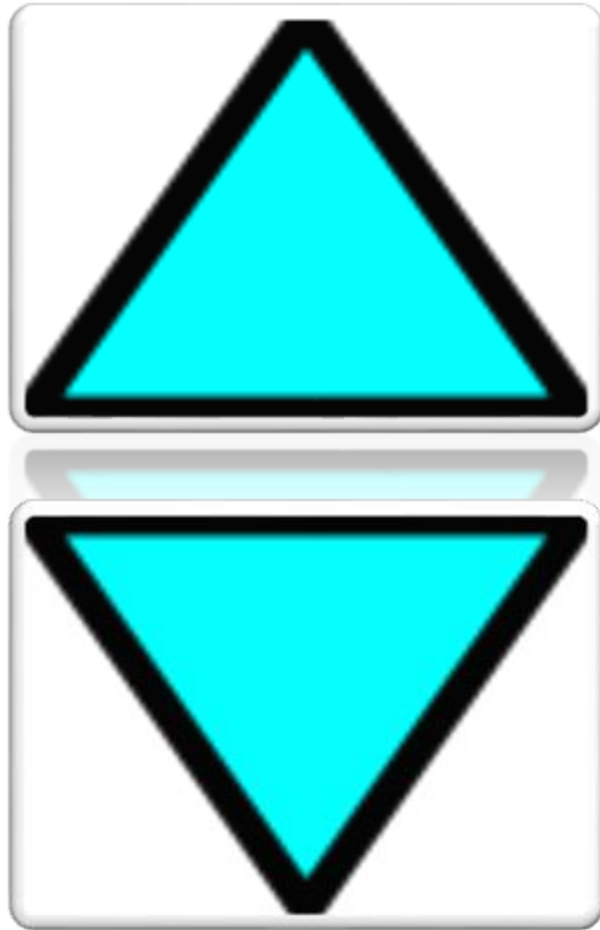
Part Manager Show Only with Pick



Part Manager Hide with Pick



Group Manager Sort & Filter





Group Manager Sort

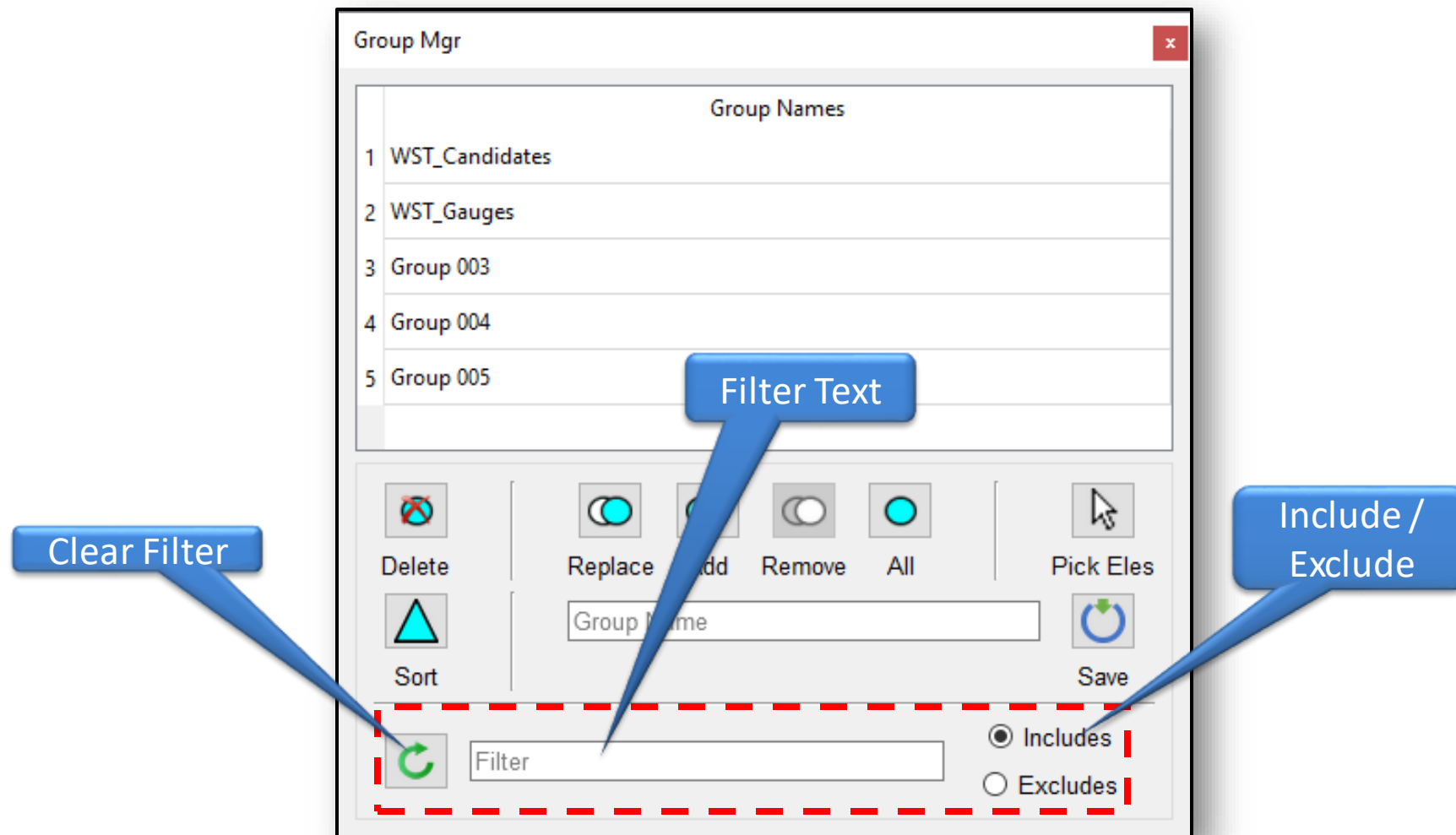
Three screenshots of the Group Manager interface illustrating different sorting states:

- Default after model load:** The list shows groups in their original order: 1 WST_Candidates, 2 WST_Gauges, 3 Group 003, 4 Group 004, 5 Group 005. The 'Sort' button (upward triangle) is highlighted with a red dashed box and a blue callout.
- Sort Descending (WST groups always at top):** The list is sorted by name in descending order: 1 WST_Gauges, 2 WST_Candidates, 3 Group 005, 4 Group 004, 5 Group 003. The 'Sort' button (downward triangle) is highlighted with a red dashed box and a blue callout.
- Sort Ascending (WST groups always at top):** The list is sorted by name in ascending order: 1 WST_Candidates, 2 WST_Gauges, 3 Group 003, 4 Group 004, 5 Group 005. The 'Sort' button (upward triangle) is highlighted with a red dashed box and a blue callout.

