

# WOLF STAR

T E C H N O L O G I E S

## True-Load Enhancements 2023-10-22



Tim Hunter

Wolf Star Technologies

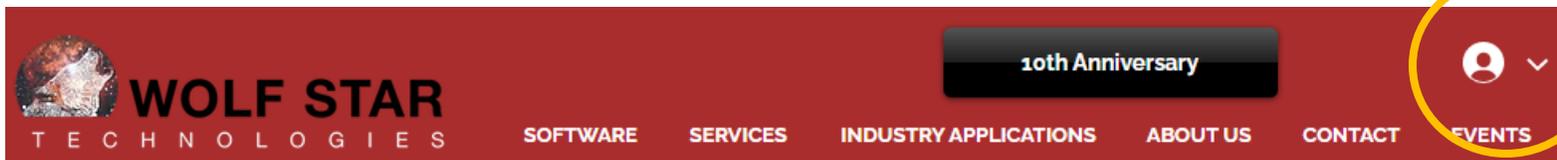


[www.wolfstartech.com](http://www.wolfstartech.com)



# Enhancements Overview

- Great updates in this release!!!
- Most of the enhancements discussed in this document are updates in performance and usability
- Some new features have been added.
- 51 Enhancements, 5 Bug Fixes



Members Only  
Area





# Overview – Major Enhancements

- TFU – Subtract Functions
- Recent Files – Save lots file browsing
- Hybrid Loading – No gauges needed!
- Time to Cycle / Angle mapping
- Units in TFU Fatigue
- Speed up of GOI / Test Data Compare
- Scratch Files relocated
- 3D STL of realistic strain gauges
- Purge intermediate files for Hybrid and Contact Control



## Enhancements - Overview



## Bug Fixes



## Details



Update / Install		Major Features		Solver Specific	
Utilitarian Improvements					



**WOLF STAR**

True-Load Enhancements  
2023-10-22



Tim Hunter



# Details

## Update / Install

Installer and GUI-Less Install



Reprise RLM Update



## Major Features

Recent Files

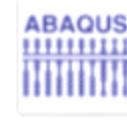


Hybrid Loading – No Gauges Needed



## Solver Specific

Abaqus Plugins



Ansys Plugin



## Utilitarian Improvements

Time to Ang / Cycles



Dimension Plane



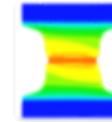
Reload Dim Params



Post-Test Report Readability



TFU Fatigue Units



Compare GOI Speed



Reorganize Tools Menu



Scratch Files



Square Axis Plotting



Measure Element to Element



Subtract Functions



STL Gauges



Post- Purge Intermediate Files



FEA Browse



# Bug Fixes





# Bugs

Module	Type	Description
TFU	Bug	When double clicking TFU file from OS, checking plot file name in TFU Mgr prints nothing for the title.
QSE	Bug	Relative paths and ODS
PRE	Bug	RoboGauge -- cogDict key not initialized in the TLD dictionary.
TFU	Bug	Change file open dialog to only allow *.TFU -- previously * was available too.
POST	Bug	Disable "Relative Path" in QSE files during Post-Test runs. Paths get confused in QSE after Post.



# Enhancements - Overview





# Enhancements – True-Load Environment

**Highlighted Records** Documented on Details page

Module	Type	Description	Release Doc
ALL	Enhancement	Enable Square axis scaling	X
ALL	Enhancement	Meaure Utils: Measure Element to Element	X
ALL	Enhancement	New TFU Tools Icon	
ALL	Enhancement	Re-structure WST_scratch files	X
ALL	Enhancement	Add Square Axis plotting to Plot Widget	X
ALL	Enhancement	Tools Menu --> Show Scratch dir	X
ALL	Enhancement	Update the installer for WST_scratch	X
ALL	Enhancement	Add recent files options (menu, auto-completion)	X
ALL	Enhancement	Re-organize Tools Menu	X
ALL	Enhancement	Install via config file	TBD
ALL	Enhancement	Upgrade Reprise licensing version 15.1	TBD





# Enhancements – TFU Mgr

**Highlighted Records** Documented on Details page

Module	Type	Description	Release Doc
TFU	Enhancement	Map time data to Cycle / Angle data	TBD
TFU	Enhancement	Subtract Functions	X
TFU	Enhancement	Subtract two TFU Files	X
TFU	Enhancement	Add units to TFU Fatigue Material Definition	TBD





# Enhancements – Gauge Dimensioning

**Highlighted Records** Documented on Details page

Module	Type	Description	Release Doc
DIM	Enhancement	Fix drawing plane issue -- Make draw plane the plane of the element	TBD
DIM	Enhancement	Store Dimension settings in user home dir and auto load	X
DIM	Enhancement	Make Dimension lines / text always visible - no hidden line processing	





# Enhancements - Pre

**Highlighted Records** Documented on Details page

Module	Type	Description	Release Doc
PRE	Enhancement	<b>When browsing for FEA DB, set type to current FEA DB type</b>	X
PRE	Enhancement	Draw Gauge Lines - 3D STL - Export One STL per Gauge checked off by default	
PRE	Enhancement	<b>STL files for Strain Gauge Representations</b>	X
PRE	Enhancement	<b>Reformat print out of eMat, eScales and pScales -- faster printing</b>	TBD
PRE	Enhancement	Minor GUI Changes	





# Enhancements - Post

**Highlighted Records** Documented on Details page

Module	Type	Description	Release Doc
Post	Enhancement	On Hybrid Loading and Contact control have a switch to purge auxiliary files	X
POST	Enhancement	Update Hybrid loading to use QSE to generate strains -- eliminate need for gauges on hybrid load cases	TBD
POST	Enhancement	Update Batch Mode to support the WST_scratch file structure	
POST	Enhancement	Reformat report header	TBD





# Enhancements - QSE

**Highlighted Records** Documented on Details page

Module	Type	Description	Release Doc
QSE	Enhancement	When browsing for FEA DB, set type to current FEA DB type	X
QSE	Enhancement	T3D Outbox full width with SaveAS button	
QSE	Enhancement	Huge speed increase in Compare GOI -- Reduce plot density for adjacent elements	TBD



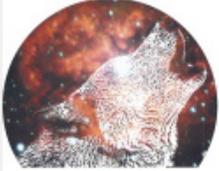
# Installer and GUI-Less Install





# Installer GUI Update

Wolf Star Technologies Installer

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

Destination Directory:

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

Default FEA:   Install Abaqus CAE Plugin  
 Open as VTFx  Download Ansys WorkBench Plugin

Shortcut Location (e.g. Desktop):

Default work dir (for shortcut):

WST\_scratch Location:

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

**New button – Only for Admins**

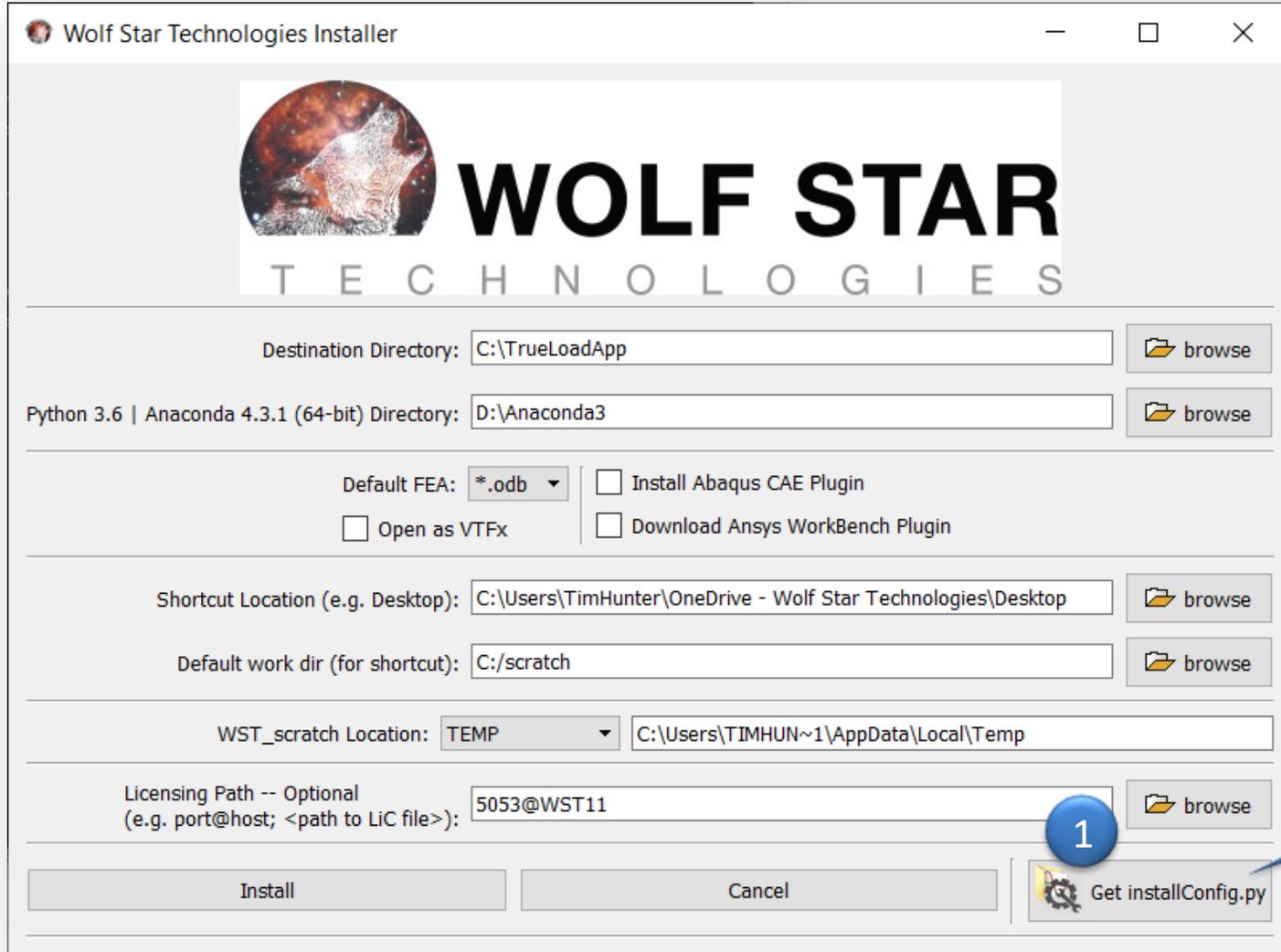
This downloads “installConfig.py” to enable GUI-less (command line) install of True-Load

Everything else works the same as before





# GUI-Less (command line) install



1) Get the installConfig.py file

You will browse for a folder to store this file in.





# installConfig.py

```
# installConfig.py
#
# Configuration file for automating / prepopulating installation parameters
#
# This is python, all paths should be preceded by "r" (r=raw text string)
#=====
# Python Imports
# -----
import os
from win32com.client import Dispatch
shell = Dispatch('WScript.Shell')
# -----
# Helper variables
# -----
winDeskTop = shell.SpecialFolders("Desktop")      # Path to Windows Desktop
winTemp     = os.environ['TEMP']                  # Path to Windows Temp directory
homeDrive   = os.environ['HOMEDRIVE']            # User Home Drive
homePath    = os.environ['HOMEPATH']             # User Home Directory
homeDir     = os.path.join(homeDrive, homePath)  # User Home Directory (full path)
#=====
#                               User variables
# -----
unAttendedInstallFlag = True                    # --> True = No GUI, False = GUI
destDir                = r'C:\trueLoadApp'      # --> True-Load Application Destination
defFEA                 = '*.odb'               # --> Default FEA ['*.odb', '*.rst', '*.op2', '*.h3d', '*.neu']
openAsVTFxFlag        = False                  # --> Converts FEA to VTFx; True=On, False=Off
shortCutDir            = winDeskTop            # --> Location for True-Load shortcut
shortCutWorkDir       = winTemp                # --> Working directory for True-Load Shortcut
scratchDir             = 'TEMP'                # --> WST_scratch location ['HOME', 'TEMP', <path>]
licenseVar             = 'WOLFSTAR_LICENSE'    # --> value for WOLFSTAR_LICENSE *** DO NOT CHANGE ***
licensePath            = '5053@WST11'          # --> Location of license server or file [port@host, <path to LIC file>]
# *** Optionally ***
pythonDir              = None                  # --> Location of Python [None, <path>]
postInstallScript      = r"C:\scratch\helloWorld.bat" # Path to script to be run post install [None, <path>]
```

Edit the installConfig.py to suite your environment.





# Unzip the installer

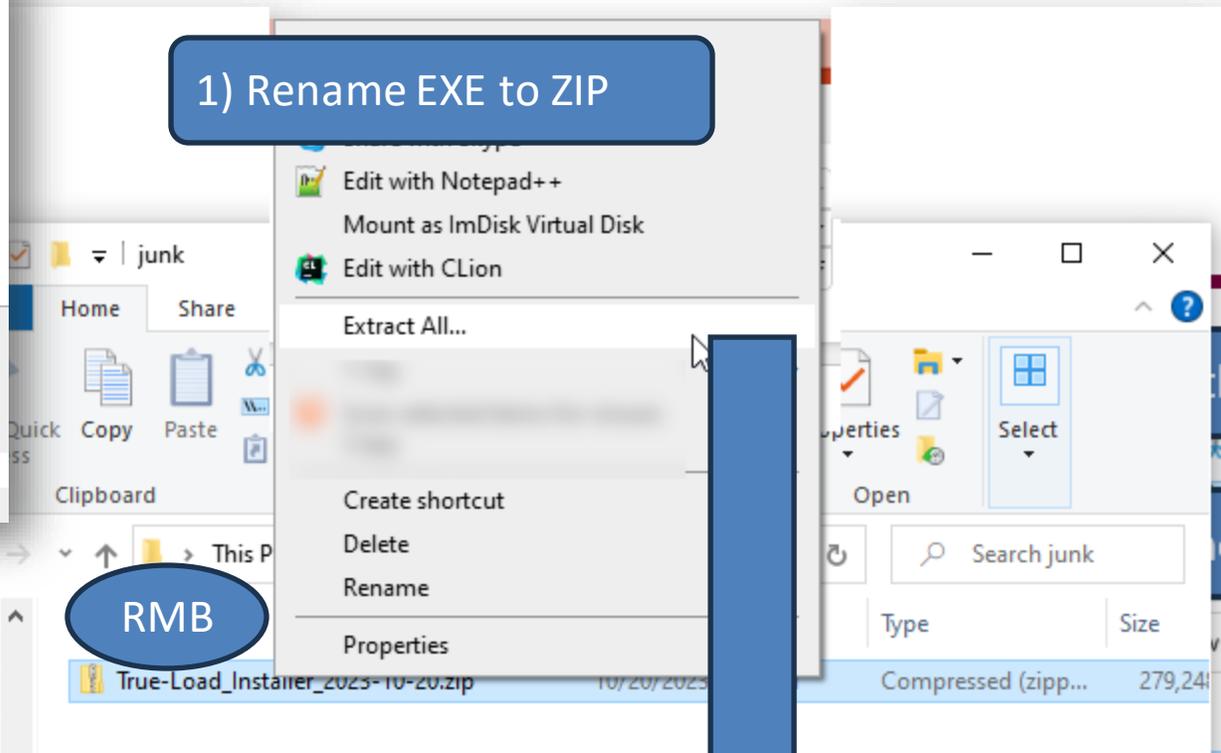
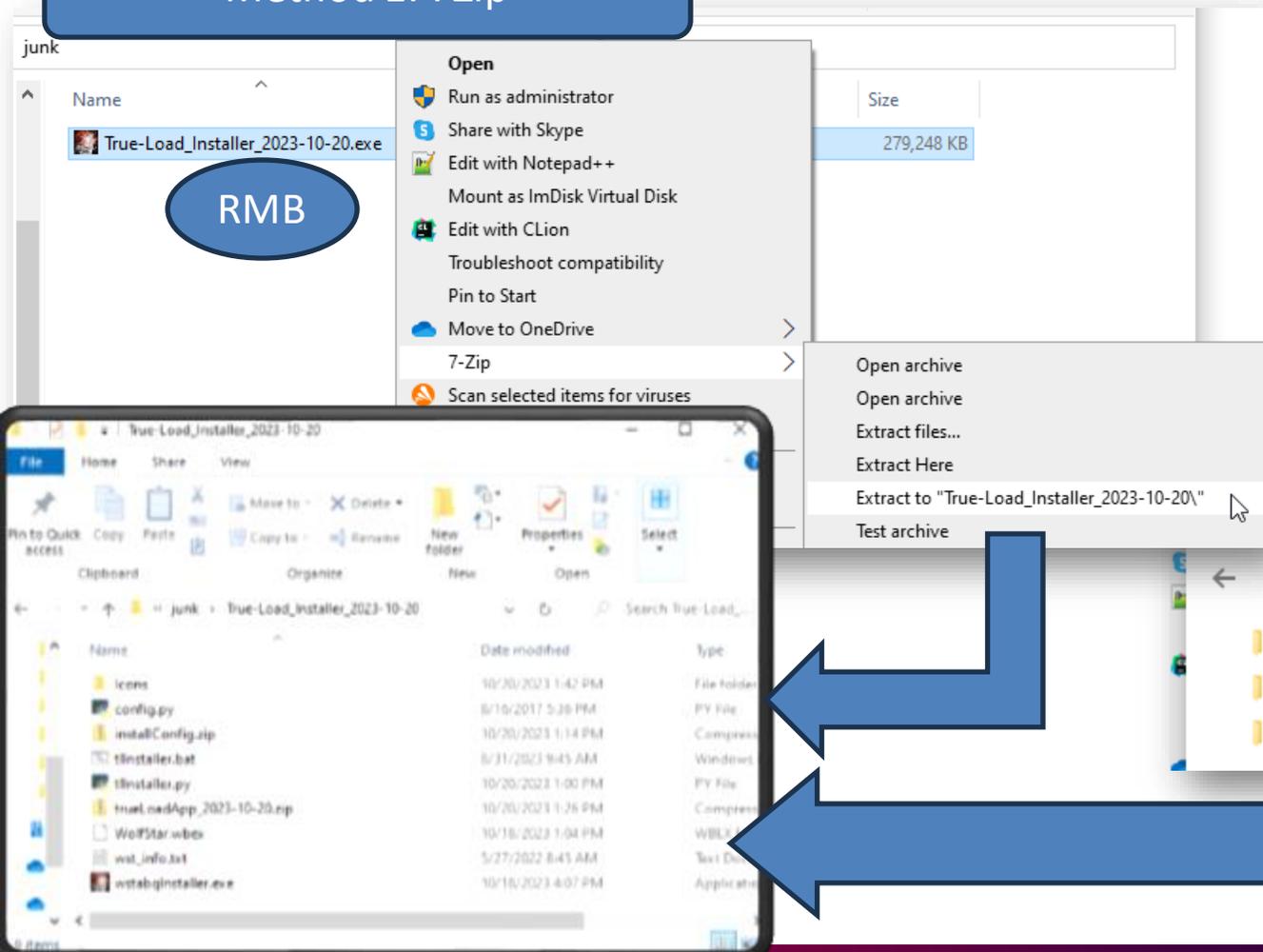
## Method 1: 7Zip

## Method 2: Zip

### 1) Rename EXE to ZIP

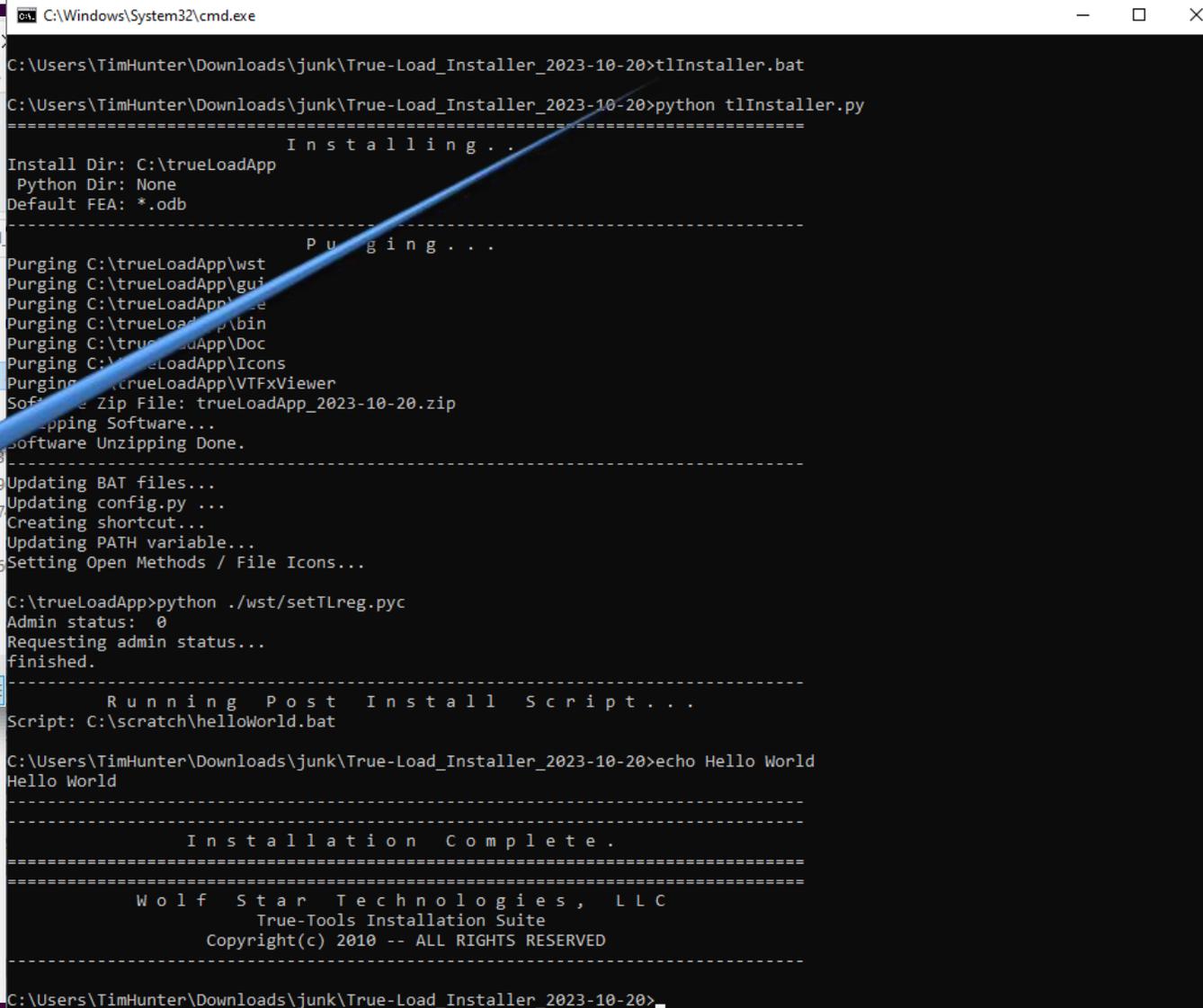
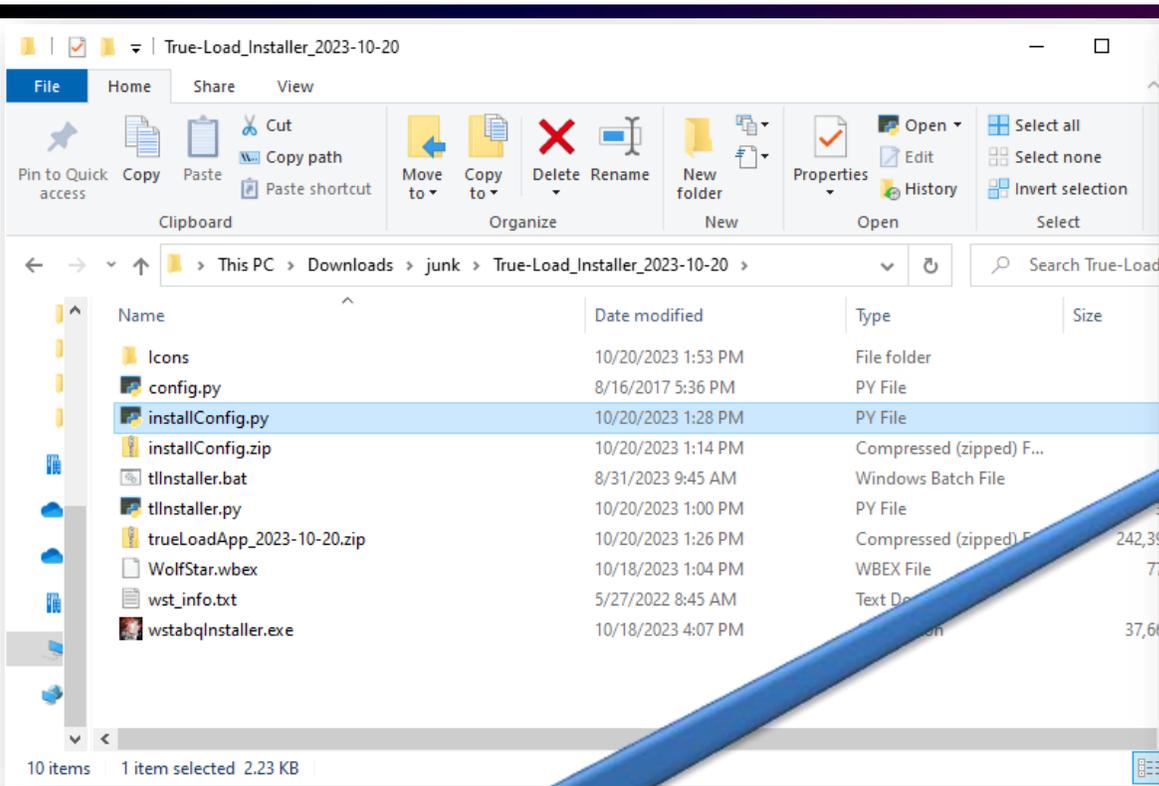
RMB

RMB





# Copy installConfig.py to installer folder



Run tlInstaller.bat



# Reprise RLM Update





# Reprise RLM Update

- True-Load license management system is now running on the latest version of Reprise RLM Software.
- This should eliminate any security concerns.
- It will not affect any current license installs.



**RLM v15.1**

**April, 2023**

**April, 2023**



# Help





True-Tools Help

Wolf Star Technologies True-Tools

True-Suite Cloud Draw Style View Tools

# Help

Tools

Widgets

Tools

Ruler

Node Info

Element Info

All Cross-Plots

CAE2VTFx

Generate Random Strains

Gauge Transform Wizard

Print Current Working Dir

Change Working Directory

Edit Config

3rd Party Plugins

True-Tools Help

About

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

True-Tools Help

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Version: Ceetron 2022-08-25

[www.wolfstartech.com](http://www.wolfstartech.com)

- Common Tools
- True-QSE
- True-LDE
- True-Load
- TFU Manager
- Duty Cycle
- Measure Utilities
- Python Shell
- tfuTools

True-Tools Help



# Abaqus Plugins





# Abaqus Plugins

Tools

- Widgets
- Measure Utilities
- Protractor
- Ruler
- Node Info
- Element Info
- All Cross-Plots
- CAE2VTFx
- Generate Random Strains on TLD
- Gauge Transform Wizard
- Print Current Working Dir
- Change Working Directory
- Edit Config
- Clean Up Scratch Files
- Update True-Load Software
- Check License Status
- 3rd Party Plugins**
  - Install Abaqus CAE Plugins **1**
  - Download Ansys Workbench Extension
- True-Tools Help
- About

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 derivation  
is strictly prohibited under US Copyright p...

WinZip Self-Extractor - wstabqInstaller.exe

Setup

Cancel

About

```
C:\WINDOWS\system32\cmd.exe
C:\Users\TIMHUN~1\AppData\Local\Temp\WZSE0.TMP>abaqus python abqInstaller.py
['C:\\TrueLoadApp\\trueLoadApp.bat\\n']
C:\\TrueLoadApp
C:
\\Users\\TimHunter
C:\\Users\\TimHunter\\abaqus_plugins\\wst_plugin_central
C:\\Users\\TimHunter\\abaqus_v6.env
('Purging', 'C:\\Users\\TimHunter\\abaqus_plugins\\wst_plugin_central')
('Software Zip File:', 'abq_plugin_central.zip')
Unzipping Software...
Software Unzipping Done.
-----
Installation Complete
Pausing...
```

**3**



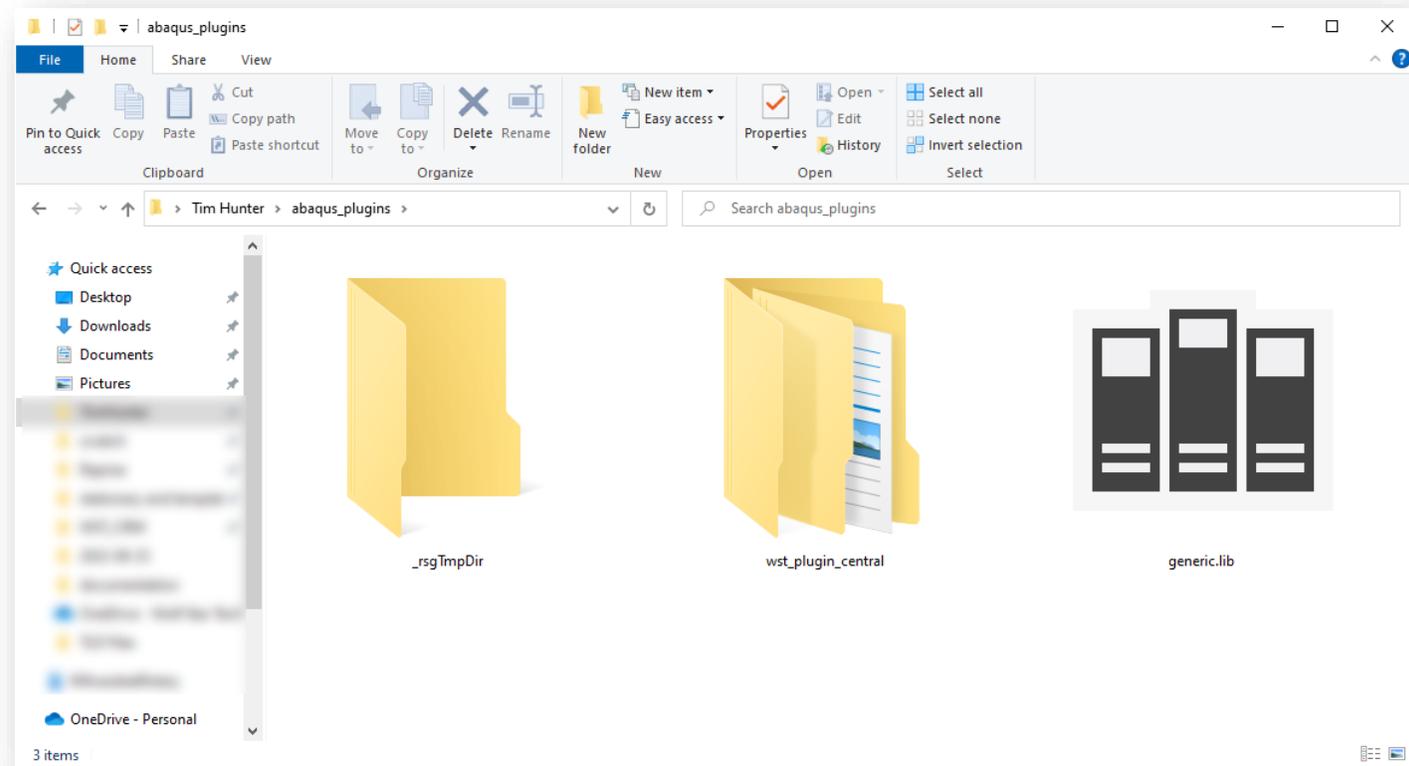


# Abaqus Plugins

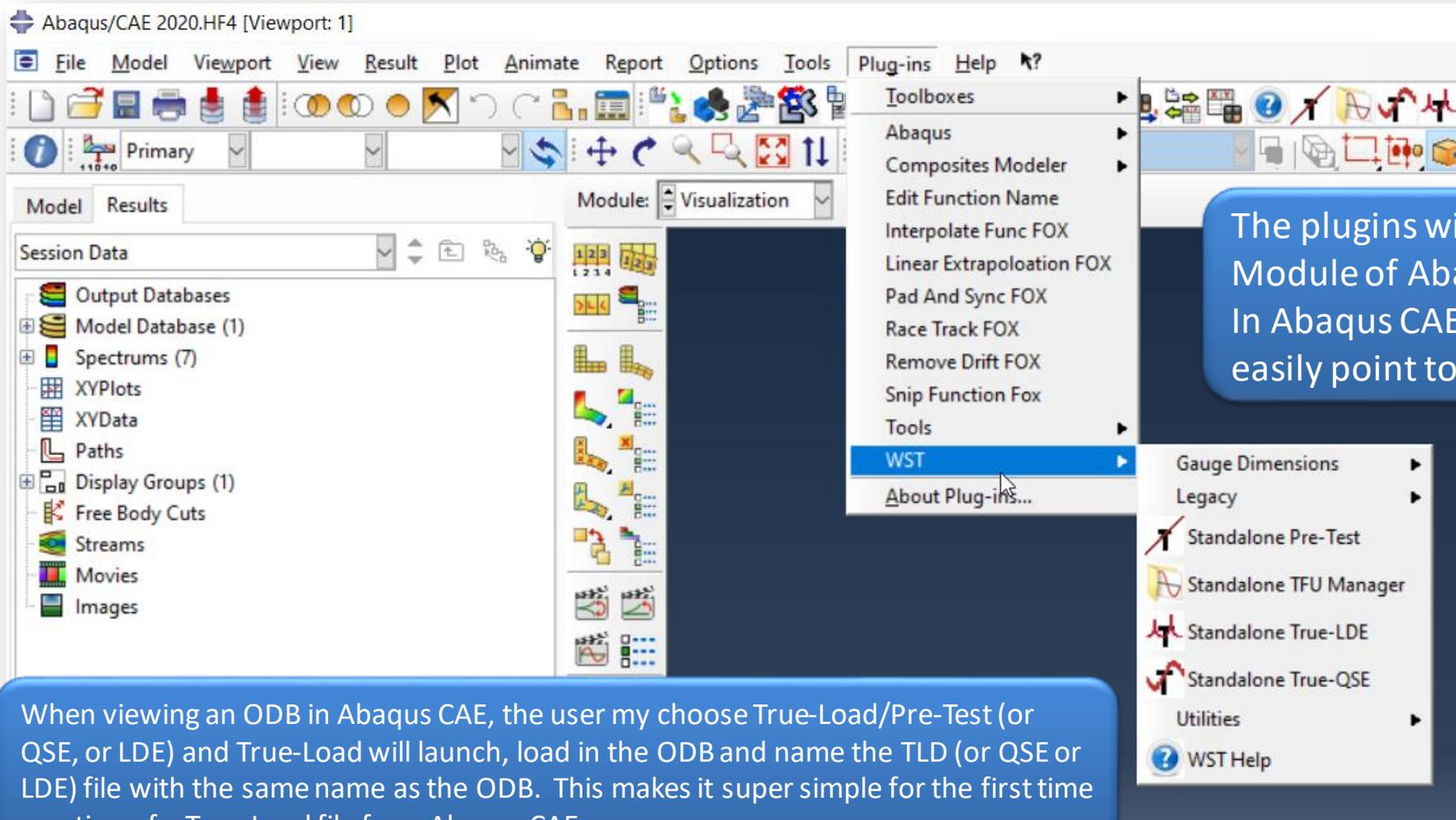
Plugin installer creates  
<HomeDir>/abaqus\_plugins.

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.