Each screenshot shows the 'Group Mgr' window with a list of 'Group Names' and a toolbar containing buttons for Delete, Replace, Add, Remove, All, Sort, and a Filter input field. The 'Sort' button is consistently highlighted across all three states.

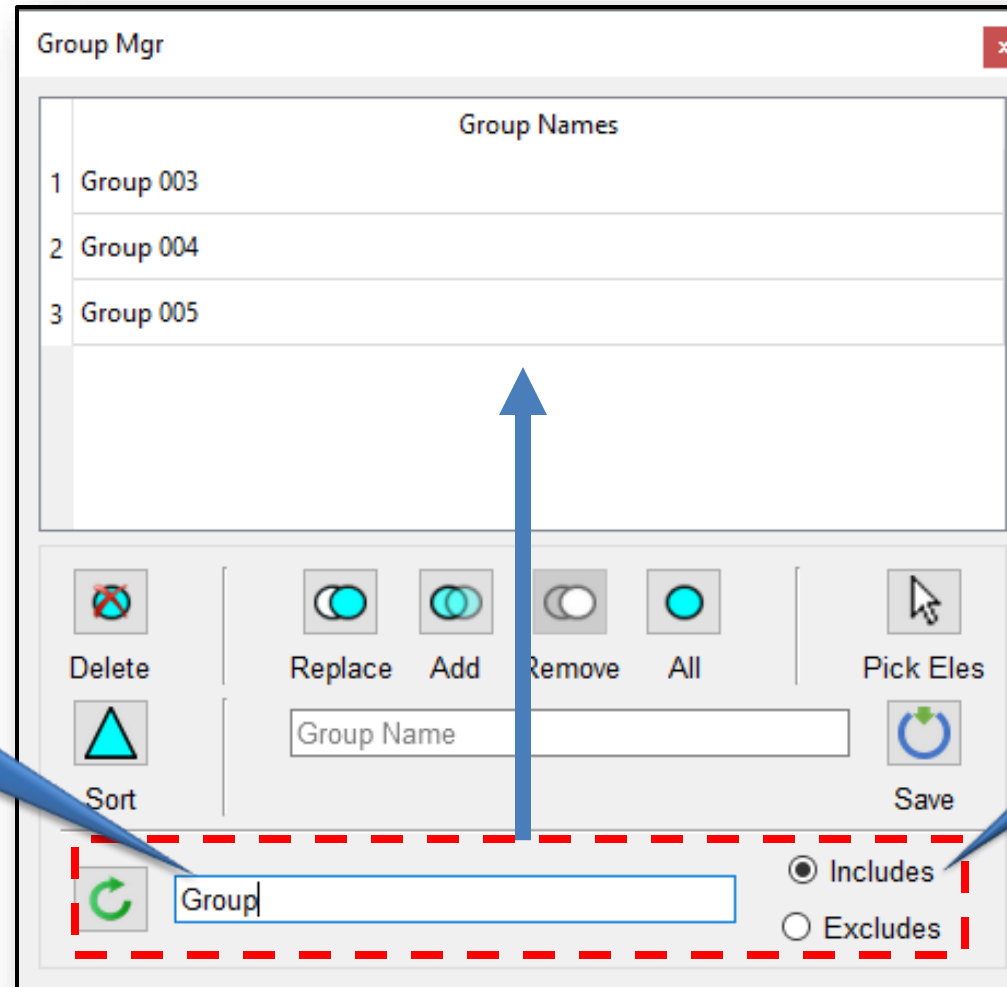


Group Manager Filter





Group Manager Filter

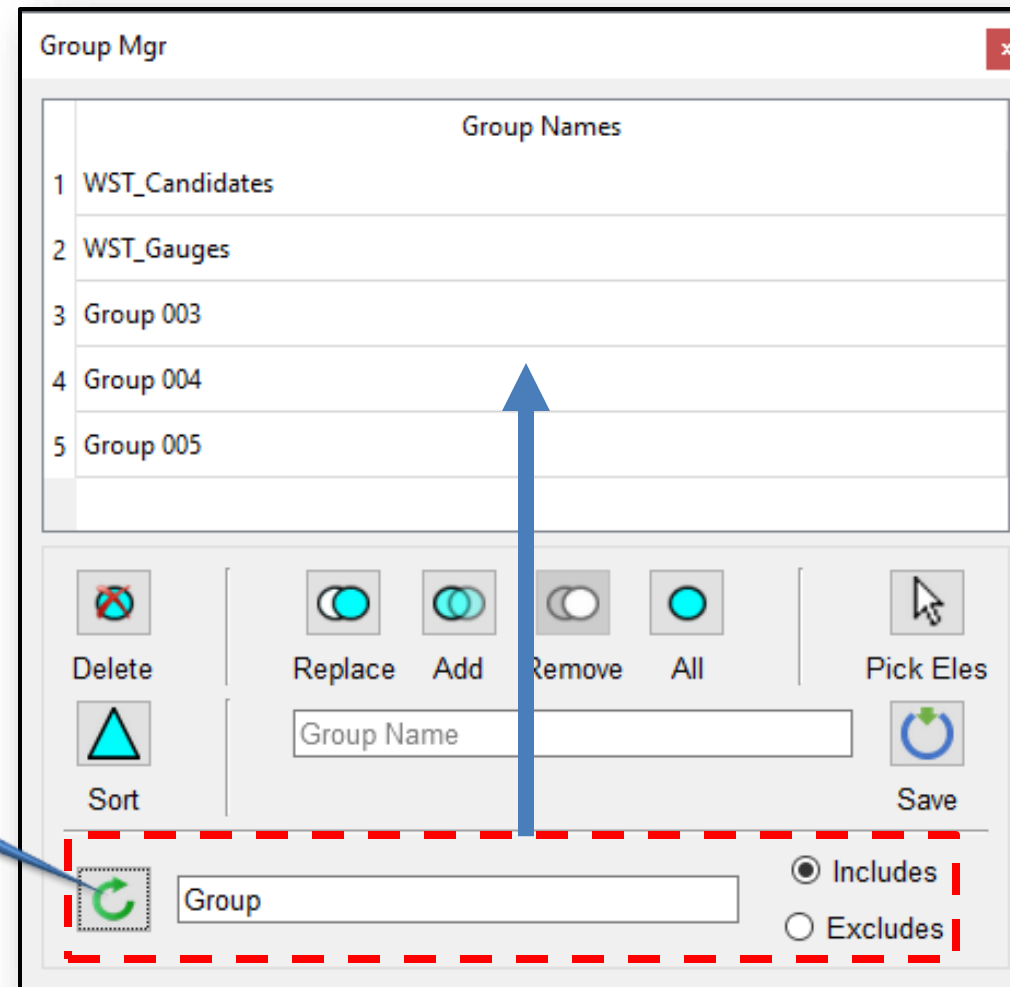


Type filter text, then click ENTER or leave the text box

"Includes" selected



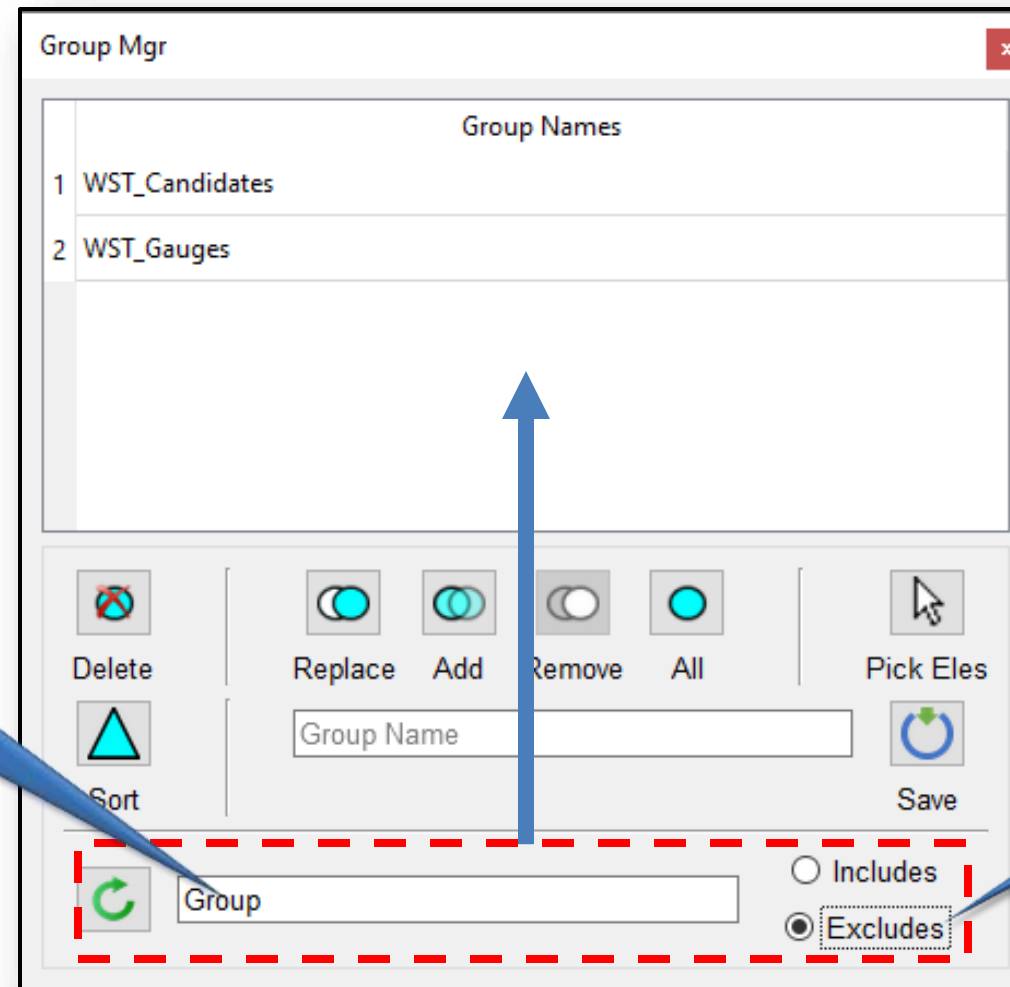
Group Manager Filter