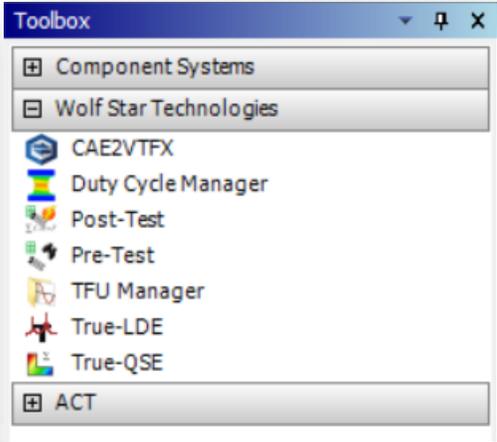
# Ansys Plugin





# Ansys Plugin

WBEX file installed in Ansys Workbench



WBEX extension downloaded to Desktop

Tools

- Widgets
- Measure Utilities
- Protractor
- Ruler
- Node Info
- Element Info
- All Cross-Plots
- CAE2VTFx
- Generate Random Strains on TLD
- Gauge Transform Wizard
- Print Current Working Dir
- Change Working Directory
- Edit Config
- Clean Up Scratch Files
- Update True-Load Software
- Check License Status
- 3rd Party Plugins
  - Install Abaqus CAE Plugins
  - Download Ansys Workbench Extension
- True-Tools Help
- About

Results Mgr

State

Contour Result: No selection

Contour Style: Contour

Vector Result: No selection

Filter

Contour  Vector

Data Type

Data Component

Data Location

Single Series Options

Results Mgr Group Mgr Part Mgr XY Mgr

Console Output

True-Tools Application Suite  
Copyright(c) 2010 -- ALL RIGHTS RESERVED  
True-Suite Version: Ceetron 2022-08-25

-----

Powered by Ceetron 3D Components 3.9.0

Session Start: Mon Aug 29 09:36:20 2022  
Opening Main Window  
Installing Abaqus CAE PlugIn...  
Downloading Ansys PlugIn (WolfStar.wbex) to Desktop



# Time to Ang / Cycles





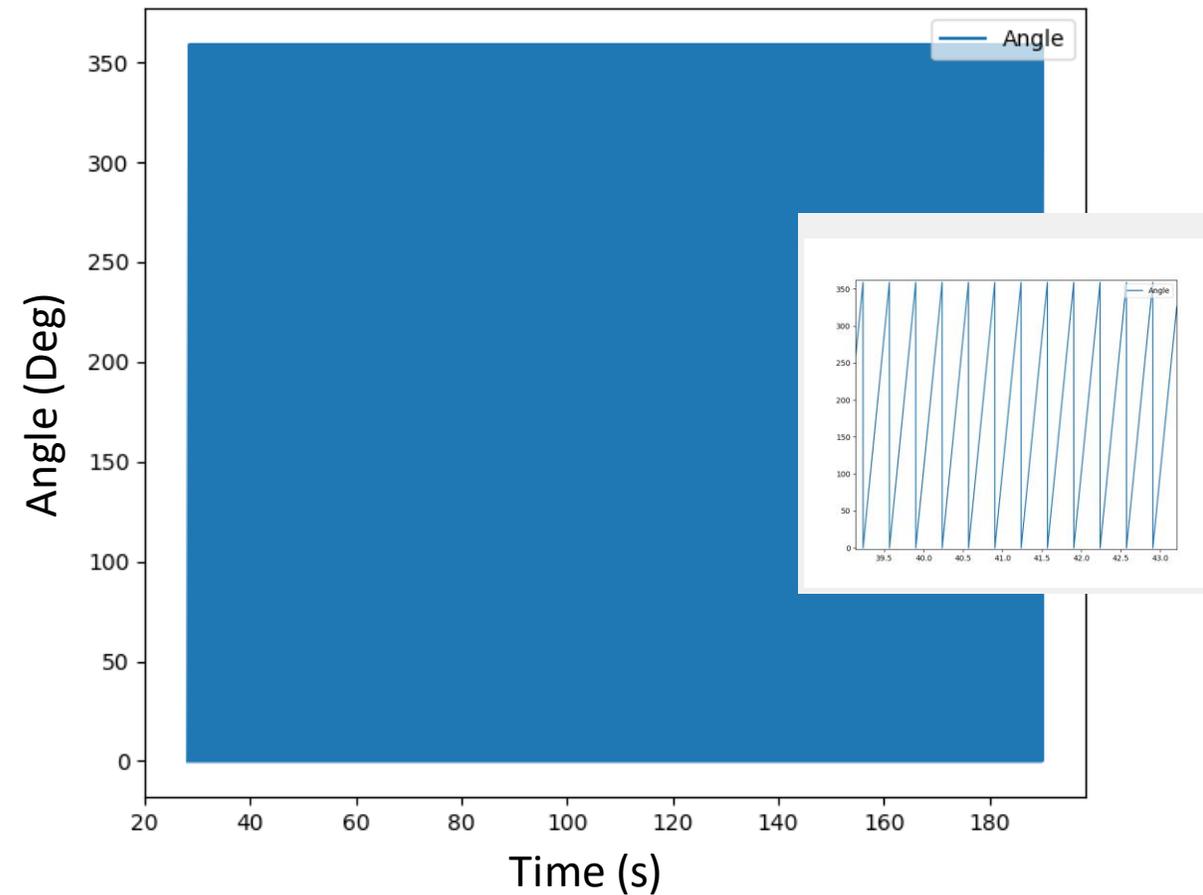
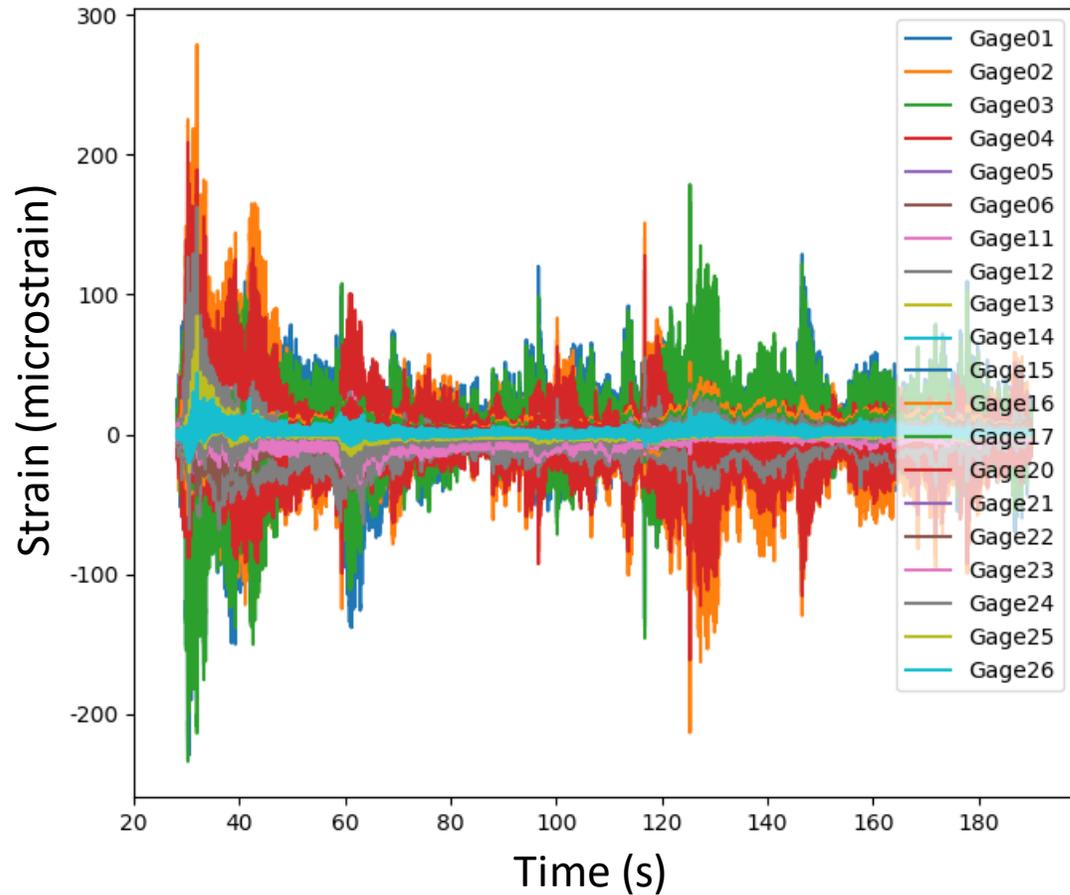
# Time to Ang / Cycles

- Time to Ang / Cycles will map time domain data to angles or cycles.
- This is especially useful if your structure is a rotating component (e.g.):
  - Engine
  - Conical Crusher
  - Generator
  - Wheel
- The user needs to provide an angle channel sampled at the same sampling rate as the data.
- The angle data needs to vary from a low value to a high value (e.g. 0 to 360, 0 to 720, etc.)





# Example data





# Map Time to Cycles

TFU Manager

TFU File

Select	Function Name
<input checked="" type="checkbox"/>	Gage20
<input checked="" type="checkbox"/>	Gage21
<input checked="" type="checkbox"/>	Gage22
<input checked="" type="checkbox"/>	Gage23
<input checked="" type="checkbox"/>	Gage24
<input checked="" type="checkbox"/>	Gage25
<input checked="" type="checkbox"/>	Gage26
<input checked="" type="checkbox"/>	Gage27
<input checked="" type="checkbox"/>	Gage28
<input checked="" type="checkbox"/>	Gage29
<input type="checkbox"/>	Angle

Manage: Math: Import: Export:

Modify:

Plot Options: Simple  Legend Title: None Font Size: 1

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Wolf Star Technologies True-...

Angle Channel: Angle

Degrees per Cycle: 360.0

Map to Cycles

Map to Angles  Store Total Angle

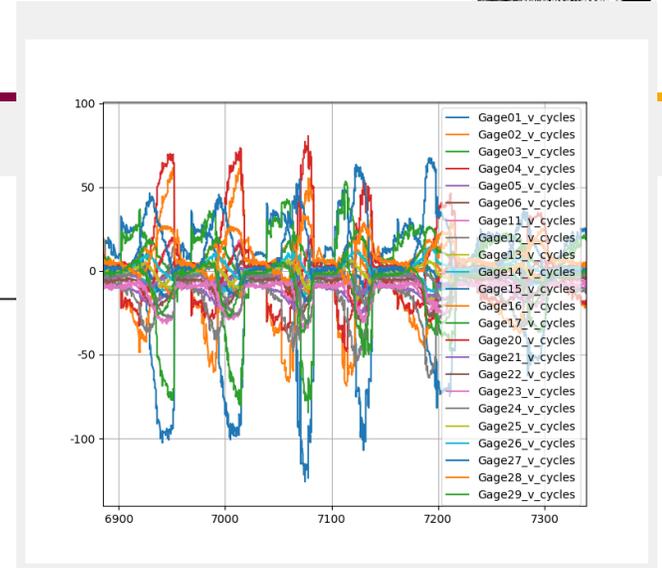
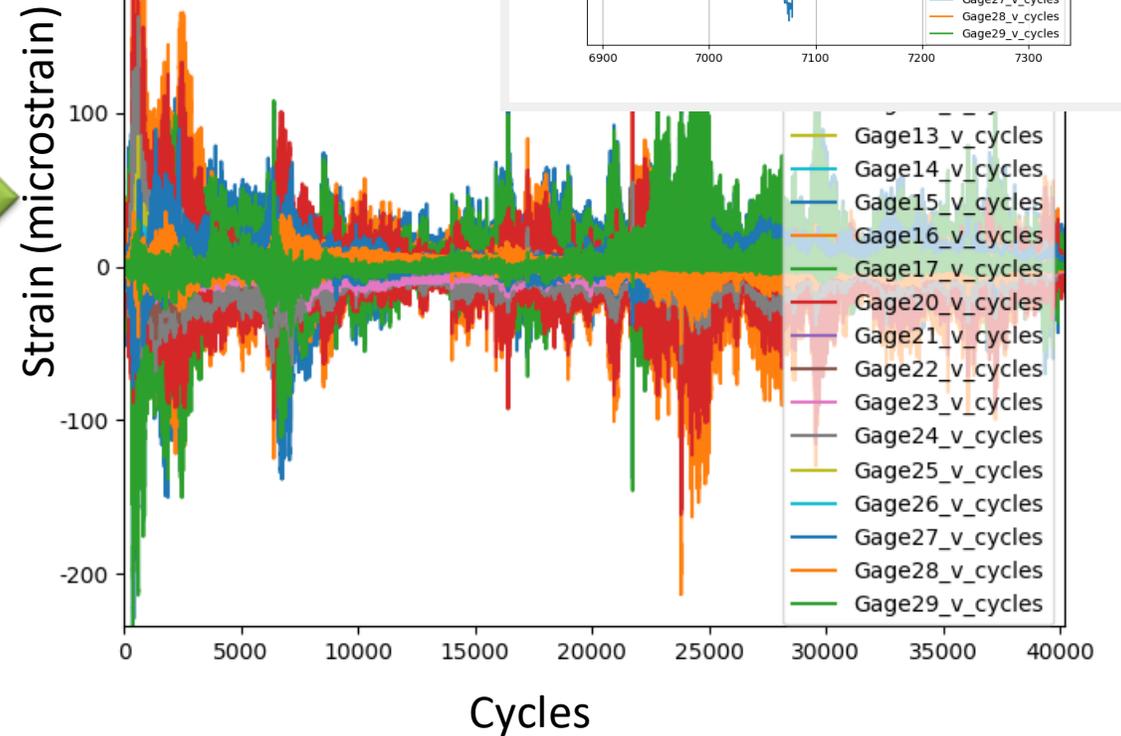
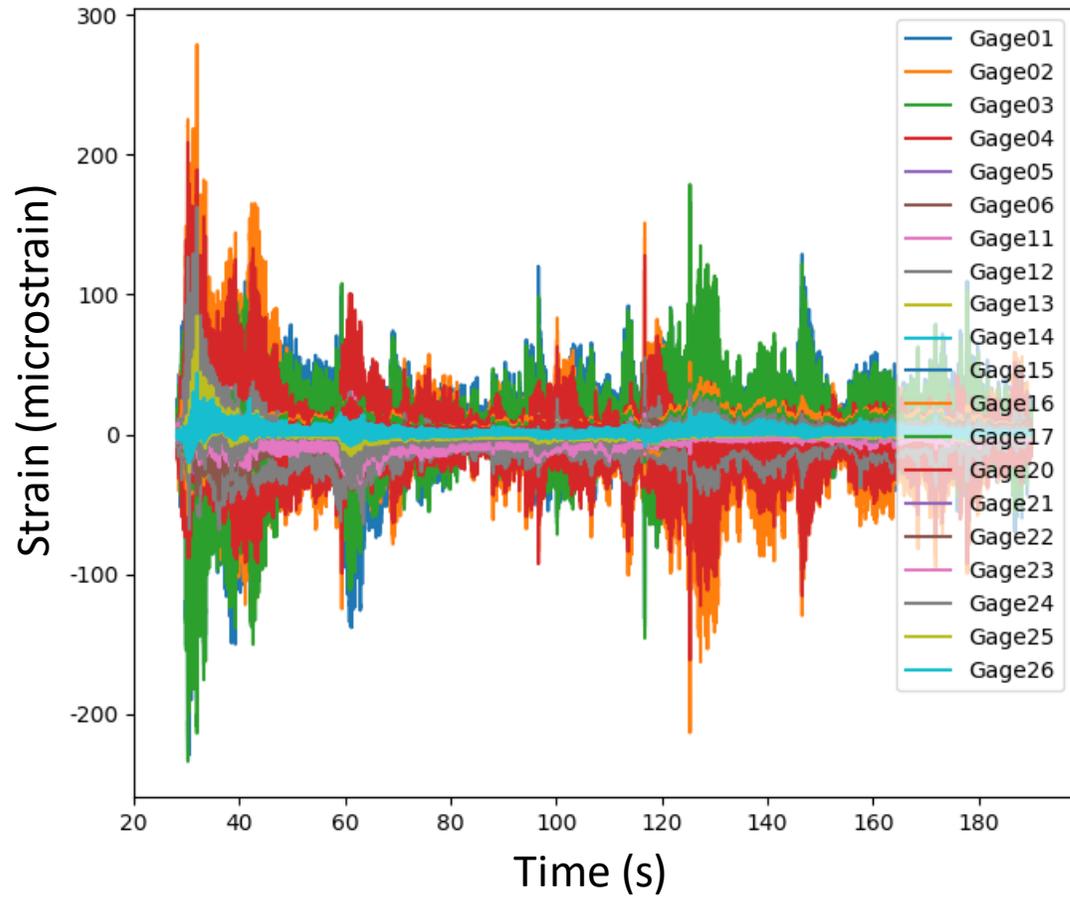
Print progress  Replace Channels

Apply





# Map to Cycles





# Map to Angles

TFU Manager

TFU File

Select	Function Name
<input checked="" type="checkbox"/>	Gage20
<input checked="" type="checkbox"/>	Gage21
<input checked="" type="checkbox"/>	Gage22
<input checked="" type="checkbox"/>	Gage23
<input checked="" type="checkbox"/>	Gage24
<input checked="" type="checkbox"/>	Gage25
<input checked="" type="checkbox"/>	Gage26
<input checked="" type="checkbox"/>	Gage27
<input checked="" type="checkbox"/>	Gage28
<input checked="" type="checkbox"/>	Gage29
<input type="checkbox"/>	Angle

Manage | Math | Import | Export

Modify

Plot Options: Simple | Legend | Title: None | Font Size: 1

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1

2

- $\frac{1}{y}$  Reciprocal
- $|y|$  Absolute Value
- $y^2$  Square
- $\sqrt{\quad}$  Square Root
- $\frac{dy}{dt}$  Derivative
- $\int y dt$  Integrate
- Time To Cycles

Wolf Star Technologies True-...