Click Clear Filter



Group Manager Filter



Type filter text, then click ENTER or leave the text box

"Excludes" selected

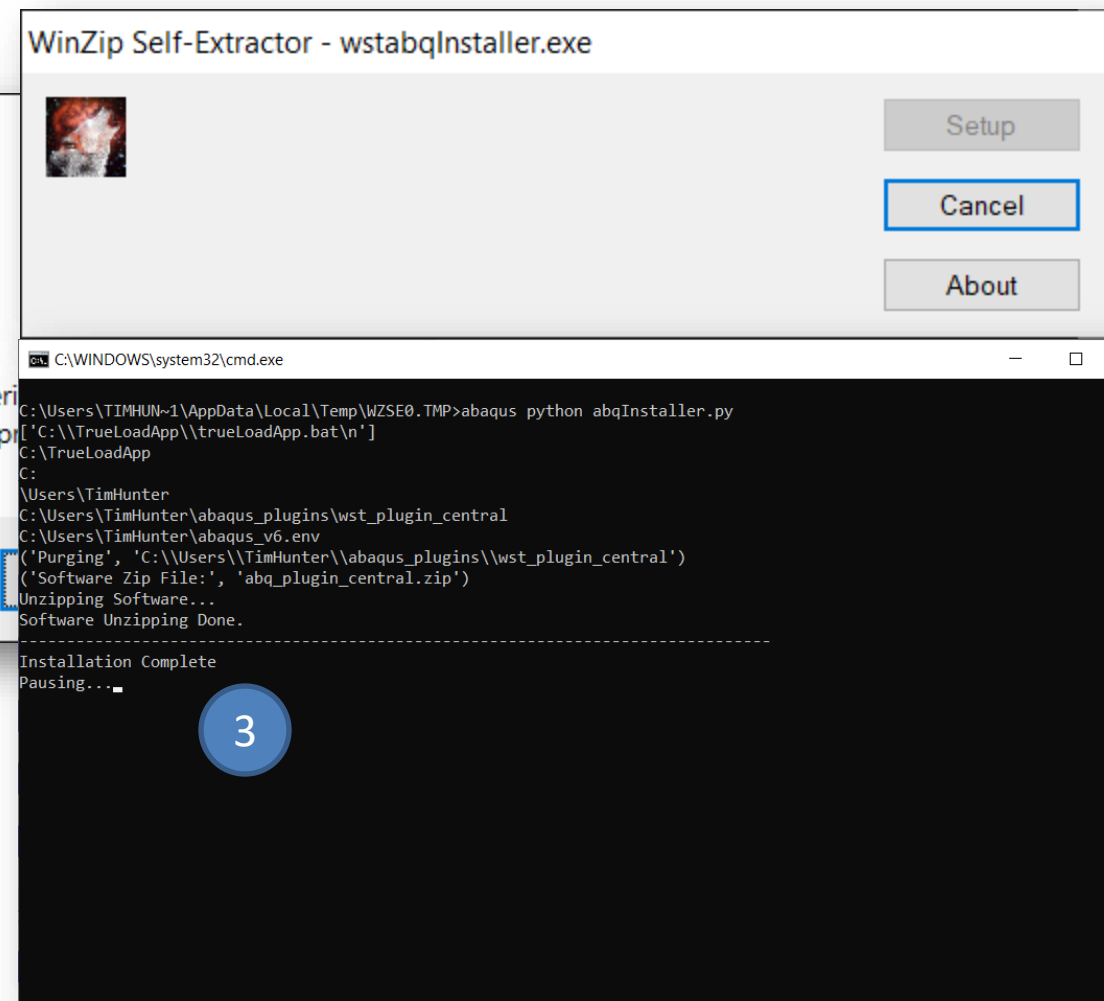
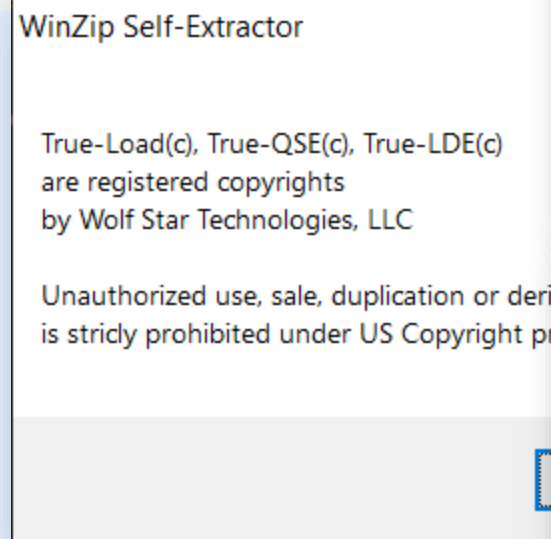
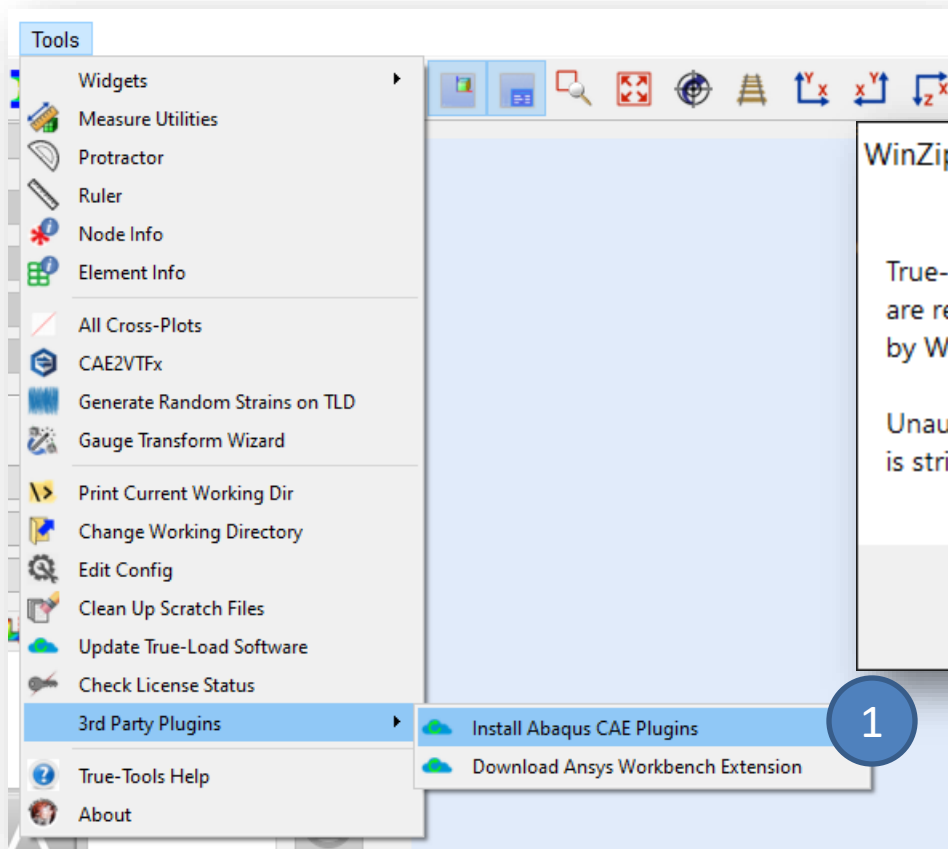


Abaqus Plugins





Abaqus Plugins



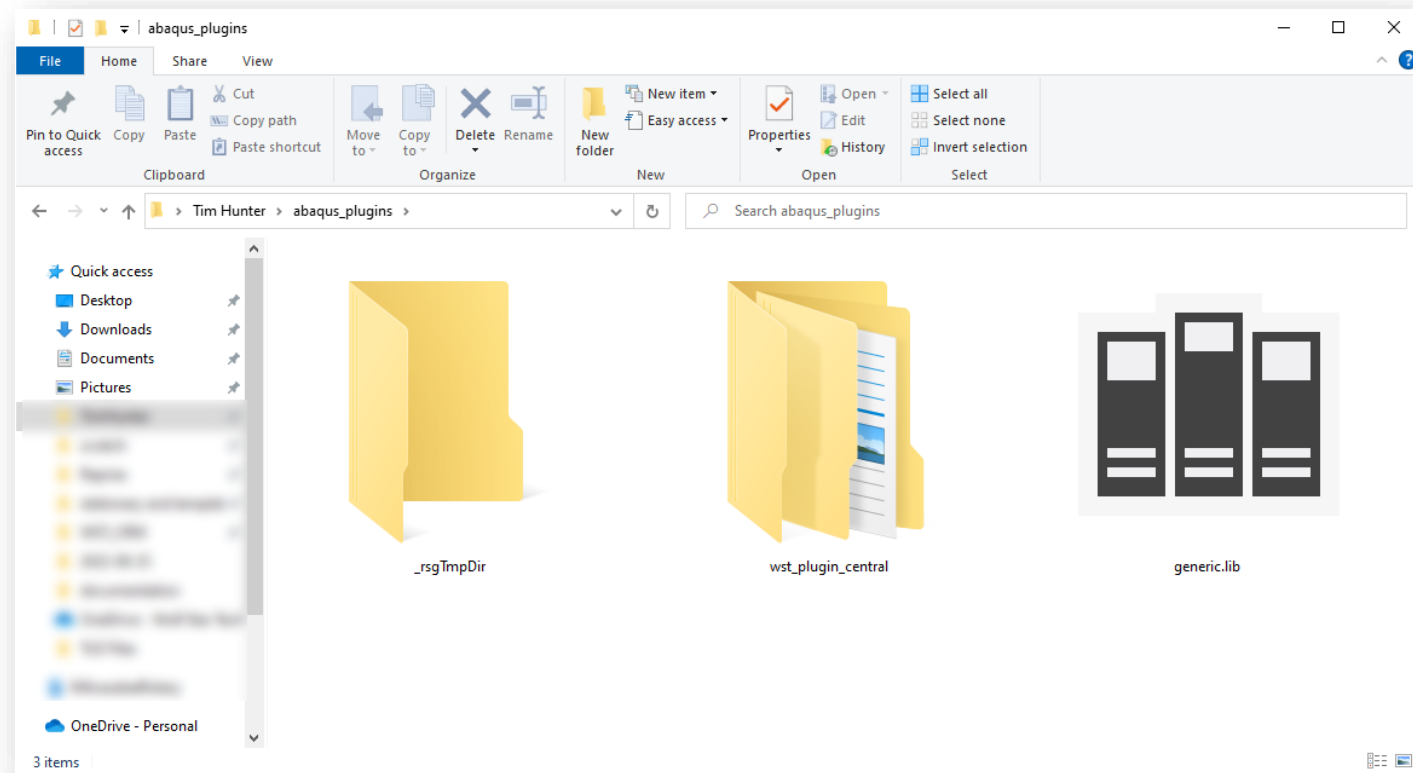


Abaqus Plugins

Plugin installer creates
<HomeDir>/abacus_plugins.