Angle Channel: Angle

Degrees per Cycle: 360.0

Map to Cycles

Map to Angles  Store Total Angle

Print progress  Replace Channels

Apply

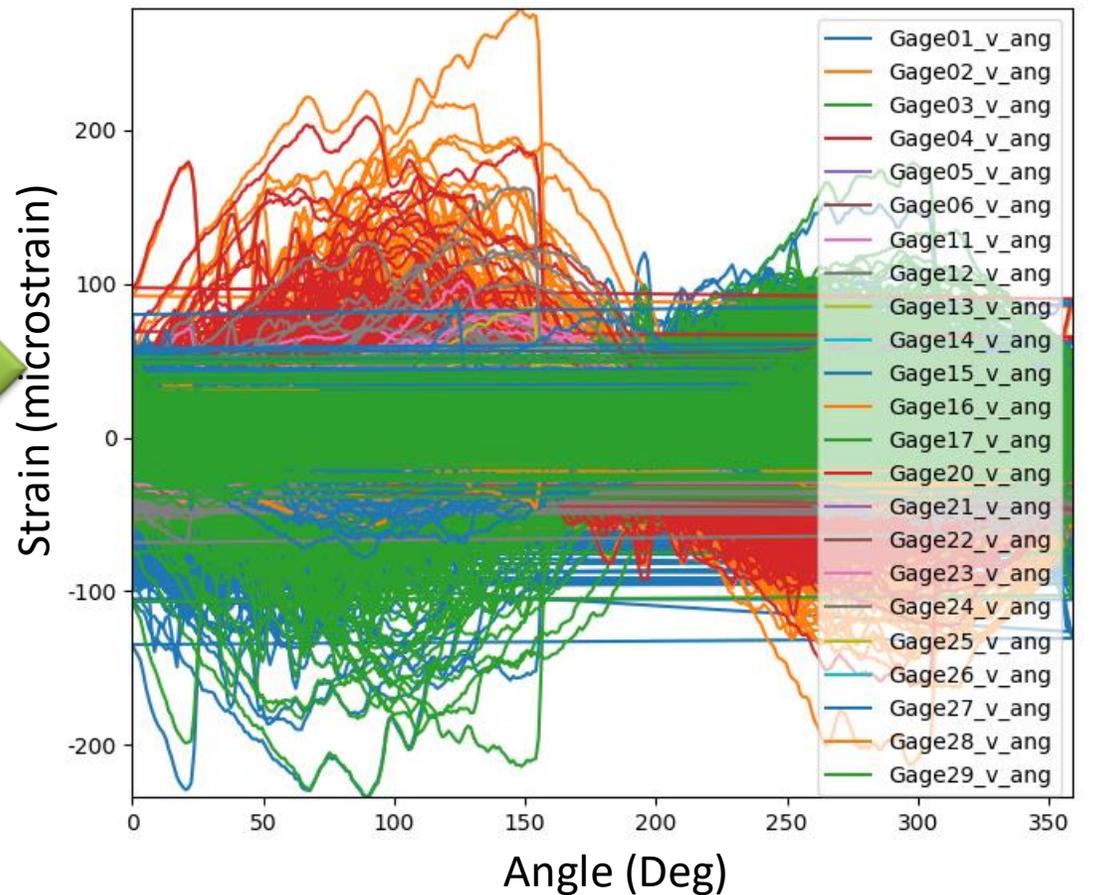
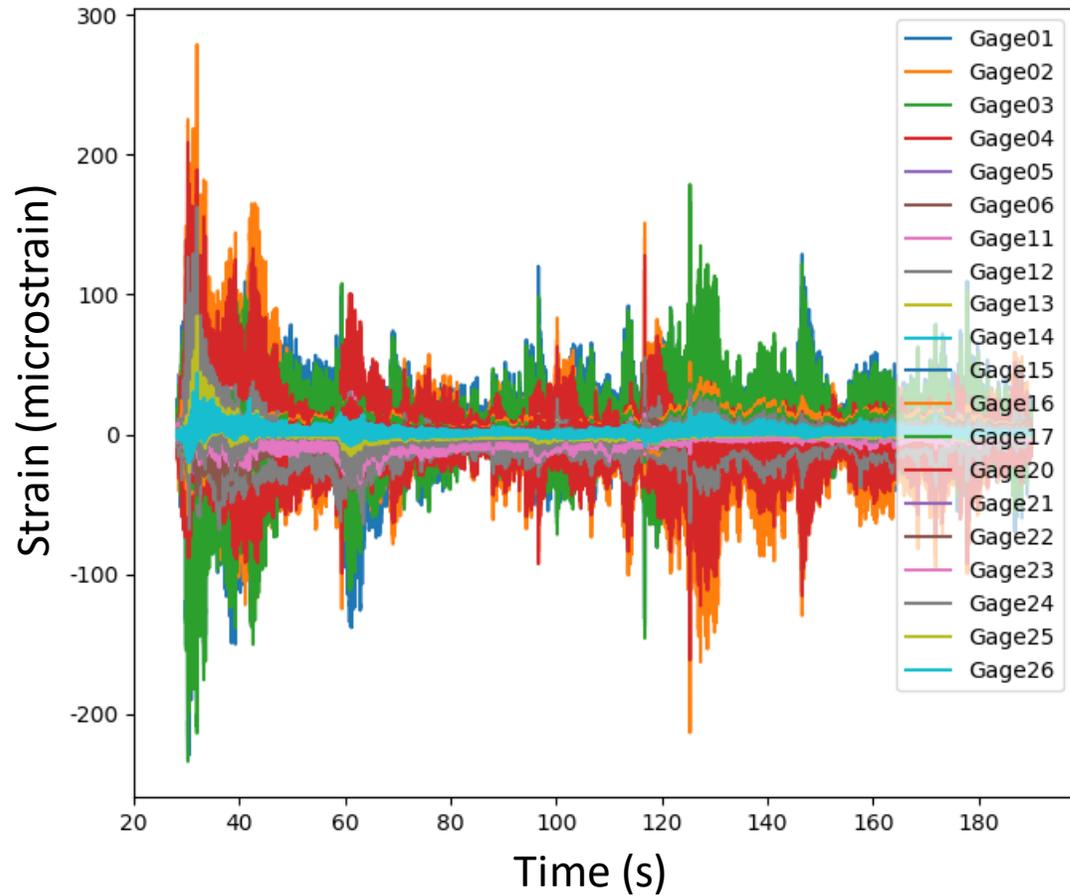
3

4





# Map to Angles





# Map to Total Angle

TFU Manager

TFU File

Select	Function Name
<input checked="" type="checkbox"/>	Gage20
<input checked="" type="checkbox"/>	Gage21
<input checked="" type="checkbox"/>	Gage22
<input checked="" type="checkbox"/>	Gage23
<input checked="" type="checkbox"/>	Gage24
<input checked="" type="checkbox"/>	Gage25
<input checked="" type="checkbox"/>	Gage26
<input checked="" type="checkbox"/>	Gage27
<input checked="" type="checkbox"/>	Gage28
<input checked="" type="checkbox"/>	Gage29
<input type="checkbox"/>	Angle

Manage: Math: Import: Export:

Modify:

Plot Options: Simple  Legend Title: None Font Size: 1

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Wolf Star Technologies True-...

Angle Channel: Angle

Degrees per Cycle: 360.0

Map to Cycles

Map to Angles  Store Total Angle

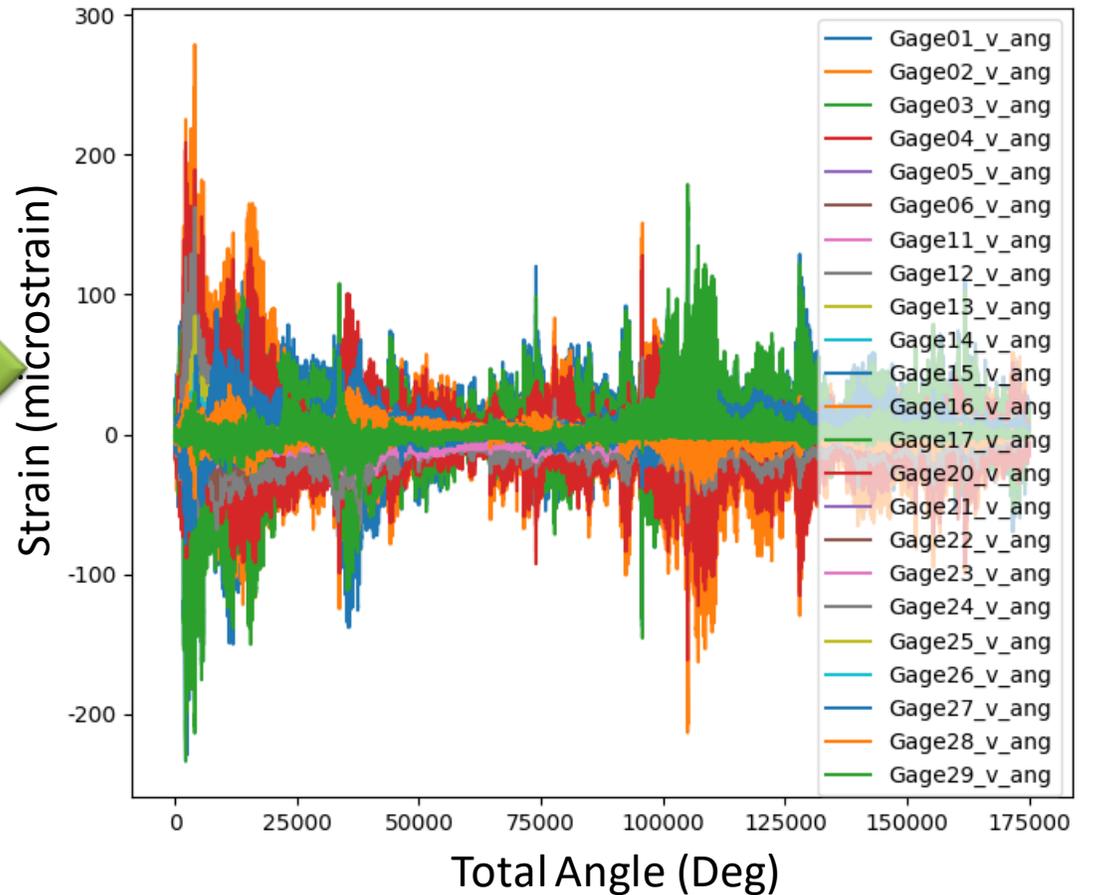
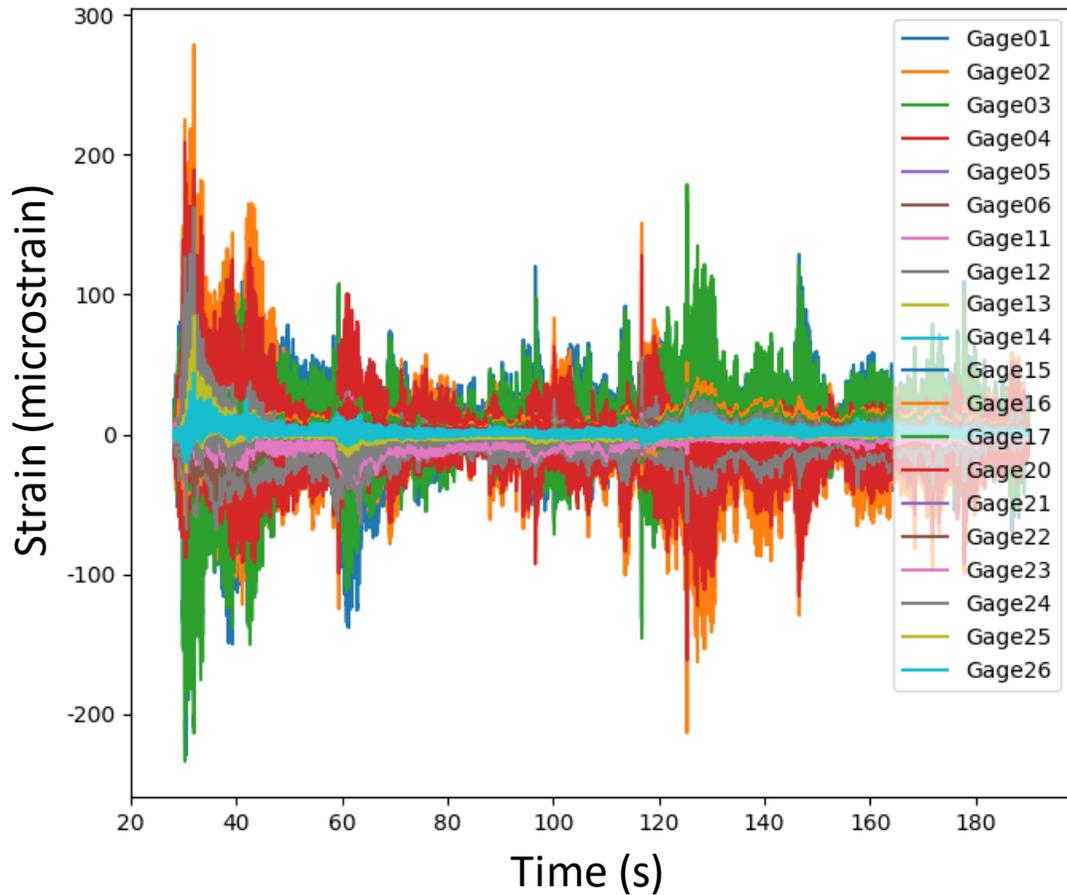
Print progress  Replace Channels

Apply





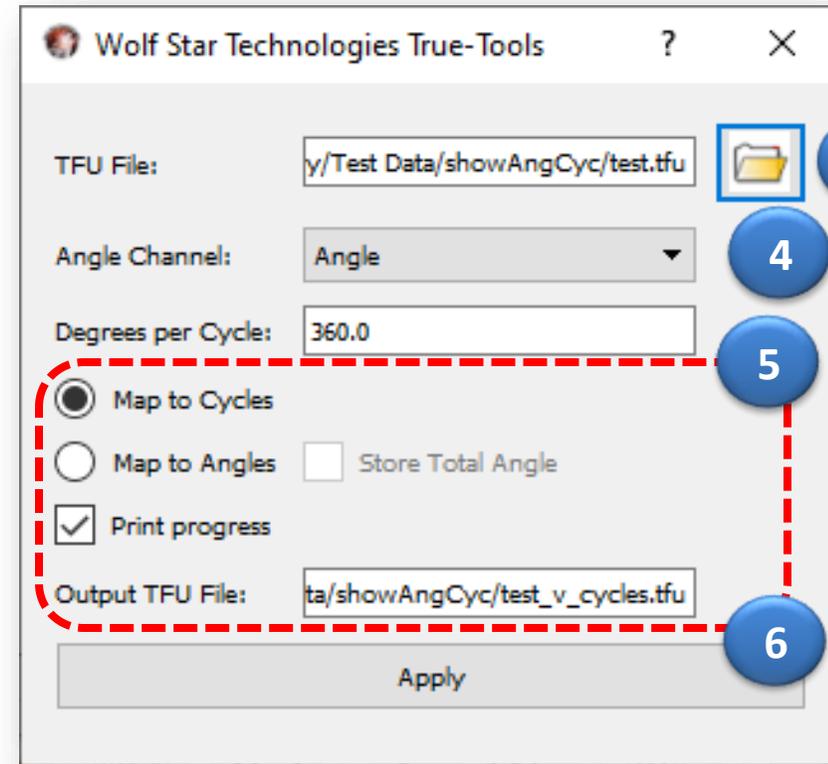
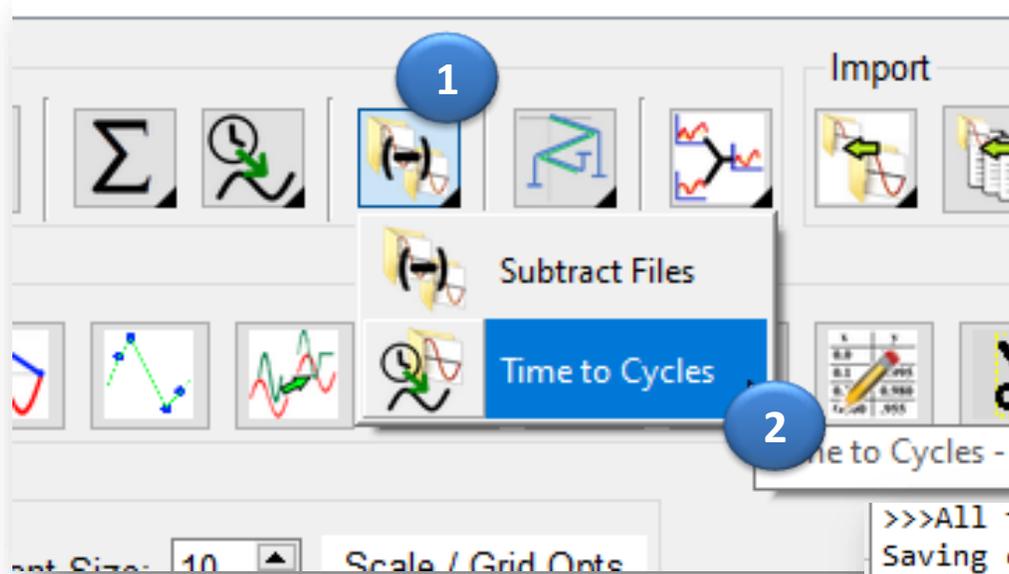
# Map to Total Angle





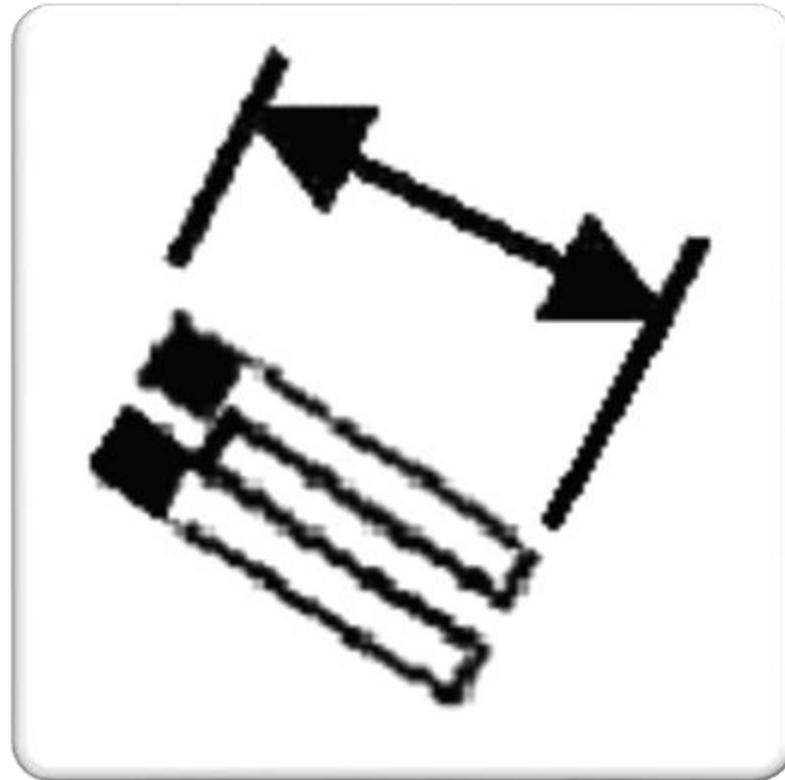
# Map to Angle / Cycle → TFU File

Perform operation on a TFU file instead of loading it in session.