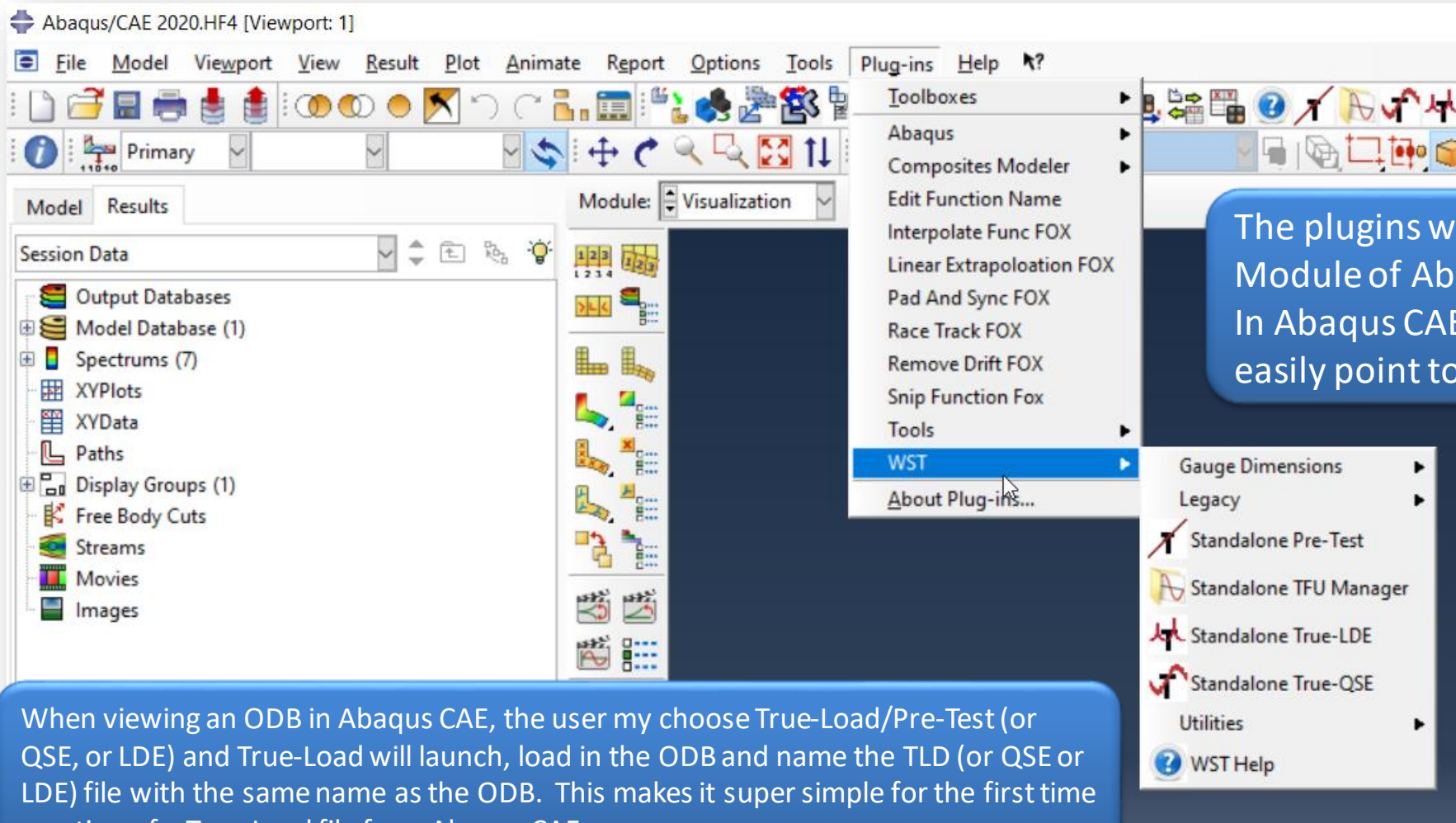
This is a standard folder that
Abaqus/CAE looks in for plugins.

The WST plugins are in a subfolder
called wst_plugin_central.





Abaqus Plugins



The plugins will appear in the Visualization Module of Abaqus CAE in the plugins menu. In Abaqus CAE the user may create toolbars to easily point to the plugins.



When viewing an ODB in Abaqus CAE, the user may choose True-Load/Pre-Test (or QSE, or LDE) and True-Load will launch, load in the ODB and name the TLD (or QSE or LDE) file with the same name as the ODB. This makes it super simple for the first time creation of a True-Load file from Abaqus CAE.