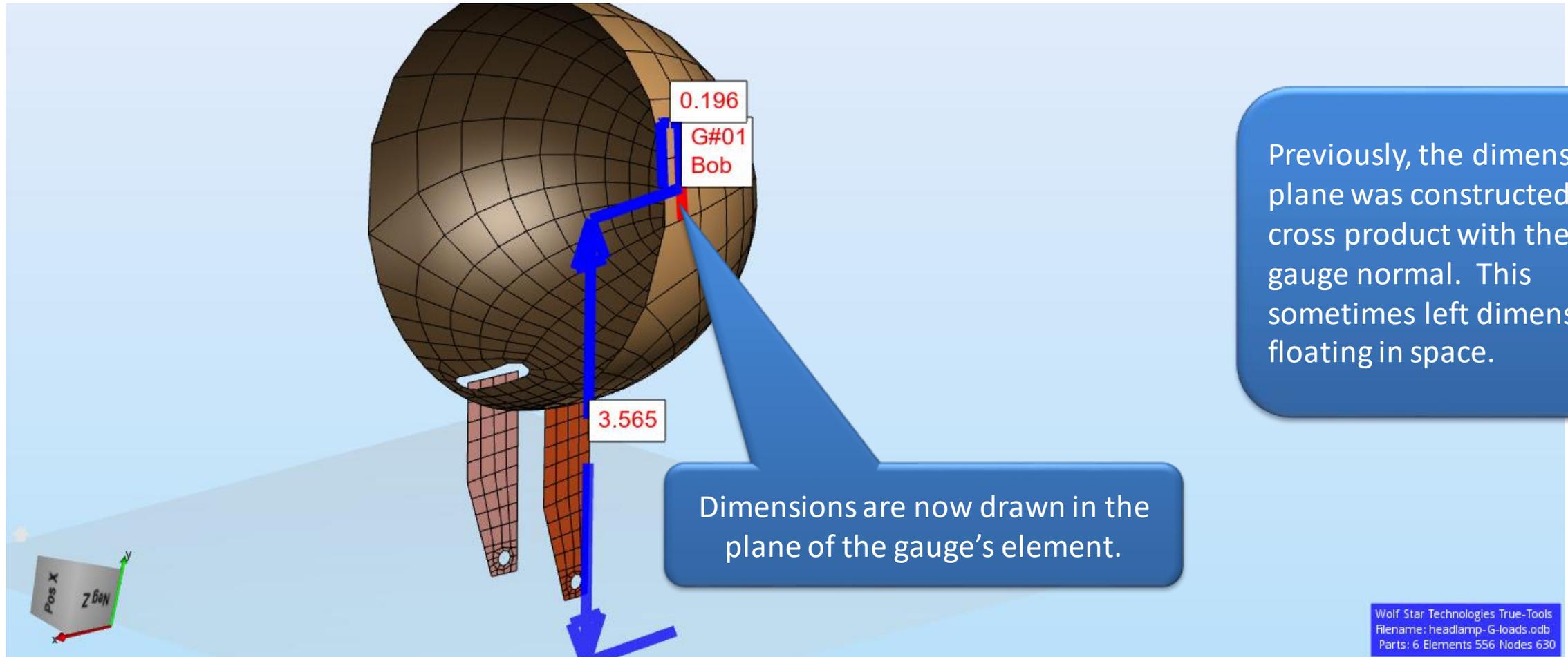
```
>>>All functions converted.  
Saving converted functions to file...  
Converted functions written to:  
D:/scratch/Metso/5065 Load Recovery/Test Data/showAngCyc/test_v_cycles.tfu.  
=====
```

# Dimension Plane





# Gauge / Dimension Plane

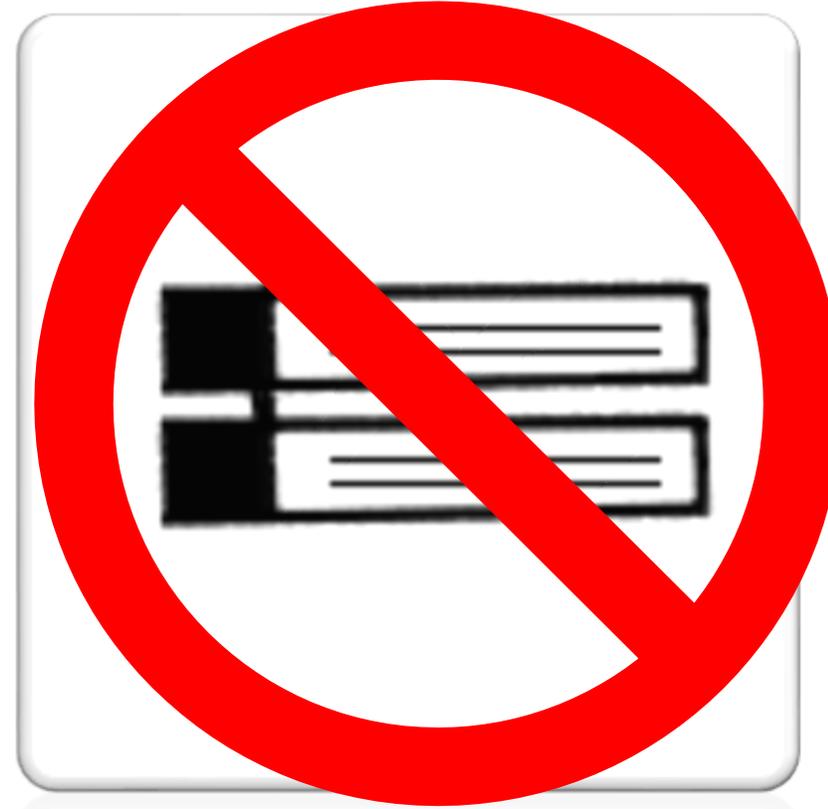
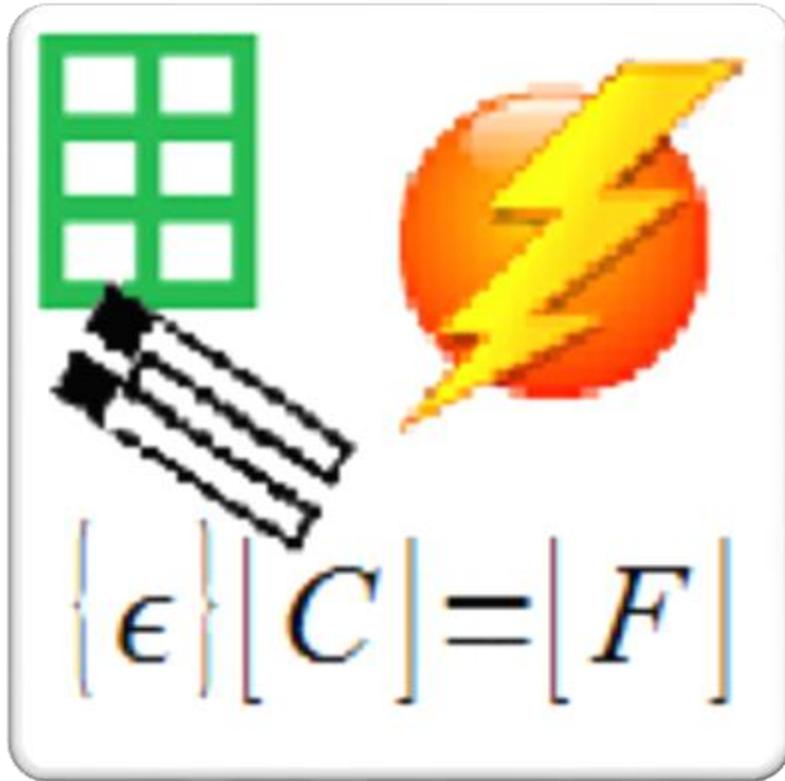


Previously, the dimension plane was constructed via cross product with the gauge normal. This sometimes left dimension floating in space.

Dimensions are now drawn in the plane of the gauge's element.



# Hybrid Loading – No Gauges Needed





# Hybrid Loading – No Gauges Needed!

- Previously, if you were doing Hybrid Loading, you would need to place gauges that could back calculate the load – even though you were measuring the load with another transducer.
- Now you do not need to include the Hybrid Load in your TLD file or lay the extra gauges for the Hybrid Load.
- You do still need to model the unit load for the measured load in your FEA model as a solved load case.





# Hybrid Loading

TLD File

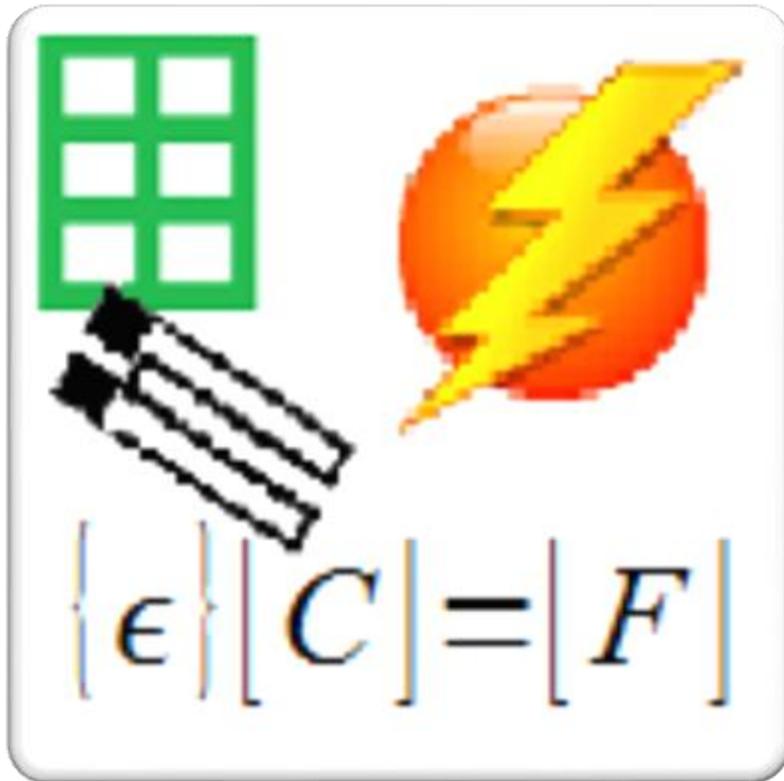
Known Load QSE File

FEA: Step	FEA: Frame	Scale Factor	Model
Unit-Loads:Load Case: FOOT-100N-FY-(2)	1002	1.0	<TFU File> Scooter_22_01_tfu==>Unit-Loa
Unit-Loads:Load Case: REARTIRE-100N-FY-(5)	1005	1.0	<TFU File> Scooter_22_01_tfu==>Unit-Loa

Step	Frame	Scale Factor
1 Unit-Loads:Load Case: FOOT-100N-FX-(1)	1001	41.13802018808038
2 Unit-Loads:Load Case: FOOT-100N-FZ-(3)	1003	25.782433675339675
3 Unit-Loads:Load Case: REARAXLE-100N-FX-(4)	1004	32.30890380342375
4 Unit-Loads:Load Case: REARTIRE-100N-FY-(5)	1005	1.0
5 Unit-Loads:Load Case: REARTIRE-100N-FZ-(6)	1006	5.48205672570474

Known Load is not in TLD File!!!  
No Gauges placed to sense known load!!!

# Post-Test Report Readability





# Post-Test Report Readability

OLD

NEW

True-Load HTML file from Post-Test Report Written: Thu Dec 9 16:17:10 2021

Navigation: [Unit Load Table](#) [Gauge Table](#) [True-Load Desktop](#) [Load Plots](#) [Overall Strain Correlation](#)

**Required Input Files**  
 True-Load File: C:\scratch\ceeTron\_dev\CodeTest\hLamp\_GOI.tld  
 Software Version: CeeTron 2021-11-17  
 Strain Data File: C:\scratch\ceeTron\_dev\CodeTest\hLampSimple-QSE.tfu  
 FEA DB File (for reference): C:\scratch\ceeTron\_dev\CodeTest\headlamp-G.loads.tbl  
 Hybrid Loading QSE file: C:\scratch\ceeTron\_dev\CodeTest\headlamp-G.loads.vtf  
 VTFx File: C:\scratch\ceeTron\_dev\CodeTest\headlamp-G.loads.vtf  
 Shells Only: False

**Output Files**  
 Quasi-Static Event (QSE) File: \hLamp\_GOI\hLampSimple-QSE.qse  
 True-Function File (TFU) File: \hLamp\_GOI\hLampSimple-QSE.tfu  
 HTML Report File: \hLamp\_GOI\hLampSimple-QSE.html  
 Simulated / Measured Strain File: \hLamp\_GOI\hLampSimple-QSE-SimMes.tfu

Number of Gauges: 6  
 Condition Number of eMat: 3.215033711112599

**Load Table:**

Step	Frame	Frame Description	Scale Factor
Load Case: GRAV-10GX	2	Load Case: GRAV-10GXFrame = 2	1.0
Load Case: GRAV-10GY	3	Load Case: GRAV-10GYFrame = 3	2.947477610113982
Load Case: GRAV-10GZ	4	Load Case: GRAV-10GZFrame = 4	1.285251199573817

**Gauge Table:**

Chosen Gauges		eMat Strains				
Gauge Number	Gauge Name	Instance	Element Label	Angle	Strain Channel	Step: Load Case: GRAV-10GX Frame: 2
1	Bob	0	240	75.0	G01	8.347785804989888e-05
2		1	19	90.0000000000123	G02	0.00017939647623640658
3		1	16	72.33742416654283	G03	-0.00028552738640728284
4		2	116	89.99999999997524	G04	-0.00015116028903718496
5		2	19	90.00000000000793	G05	0.00035659334659568373
6	Sue	0	71	5.599068339715134e-12	G06	9.053314275717642e-05

True-Load HTML file from Post-Test Report Written: Fri Oct 6 08:31:13 2023

Navigation: [Unit Load Table](#) [Gauge Table](#) [True-Load Desktop](#) [Load Plots](#) [Overall Strain Correlation](#) [Strain Correlation Quality Table](#) [Gauges of Interest](#)

**Required Input Files**

True-Load File: hybrid-razorScooter\_update.tld  
 Software Version: CeeTron 2023-10-06  
 Strain Data File: C:\scratch\ceeTron\_dev\CodeTest\Benchmark 2023\Scooter\Test Data\2022-09-19\hybrid-Scooter\_22\_01.tfu  
 FEA DB File: \FEA\Scooter-Unit-Loads\_v3.tbl  
 VTFx File: \FEA\Scooter-Unit-Loads\_v3.vtf  
 Hybrid Loading QSE file: C:\scratch\ceeTron\_dev\CodeTest\Benchmark 2023\Scooter\Test Data\2022-09-19\Ctrl-razorScooter\_update-Scooter\_22\_01-D1.qse  
 Shells Only: False

**Output Files**

Quasi-Static Event (QSE) File: \razorScooter\_update-hybrid-Scooter\_22\_01-D1.qse  
 True-Function File (TFU) File: \razorScooter\_update-hybrid-Scooter\_22\_01-D1.tfu  
 HTML Report File: \razorScooter\_update-hybrid-Scooter\_22\_01-D1.html  
 Simulated / Measured Strain File: \razorScooter\_update-hybrid-Scooter\_22\_01-D1-SimMes.tfu  
 Number of Gauges: 11  
 Condition Number of eMat: 2.387215

**Load Table:**

Step	Frame	Frame Description	Scale Factor
Unit-Loads:Load Case: FOOT-100N-FX-(1)	1001	Unit-Loads:Load Case: FOOT-100N-FX-(1)Frame = 1001	39.10162563123969
Unit-Loads:Load Case: FOOT-100N-FZ-(3)	1003	Unit-Loads:Load Case: FOOT-100N-FZ-(3)Frame = 1003	24.506164001725665
Unit-Loads:Load Case: REARAXLE-100N-FX-(4)	1004	Unit-Loads:Load Case: REARAXLE-100N-FX-(4)Frame = 1004	30.709563933834083
Unit-Loads:Load Case: REARTIRE-100N-FZ-(6)	1006	Unit-Loads:Load Case: REARTIRE-100N-FZ-(6)Frame = 1006	5.2165311460048285
Unit-Loads:Load Case: REARTIRE-100NM-MY-(7)	1007	Unit-Loads:Load Case: REARTIRE-100NM-MY-(7)Frame = 1007	1.0

**Gauge Table:**

Chosen Gauges		eMat Strains				
Gauge Number	Gauge Name	Instance	Element Label	Angle	Strain Channel	Step: Unit-Loads:Load Case: FOOT-100N-FX-(1) Frame: 1001
1		2	5497	3.200000000000001	*** Dropped ***	---
2		2	2691	168.02521877685058	Chan#02 Uniaxial Gauge	0.0003179123108947779
3		2	18696	59.9999999979727434	Chan#03 Uniaxial Gauge	-0.00011875410384063057
4		5	19061	56.089065237402746	Chan#04	0.00012350912085731734

**Gauge Table:**

Chosen Gauges		eMat Strains								
Gauge Number	Gauge Name	Instance	Element Label	Angle	Strain Channel	Step: Unit-Loads:Load Case: FOOT-100N-FX-(1) Frame: 1001	Step: Unit-Loads:Load Case: FOOT-100N-FZ-(3) Frame: 1003	Step: Unit-Loads:Load Case: REARAXLE-100N-FX-(4) Frame: 1004	Step: Unit-Loads:Load Case: REARTIRE-100N-FZ-(6) Frame: 1006	Step: Unit-Loads:Load Case: REARTIRE-100NM-MY-(7) Frame: 1007
1		2	5497	3.200000000000001	*** Dropped ***	---	---	---	---	---
2		2	2691	168.02521877685058	Chan#02 Uniaxial Gauge	0.0003179123108947779	-0.00013072833765645953	3.656186842970702e-05	0.00012687736254194092	-0.00011664528275662094
3		2	18696	59.9999999979727434	Chan#03 Uniaxial Gauge	-0.00011875410384063057	-6.749258027811764e-05	0.0002551820377148186	3.88800023983477e-05	2.91071742647494e-05
4		5	19061	56.089065237402746	Chan#04	0.00012350912085731734	5.013260232061875e-05	0.0001447314108075147	3.500317707501576e-05	7.091064660173481e-05