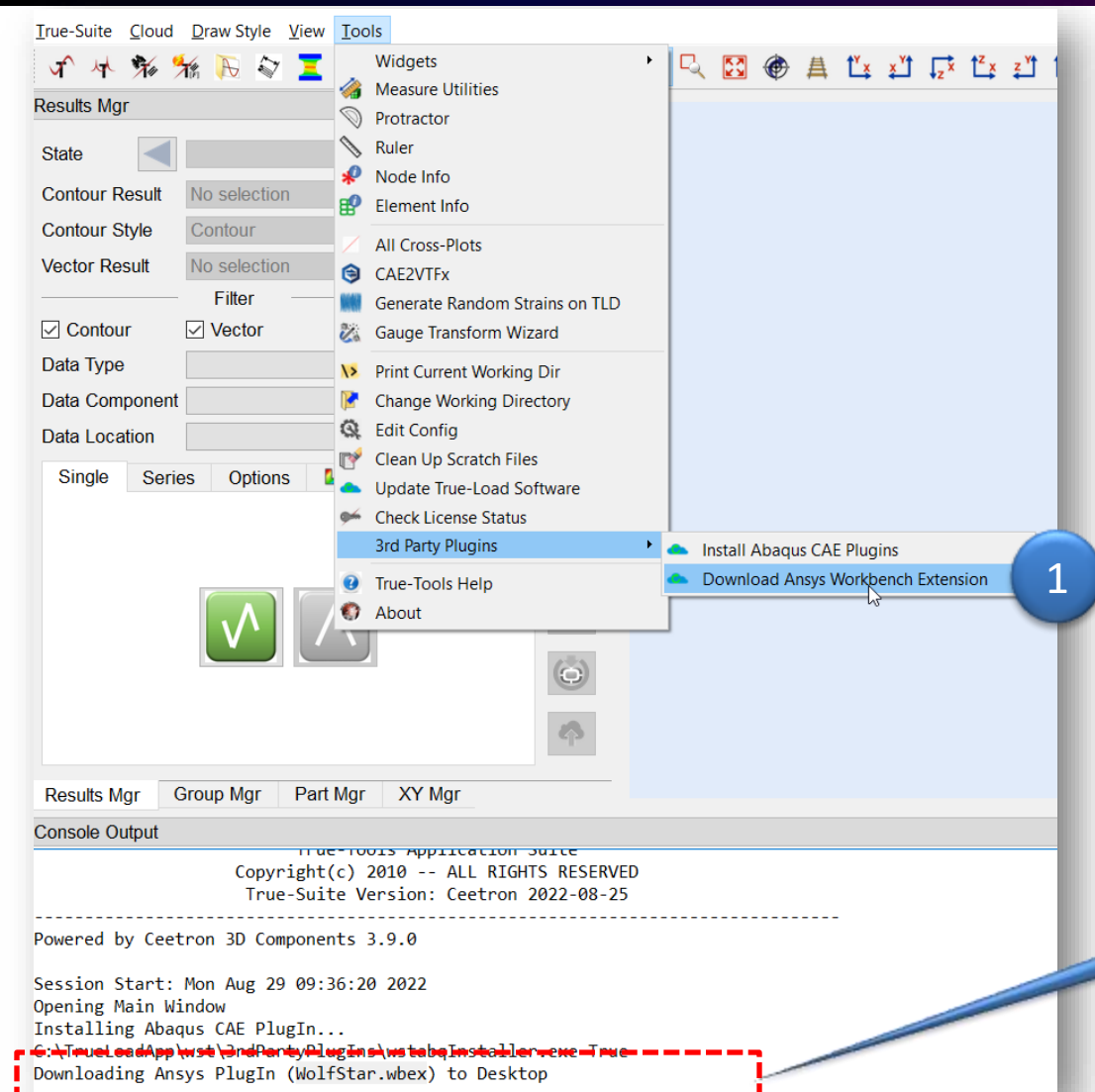


Ansys Plugin

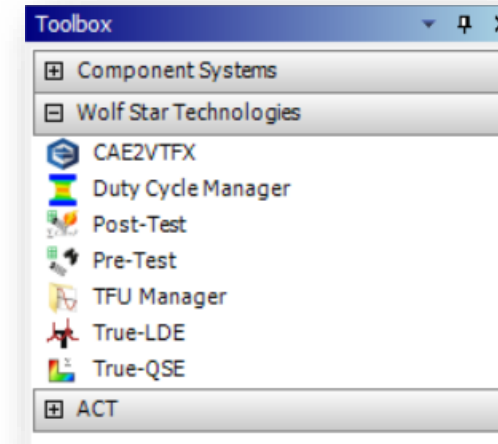




Ansys Plugin



WBEX file installed in Ansys Workbench



WBEX extension downloaded to Desktop

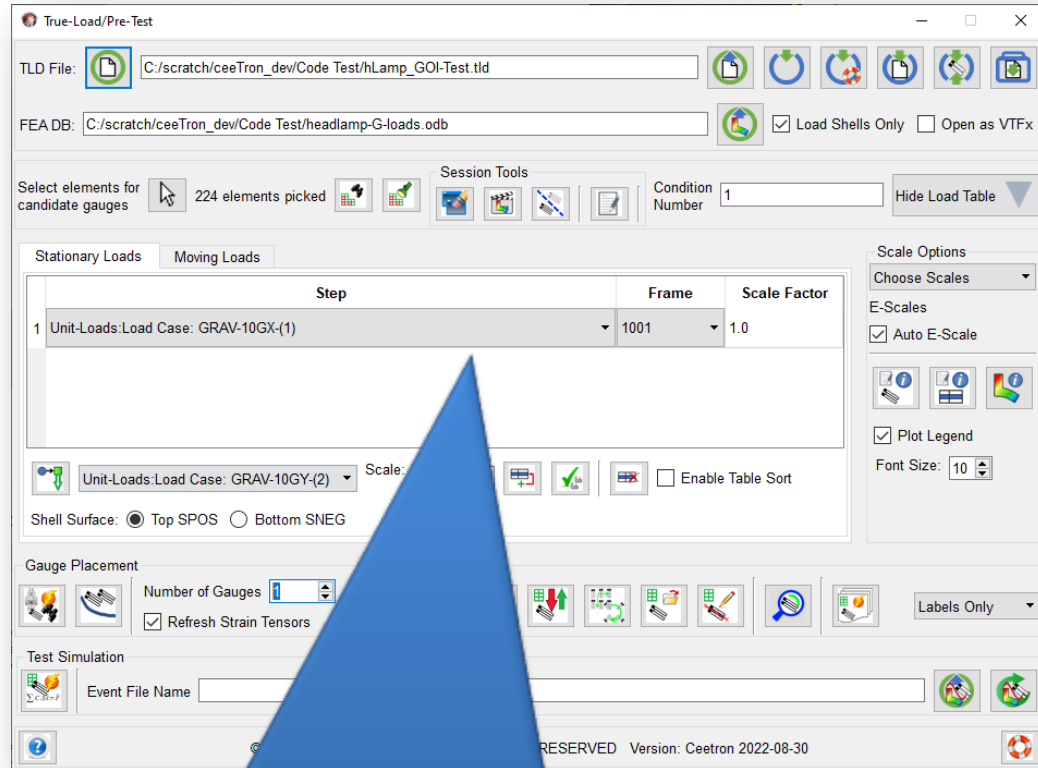


Trivial – One Load Case

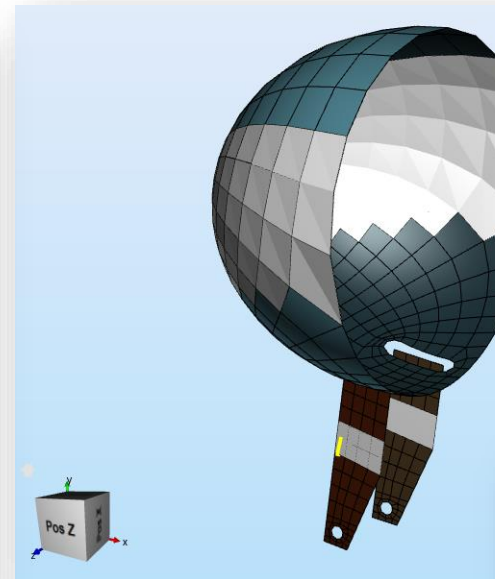




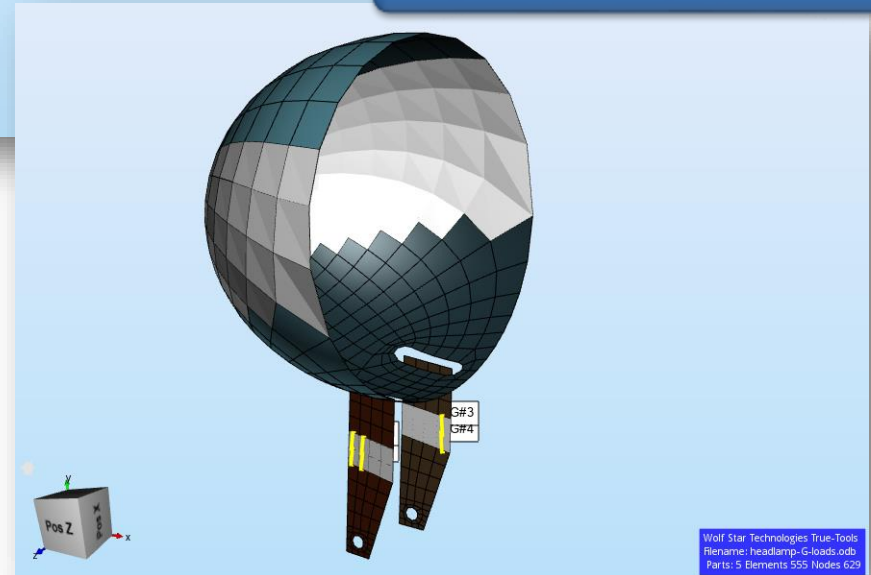
Trivial – One Load Case



Now True-Load can support the trivial one load case problem. Historically, True-Load would require 2 or more loads.