# Post-Test Report Readability

*True-Load HTML file from Post-Test Report Written: Fri Oct 6 08:31:13 2023*

[Navigation:](#)
[Unit Load Table](#)
[Gauge Table](#)
[True-Load Desktop](#)
[Load Plots](#)
[Overall Strain Correlation](#)
[Strain Correlation Quality Table](#)
[Gauges of Interest](#)

**Required Input Files**

**True-Load File:** [hybrid-razorScooter\\_update.tld](#)  
**Software Version:** [CeeTron 2023-10-06](#)  
**Strain Data File:** [C:\scratch\ceeTron\\_dev\Code Test\Benchmark 2023\Scooter\Test Data\2022-09-19\hybrid-Scooter\\_22\\_01.tfu](#)  
**FEA DB File:** [\\_FEA\Scooter-Unit-Loads\\_v3.odb](#)  
**VTFx File:** [\\_FEA\Scooter-Unit-Loads\\_v3.vtfx](#)  
**Hybrid Loading QSE file:** [C:\scratch\ceeTron\\_dev\Code Test\Benchmark 2023\Scooter\Test Data\2022-09-19\Ctrl-razorScooter\\_update-Scooter\\_22\\_01-D1.qse](#)  
**Shells Only:** [False](#)

**Output Files**

**Quasi-Static Event (QSE) File:** [\\_razorScooter\\_update-hybrid-Scooter\\_22\\_01-D1.qse](#)  
**True-Function File (TFU) File:** [\\_razorScooter\\_update-hybrid-Scooter\\_22\\_01-D1.tfu](#)  
**HTML Report File:** [\\_razorScooter\\_update-hybrid-Scooter\\_22\\_01-D1.html](#)  
**Simulated / Measured Strain File:** [\\_razorScooter\\_update-hybrid-Scooter\\_22\\_01-D1-SimMes.tfu](#)  
**Number of Gauges:** [11](#)  
**Condition Number of eMat:** [2.387215](#)

[Report Information](#)
[Unit Load Table](#)
[Gauge Table](#)
[True-Load Desktop](#)
[Load Plots](#)
[Overall Strain Correlation](#)
[Strain Correlation Quality Table](#)
[Gauges of Interest](#)

**Load Table:**

Step	Frame	Frame Description	Scale Factor
Unit-Loads:Load Case: FOOT-100N-FX-(1)	1001	Unit-Loads:Load Case: FOOT-100N-FX-(1)Frame = 1001	39.10162563123969
Unit-Loads:Load Case: FOOT-100N-FZ-(3)	1003	Unit-Loads:Load Case: FOOT-100N-FZ-(3)Frame = 1003	24.506164001725665
Unit-Loads:Load Case: REARAXLE-100N-FX-(4)	1004	Unit-Loads:Load Case: REARAXLE-100N-FX-(4)Frame = 1004	30.709563933834083
Unit-Loads:Load Case: REARTIRE-100N-FZ-(6)	1006	Unit-Loads:Load Case: REARTIRE-100N-FZ-(6)Frame = 1006	5.2165311460048285
Unit-Loads:Load Case: REARTIRE-100NM-MY-(7)	1007	Unit-Loads:Load Case: REARTIRE-100NM-MY-(7)Frame = 1007	1.0

[Report Information](#)
[Unit Load Table](#)
[Gauge Table](#)
[True-Load Desktop](#)
[Load Plots](#)
[Overall Strain Correlation](#)
[Strain Correlation Quality Table](#)
[Gauges of Interest](#)

**Chosen Gauges**

Gauge Number	Gauge Name	Instance	Element Label	Angle	Strain Channel	Step: Unit-Loads:Load Case: FOOT-100N-FX-(1) Frame: 1001	Step: Unit-Loads:Load Case: FOOT-100N-FZ-(3) Frame: 1003	Step: Unit-Loads:Load Case: REARAXLE-100N-FX-(4) Frame: 1004	Step: Unit-Loads:Load Case: REARTIRE-100N-FZ-(6) Frame: 1006	Step: Unit-Loads:Load Case: REARTIRE-100NM-MY-(7) Frame: 1007
1		2	5497	3.200000000000001	*** Dropped ***	---	---	---	---	---
2		2	2691	168.02521877685058	Chan#02 Uniaxial Gauge	0.0003179123108947779	-0.00013072833765645953	3.656186842970702e-05	0.00012687736254194092	-0.00011664528275662094
3		2	18696	59.999999979727434	Chan#03 Uniaxial Gauge	-0.00011875410384063057	-6.749258027811764e-05	0.0002551820377148186	3.88800023983477e-05	2.91071742647494e-05
4		2	18061	56.08886522402746	Chan#04	0.00012350212085721724	5.012369232061875e-05	0.0002447141408075147	3.500317207501576e-05	7.8010646681724918e-05

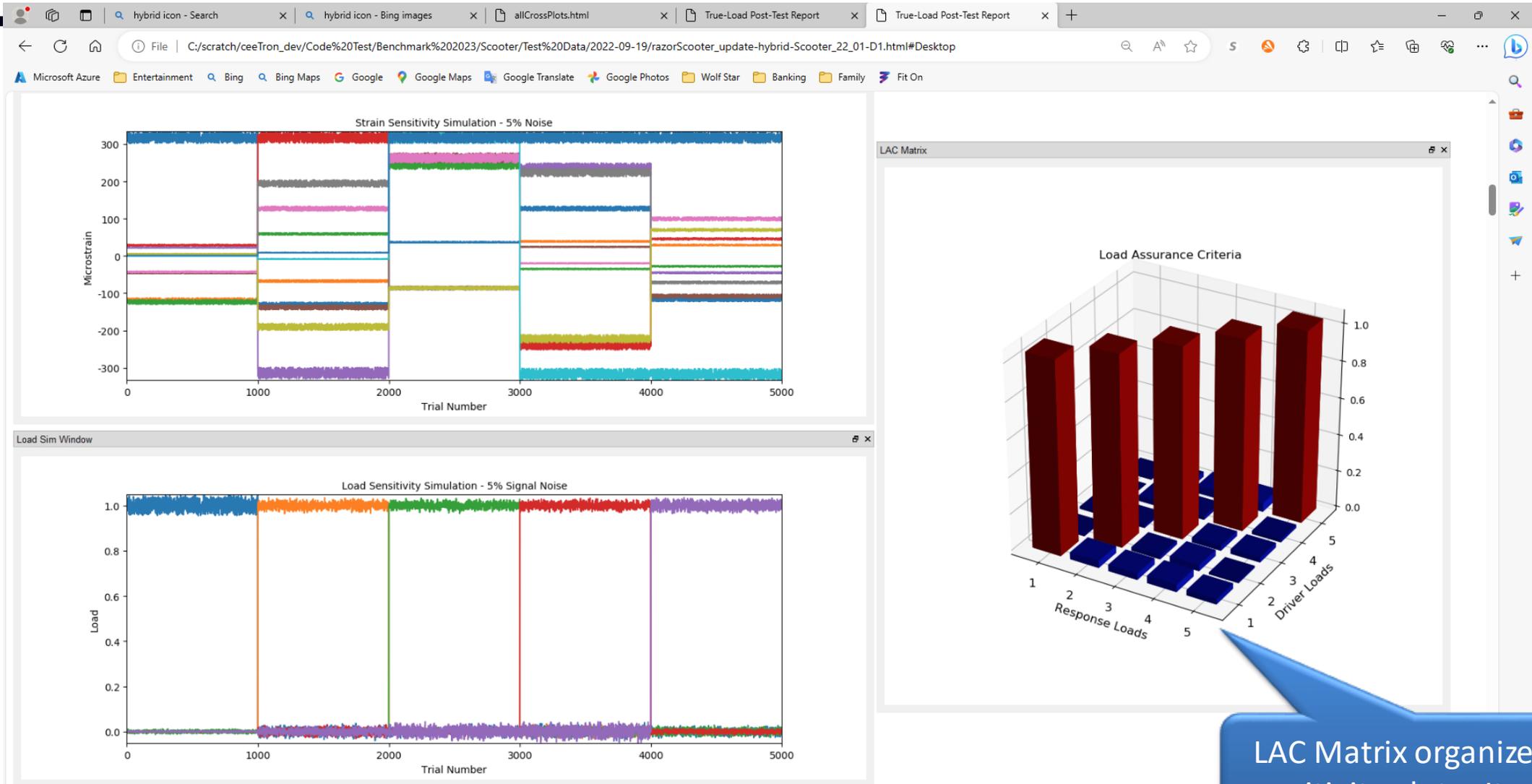
Required Input data

Generated Output Data



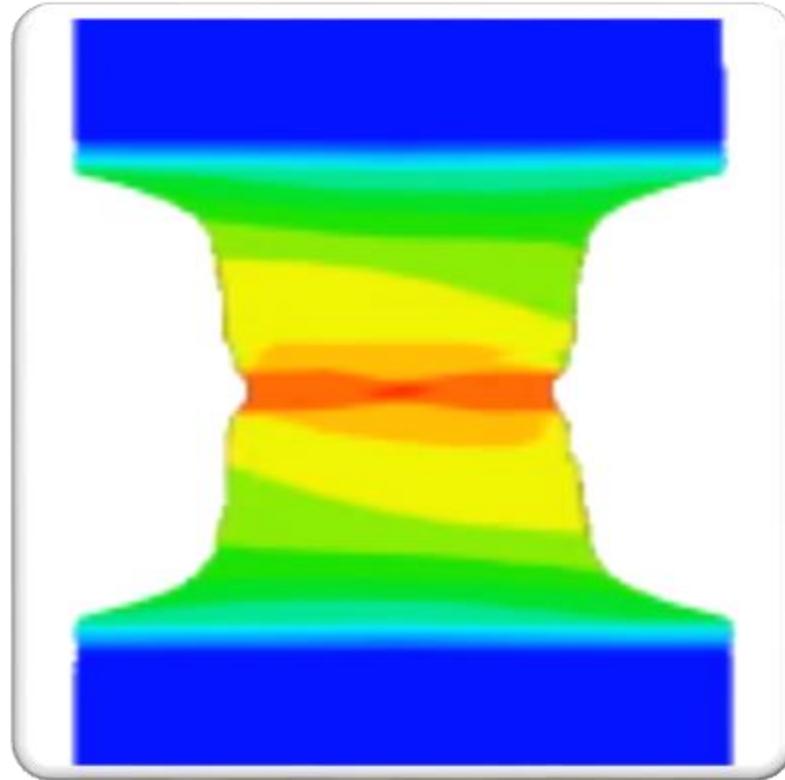


# Post-Test Report Readability



LAC Matrix organized next to sensitivity plots. It was below.

# TFU Fatigue Units





# TFU Fatigue Units

TFU Fatigue

Damage Model: Strain Life

Damage Calc:  Histogram  Cycle-by-Cycle

Notch Factor:  1.0  Range Start: 1.0 End: 2.0 Increment: 0.1

Material DB: WST Mats-Imperial.pkl

Material: 1008-HR,SH-As-rec.-BHN86  Plot: Strain Life

Material Parameters

Material Name: 1008-HR,SH-As-rec.-BHN86

Units: Lbf-in

Fatigue Strength Coefficient ( $\sigma_f$ ): 1.63e+05 psi

Fatigue Strength Exponent (b): -0.172 Unitless

Fatigue Ductility Coefficient ( $\epsilon_f$ ): 0.46 Strain (Unitless)

Fatigue Ductility Exponent (c): -0.543 Unitless

Modulus of Elasticity (E): 3.002e+07 psi

Cyclic Strength Coefficient (K'): 2.093e+05 psi

Strain Hardening Exponent (n'): 0.318 Unitless

Yield Point (YP): 3.394e+04 psi

Ultimate Strength (UTS): 4.801e+04 psi

--Calculated--

Transition Life (N): 1.573e+05 Cycles (2N<sub>t</sub>)

If using standard materials, switching units will switch standard databases.





# TFU Fatigue Units

TFU Fatigue

Damage Model: Strain Life Damage Calc:  Histogram  Cycle-by-Cycle

Notch Factor:  1.0  Range Start: 1.0 End: 2.0 Increment: 0.1

Material DB: userMats.pkl Hide / Show

Material: 1015-HR,SH-Norm. -BHN80-mod Plot: Strain Life

Material Parameters

Material Name:	1015-HR,SH-Norm. -BHN80-mod
Units	Lbf-in <input checked="" type="checkbox"/> Update Parameters
Fatigue Strength Coefficient( $\sigma_f$ ):	1.3e+05 psi
Fatigue Strength Exponent (b):	-0.124 Unitless
Fatigue Ductility Coefficient ( $\epsilon_f$ ):	0.729 Strain (Unitless)
Fatigue Ductility Exponent (c):	-0.581 Unitless
Modulus of Elasticity (E):	3.002e+07 psi
Cyclic Strength Coefficient (K')	1.371e+05 psi
Strain Hardening Exponent (n')	0.213 Unitless
Yield Point(YP):	3.307e+04 psi
Ultimate Strength (UTS):	6.005e+04 psi
--Calculated--	
Transition Life (N):	7.436e+04 Cycles (2N <sub>t</sub> )

Apply Cancel

If using user materials, switching units changes the unit base for the material.

If Update Parameters is checked, then the parameters with units will have their values updated to the new Unit System



# Compare GOI Speed





# Huge Speed Increase!

## Old GOI Compare

Test Data Comparison

GOI File: D:\scratch\Cork Screw\TLD Files\corkScrew12.tld

Include TL Gauges Add adjacent Remove adjacent

Data Component

Shell Surface:  Top SPOS  Bottom SNEG

Map File: D:\scratch\Cork Screw\TLD Files\corkScrew2.map

Test TPU File: ita\2023-08-22\Calibration Run 001\corkScrew\_2023-08-22\_Run001\_12.tpu

Plot:  All Adjacent GOIs  Best Adjacent GOI

Best Adj Coord: 27.076, 2.211, 1.215 Vector: 1.000, 0.008, 0.005

Movement to Best Adj GOI: 0.000, 0.000, 0.000 Distance: 0.000

Single Multiple

Test Function: Char#07 CSK-06-85145-350-33F GOI Name: TLD #3

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

Clear Apply Cancel

00:03:36.04

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

Clear Apply Cancel

## New GOI Compare

Test Data Comparison

GOI File: D:\scratch\Cork Screw\TLD Files\corkScrew12.tld

Include TL Gauges Add adjacent Remove adjacent

Data Component

Shell Surface:  Top SPOS  Bottom SNEG

Map File: D:\scratch\Cork Screw\TLD Files\corkScrew12.map

Test TPU File: ita\2023-08-22\Calibration Run 001\corkScrew\_2023-08-22\_Run001\_12.tpu

Plot:  All Adjacent GOIs  Best Adjacent GOI

Best Adj Coord: 27.076, 2.211, 1.215 Vector: 1.000, 0.008, 0.005

Movement to Best Adj GOI: 0.000, 0.000, 0.000 Distance: 0.000

Single Multiple

Test Function: Char#07 CSK-06-85145-350-33F GOI Name: TLD #3

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

Clear Apply Cancel

00:00:38.64

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

Clear Apply Cancel

5.6 times faster for this example

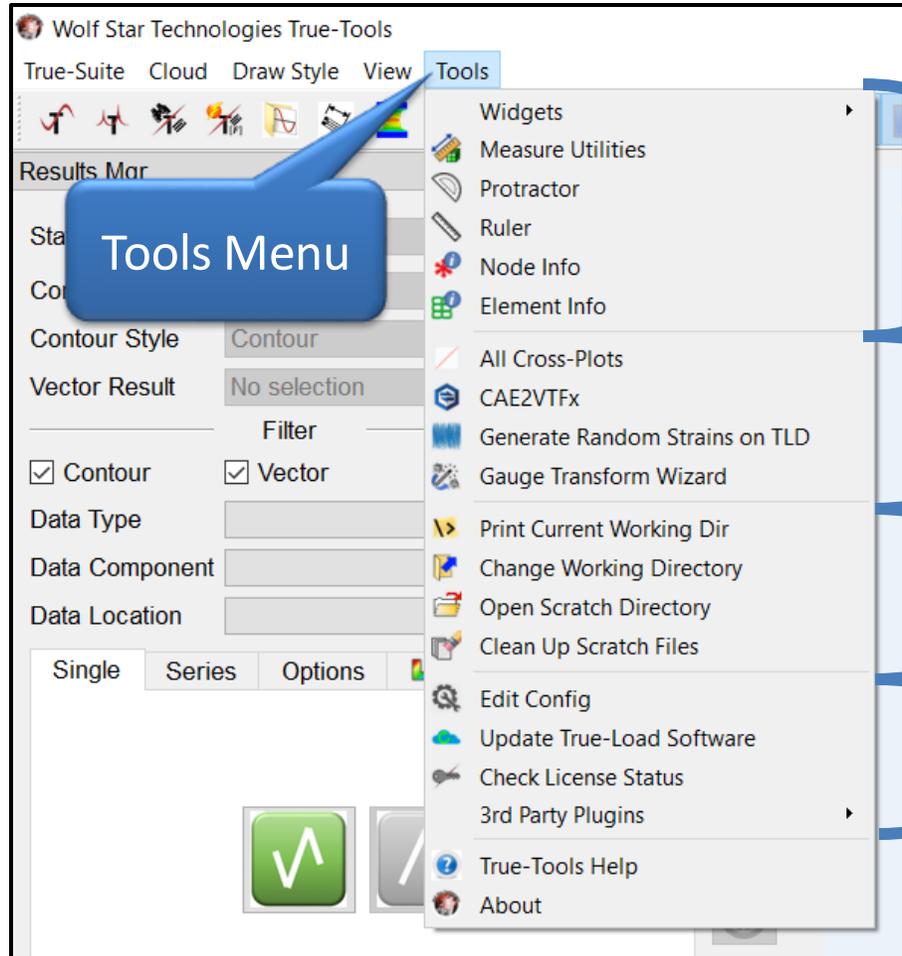


# Reorganize Tools Menu





# Reorganize Tools Menu



Model Measurement and Probe Tools

True-Load Tools

Directory / File Management Tools

Application Software Tools



# Scratch Files





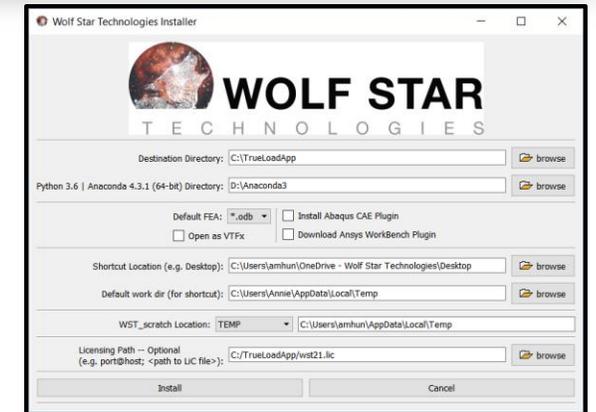
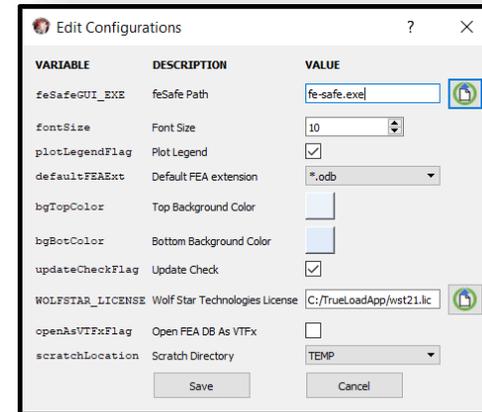
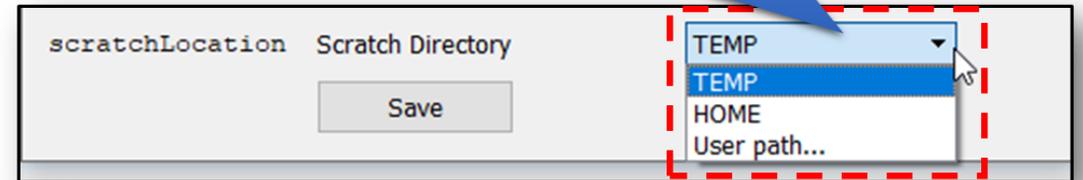
# Scratch Files Restructured

Scratch files are now less intrusive.

They are kept out of the working directory by default and deleted after two days.

Scratch files are now stored in the system **TEMP** folder by default. The True-Load scratch folder can be changed in the installer, in the edit configurations form (Tools menu), or in the configuration file (config.py) directly.

Scratch file location menu



In the chosen scratch location, there is a top-level folder called "WST\_scratch". A folder for each True-Load session is created in "WST\_scratch". Files shared between sessions are in the top-level "WST\_scratch" folder.





# Show Scratch Directory

The current scratch file folder can be viewed with the **Open Scratch Directory** option in the Tools Menu.

The screenshot illustrates the process of opening the scratch directory. In the True-Tools application, the 'Tools' menu is open, and the 'Open Scratch Directory' option is highlighted with a red dashed box and a blue callout bubble labeled '2'. A blue arrow points from this option to a Windows File Explorer window. The File Explorer window shows the path 'Local > Temp > WST\_scratch > WST\_scratch\_25124' and contains a single file named 'WST\_logFile.txt' with a size of 0 KB. A blue callout bubble labeled '1' points to the 'Tools' menu in the application, and another blue callout bubble labeled 'Open Scratch Directory' points to the menu item. A third blue callout bubble labeled 'Current scratch folder' points to the File Explorer window. The console output at the bottom of the application shows the following text:

```
>>> Scratch file top directory:
>>> Scratch file process direct
>>> Working directory:
Cleaning o
Legacy format:
Old process(es):
```



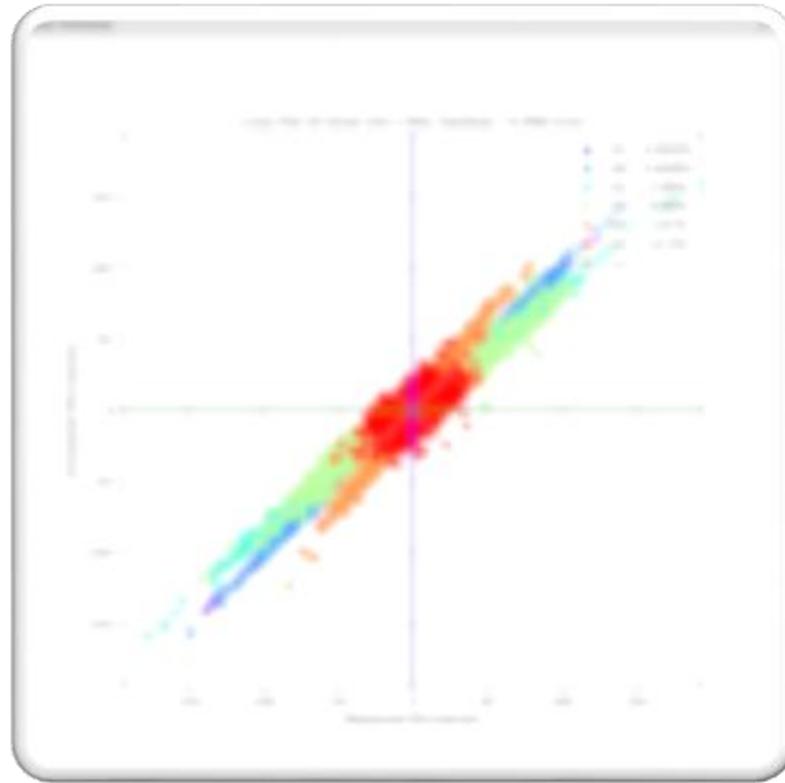


# Scratch Files Restructured

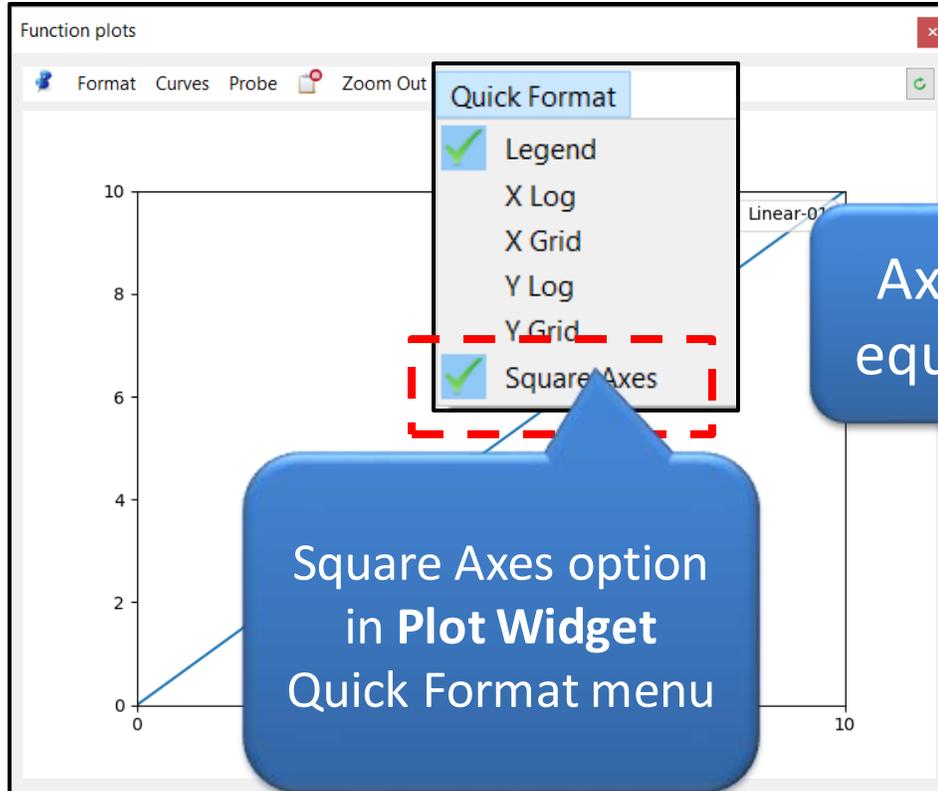
- Work folders containing WST\_\* files will be purged of these files (moved to trash).
- The Scratch folders in the system WST\_scratch directory will be purged (moved to trash) if they are older than 2 days old.
- This makes the work directory look much cleaner.
- This aligns with the way most other software work.
- Huge advantage with this method:
  - Multiple sessions of True-Load can be run from the same directory.
  - Previously, session of True-Load in the same directly could clobber WST\_\* scratch files.
- To view the log file:
  1. Choose Tools->Open Scratch Directory
  2. Open the WST\_logFile.txt



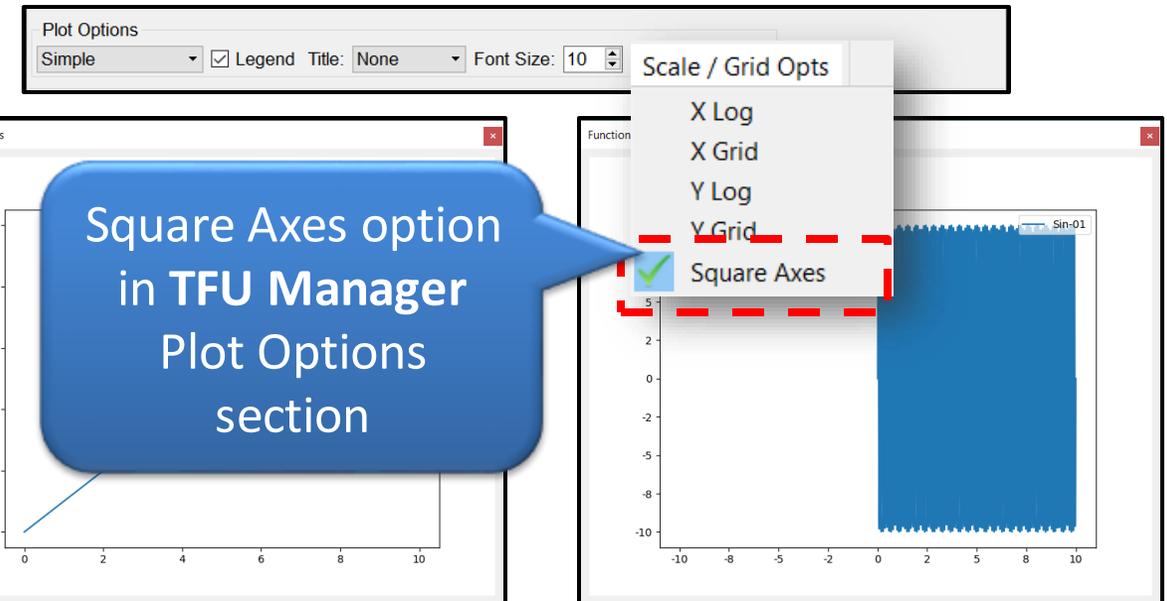
# Square Axis Plotting



# Square Axis Plotting

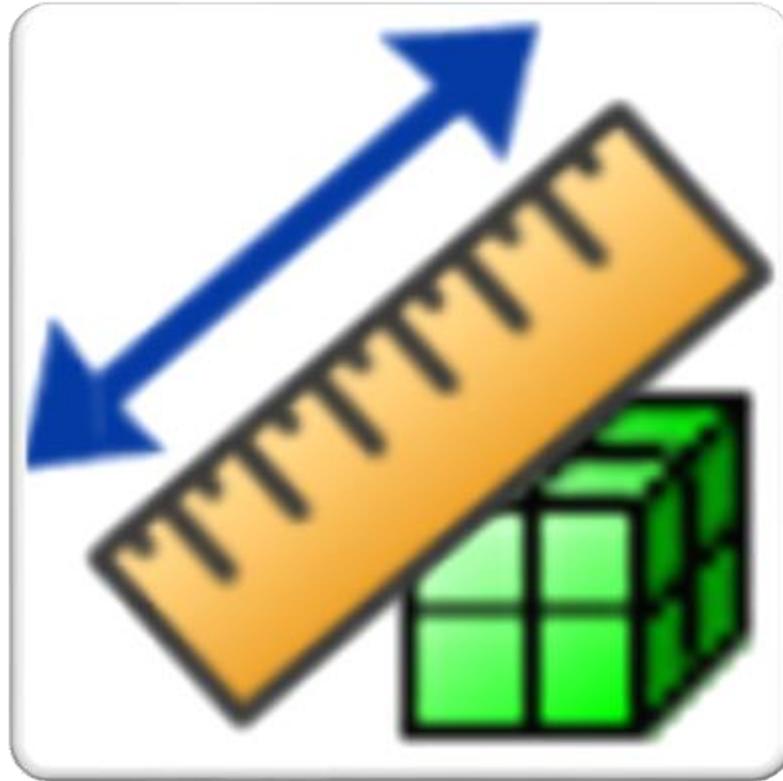


The Square Axes option gives the x and y axes equal limits. Equal axes are persistent even when the axis limits are changed with the format menu or the drag and drop resize.



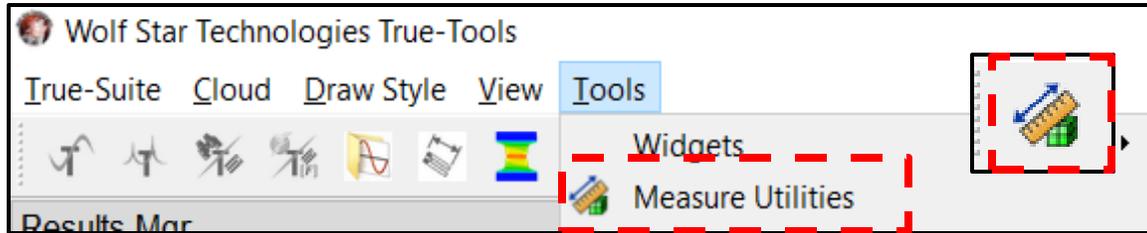
The square axes option is also exposed to the Python scripting environment through the `Plot.squareAxes` attribute. `Plot.squareAxes` is a Boolean setting the axes equal when True.

# Measure Element to Element



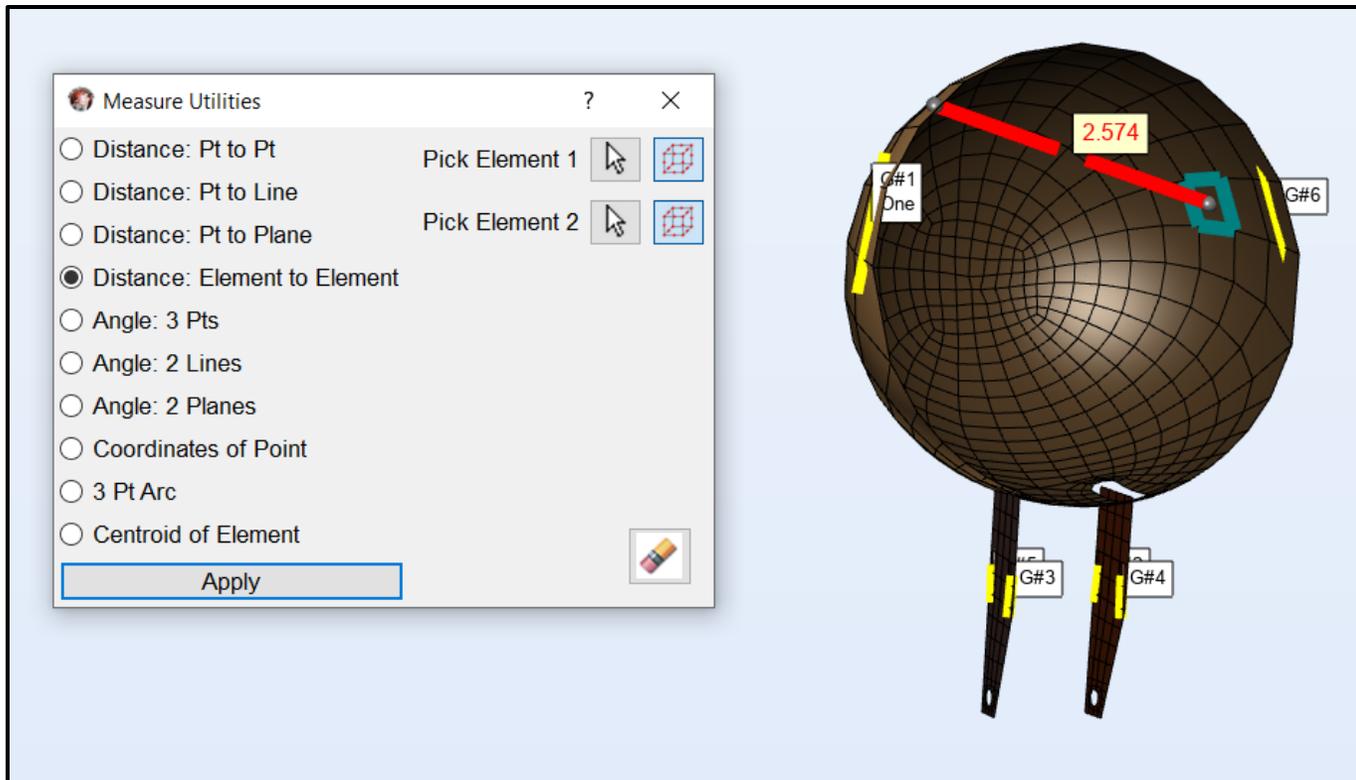


# Measure Element to Element



Element to element measuring is available in Measure Utilities.

The element selected will be outlined and the centroid of the element displayed. The centroid of each element is used for calculations.