1 Gauge Requested



6 Gauges Requested



Pre-Test Report – Matrix Output





Pre-Test Report – Matrix Output

$$e_{Mat} = [\epsilon^T]$$
$$p_{Mat} = C = [\epsilon^T \epsilon]^{-1} \epsilon^T$$

True-Load/Pre-Test

TLD File:

FEA DB:

☒ Load Shells Only ☐ Open as VTFx

Select elements for candidate gauges: 6 elements picked

Session Tools

Condition Number: 3.253

Hide Load Table

Stationary Loads Moving Loads

Step Frame Scale Factor

1 Unit-Loads:Load Case: GRAV-10 239552774

2 Unit-Loads:Load Case: GRAV-10 7895843669

3 Unit-Loads:Load Case: GRAV-10

Unit-Loads:Increment 0: Ba

Shell Surface: ☒ Top SPOS ☐

Gauge Placement

Number of Gauges: 6

☒ Refresh Strain Tensors

Test Simulation

Event File Name

Report Generation

Do you want to generate a Pre-Test Report?

Yes No

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True-Load Pre-Test Report

Load Proportional Database

Free-Load File: C:/scratch/ceeTron_dev/Code Test/hLamp_GOI.tld

Software Version: Ceetron 2022-08-30

Required Input File

FEA DB File: C:/scratch/ceeTron_dev/Code Test/headlamp-G-loads.odb

Shells Only: True

Optional Input File

QSE File for Simulated Strains:

Optional Output File

Simulation Results at Geoprog: SimTestId: hLamp_GOI.tld

RTM: Report File: C:/scratch/ceeTron_dev/Code Test/hLamp_GOI.tld

CSV Report File: C:/scratch/ceeTron_dev/Code Test/hLamp_GOI.tld

Number of Gauges: 6

Number of Elements: 6

Condition Number of hLamp: 3.2525034307761

Load Table

Step	Frame	Scale Factor	Frame Description	VTFX File
1	Unit-Loads:Load Case: GRAV-10	1.0	Unit-Loads:Load Case: GRAV-10	hLamp_GOI.tld
2	Unit-Loads:Load Case: GRAV-10	1.0	Unit-Loads:Load Case: GRAV-10	hLamp_GOI.tld
3	Unit-Loads:Load Case: GRAV-10	1.0	Unit-Loads:Load Case: GRAV-10	hLamp_GOI.tld

Chosen Gauges

Gauge Number	Group Name	Instance	Element Label	Angle	Step	Unit-Loads:Load Case: GRAV-10	Frame	Scale Factor	Unit-Loads:Load Case: GRAV-10	Frame	Scale Factor
1	Bob	0	240	75.0	1	Unit-Loads:Load Case: GRAV-10	1.0	1.0	Unit-Loads:Load Case: GRAV-10	1.0	1.0
2	1	19	19	-95.702	2	Unit-Loads:Load Case: GRAV-10	1.0	1.0	Unit-Loads:Load Case: GRAV-10	1.0	1.0
3	1	16	16	-95.702	3	Unit-Loads:Load Case: GRAV-10	1.0	1.0	Unit-Loads:Load Case: GRAV-10	1.0	1.0
4	1	16	16	-95.702	4	Unit-Loads:Load Case: GRAV-10	1.0	1.0	Unit-Loads:Load Case: GRAV-10	1.0	1.0
5	1	16	16	-95.702	5	Unit-Loads:Load Case: GRAV-10	1.0	1.0	Unit-Loads:Load Case: GRAV-10	1.0	1.0
6	1	16	16	-95.702	6	Unit-Loads:Load Case: GRAV-10	1.0	1.0	Unit-Loads:Load Case: GRAV-10	1.0	1.0

3D Model

WST True Load CSV file

Step	Frame	Scale Factor	Frame Description	VTFX File
1	Unit-Loads:Load Case: GRAV-10	1.0	Unit-Loads:Load Case: GRAV-10	hLamp_GOI.tld
2	Unit-Loads:Load Case: GRAV-10	1.0	Unit-Loads:Load Case: GRAV-10	hLamp_GOI.tld
3	Unit-Loads:Load Case: GRAV-10	1.0	Unit-Loads:Load Case: GRAV-10	hLamp_GOI.tld

Chosen Gauges

Gauge Nu	Gauge Na	Instance	Element Label	Angle
1	Bob	0	240	75
2	1	19	19	-95.702
3	1	16	16	-95.702
4	1	16	16	-95.702
5	1	16	16	-95.702
6	1	16	16	-95.702

27 eMat:

28	8.35E-05	-0.00024	-0.00018		
29	0.000179	3.94E-05	0.000278		
30	-0.0003	0.000356	-0.00016		
31	-0.00015	1.28E-05	9.79E-05		
32	0.000356	-0.00034	-0.00036		
33	9.05E-05	-0.00027	0.000172		

34 pMat (unscaled):

35	-880.257	2071.19	-423.399	-1492.04	1284.465	-1145.69
36	-1180.6	1402.024	799.1097	-1101.91	218.7732	-1701.33
37	-439.25	884.5194	-779.85	378.8222	-1050.05	826.368

Candidate Elements:

Instance	Element Label
0	240
1	19
2	16
3	16
4	16
5	16
6	16

hLamp_GOI