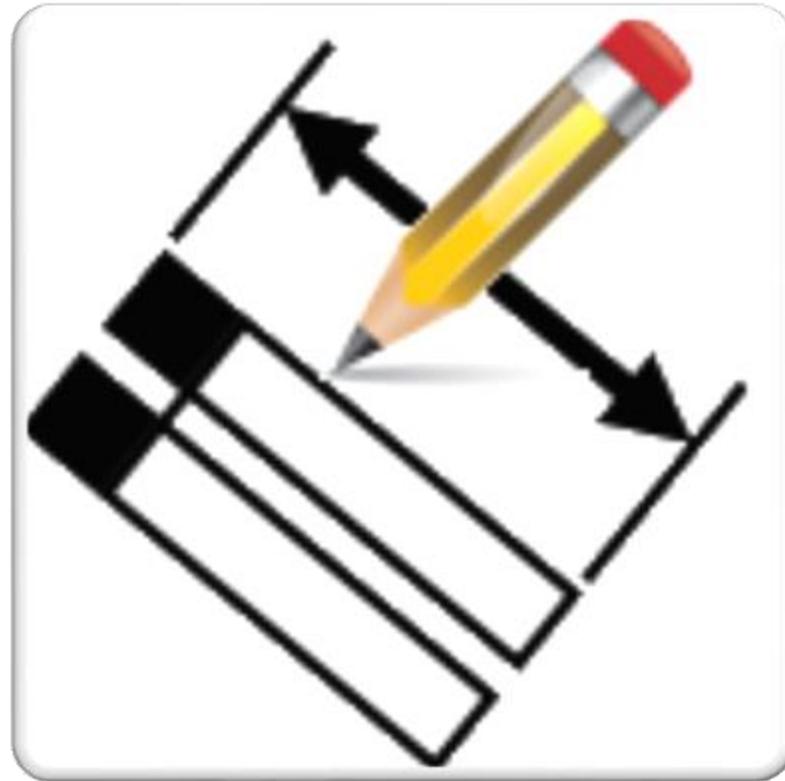


## Console Output

```
-----  
-----  
pt01 = [-0.15315524, +1.19834372, +1.05302842]  
pt02 = [-0.87112546, +0.54718163, -1.33124644]  
d01 = 2.5737637614719246  
midPt01 = [-0.51214035, +0.87276268, -0.13910901]  
vec01 = [-0.71797022, -0.65116210, -2.38427486]  
dx01 = -0.717970222234726  
dy01 = -0.6511620953679085  
dz01 = -2.3842748552560806  
-----  
-----
```



# Reload Dim Params





# Auto Saving Parameters

Dimension Gauges

Dim File: <untitled>

Geometry File: D:\scratch\Cork Screw\FEA\corkscrew\_sim1-unitloads.op2

TLD File: D:\scratch\Cork Screw\TLD Files\corkScrewH2.tld

Shells Only

Labels Only

Gauge	Lin Plane 1	Lin Plane 2	Angle Plane	Gauge Label
G#01	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
G#02	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
G#03	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
G#04	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Text Attributes

Font Size: 16 Color: [Red]

Decimal Places: 3

Background  None  Color: [White]

Location: Middle

Line Attributes

Arrows: |<-- x.xx -->|

Width: 10 px Color: [Blue]

Gauge Attributes

Length: 0.5 Width: 10 px Color: [Red]

Preview Save

<Home Dir> WST\_userFiles

- User Views
- icon\_Try1\_24x24.png
- icon\_Try2\_24x24.png
- userMats.pkl
- userViews.pkl
- WST\_dimensionMgr\_settings.bin
- WST\_recentFiles.bin

Location of settings file

Parameters saved when Dimensions are saved.





# Reload Dimension Attributes

Previously saved attributes are reloaded

Dimension Gauges

Dim File: <untitled>

Geometry File: C:/scratch/ceeTron\_dev/Code Test/headlamp-G-loads.odb

TLD File: C:/scratch/ceeTron\_dev/Code Test/odbNormal.tld

Create Dimension | Modify Dimension | Auto Dimension

Dimensions

Gauge: G#01

Dimension Type: Linear

Reference Plane: [Selection]

Offset: +/- 1.0

Preview Save

Text Attributes

Font Size: 12 Color: [Light Blue]

Decimal Places: 0

Background  None  Color: [White]

Location: Middle

Line Attributes

Arrows: <-- x.xx -->

Width: 10 px Color: [Blue]

Gauge Attributes

Length: 0.25 Width: 10 px Color: [Red]

Help Options

©2010, Wolf Star Technologies ALL RIGHTS RESERVED Version: Ceetron 2023-10-12

Auto Dimension

Dimensions

Gauge: G#01

Dimension Type: Linear

Reference Plane: [Selection]

Offset: +/- 1.0

Preview Save

Text Attributes

Font Size: 12 Color: [Red]

Decimal Places: 1

Background  None  Color: [White]

Location: Ref Plane End

Line Attributes

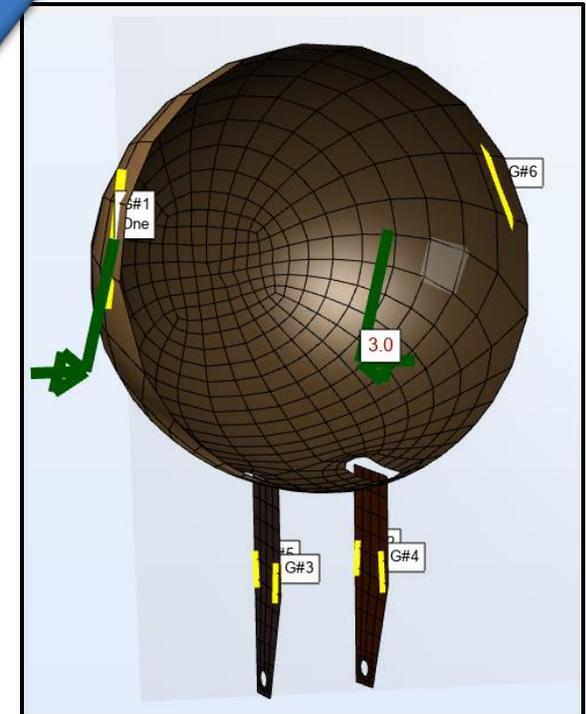
Arrows: -->| x.xx |<--

Width: 10 px Color: [Green]

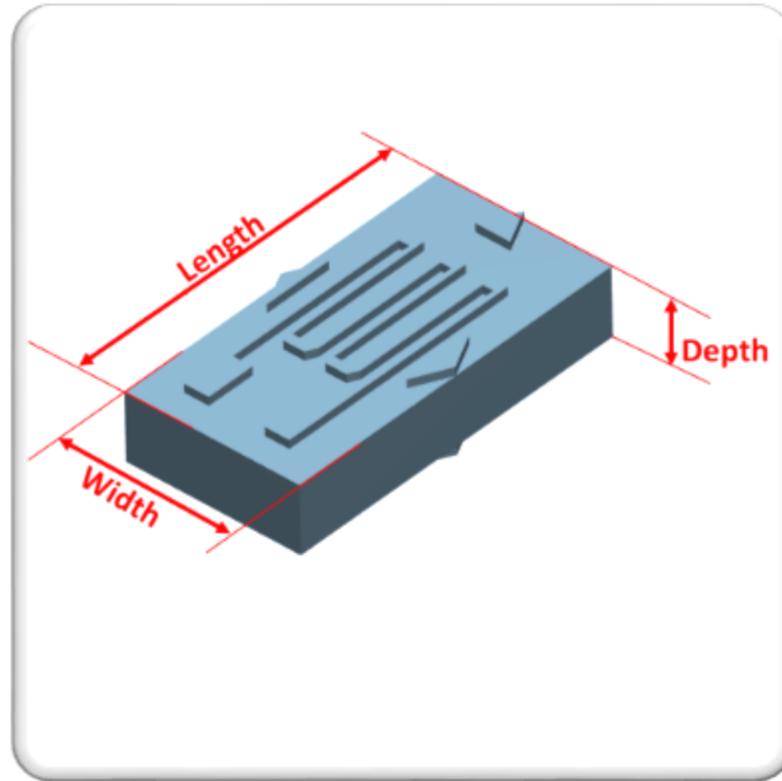
Gauge Attributes

Length: 0.25 Width: 10 px Color: [Black]

on: Ceetron 2023-10-12



# STL Gauges





# Strain Gauge STL Export

Gauge Line Specifications

Export Type:  Gauge Line CSV  3 Point CSV  Punch XML  3D STL  Process GOIs

Output: C:\Program Files\Code Test

Gauge Box

Punch XML 3D STL

The STL file is used for importing gauges into CAD Systems. This is a 3D solid faceted representation of the gauges.

Length: 14.0

Width: 6.9 49 %

Depth: 2.8000000000000000 20 %

250UWA

250UWA

125UWA

S5145

Inches  Millimeters

Feet  Meters

One STL per Gauge  STL with all Gauges

Apply Cancel

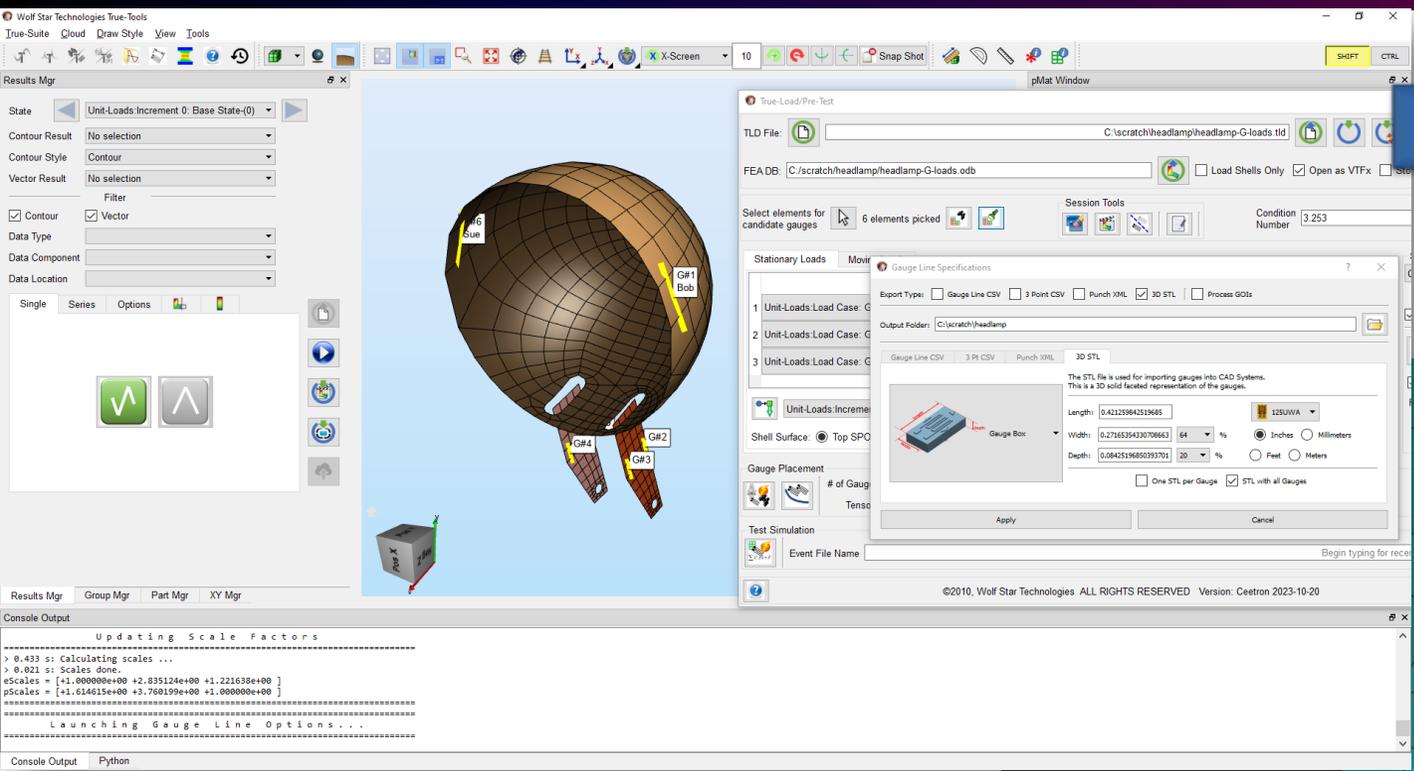
Standard gauge shapes with units are available in the “Gauge Box” option. The Gauge Box STL export offers strain gauge shapes and units to choose from.

Gauge specifications from <https://micro-measurements.com/pca/>

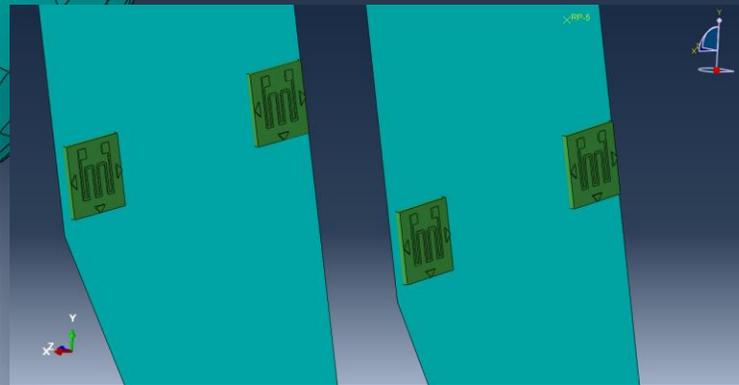
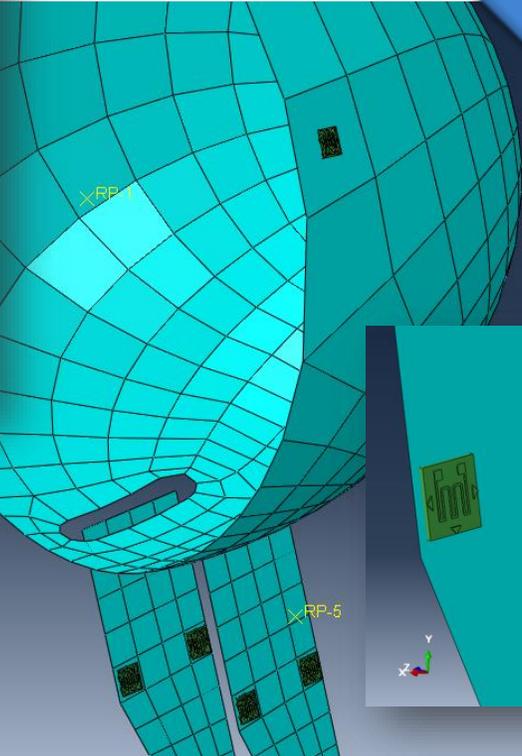




# Visualize Gauges on Part



CAD / FEA Application



# Post- Purge Intermediate Files

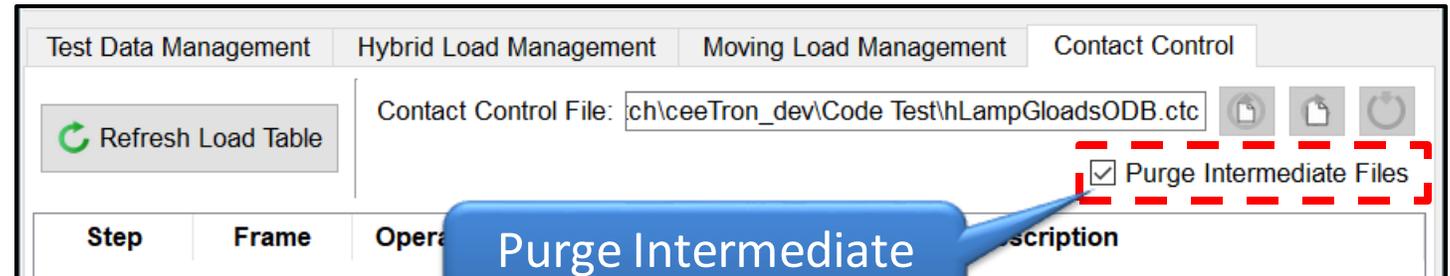
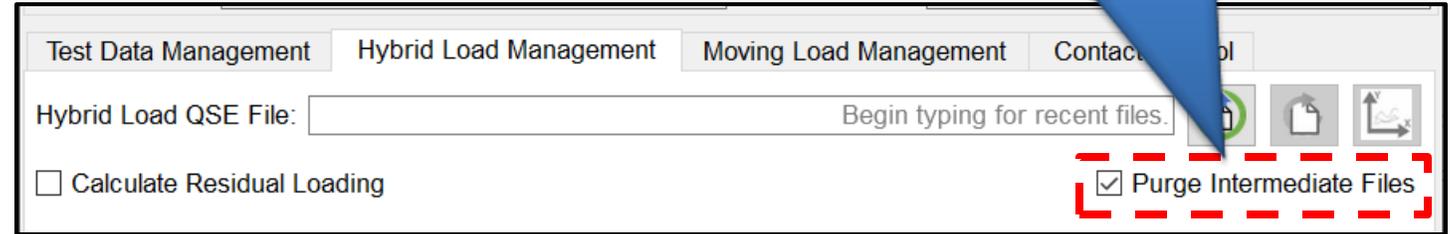




# Purge Intermediate Files Hybrid and Contact Control

The Hybrid Loading and Contact Control processes create intermediate files. The "Purge Intermediate Files" checkbox in each tab moves all auxiliary files to the system trash, leaving only the result files.

Purge Intermediate  
Files Option



Purge Intermediate  
Files Option





# Hybrid Example

Starter files before Post-Test

File Explorer window showing the directory path: <code>scratch > ceeTron\_dev > Code Test > Benchmark 2023 > Scooter > Test Data > Hybrid</code>. The file list contains the following items:

Name	Date	Type
GOI_Test_01.tfu	10/15/2023 6:19 AM	TFU File
known_01.grp	9/29/2023 12:11 PM	Microsoft Program Gro
known_01.qse	9/29/2023 12:11 PM	QSE File
known_01.tfu	9/29/2023 12:11 PM	TFU File

Strain Data

Known Loads QSE





# Hybrid Example

Purge Intermediate Files Option - UnChecked

Name	Date modified
razorScooter_GOI-hybrid-GOI_Test_01-pics	10/20/2023 3:21 PM
GOI_Test_01.tfu	10/15/2023 6:19 AM
hybrid-GOI_Test_01.tfu	10/20/2023 3:21 PM
known_01.grp	9/29/2023 12:11 PM
known_01.qse	9/29/2023 12:11 PM
known_01.tfu	9/29/2023 12:11 PM
razorScooter_GOI-hybrid-GOI_Test_01.html	10/20/2023 3:23 PM
razorScooter_GOI-hybrid-GOI_Test_01.qse	10/20/2023 3:23 PM
razorScooter_GOI-hybrid-GOI_Test_01.tfu	10/20/2023 3:23 PM
razorScooter_GOI-hybrid-GOI_Test_01-SimMes.tfu	10/20/2023 3:23 PM
SimTest-hybrid-razorScooter_GOI.csv	10/20/2023 3:21 PM
SimTest-hybrid-razorScooter_GOI.tfu	10/20/2023 3:21 PM

Purge Intermediate Files Option - Checked

Name	Date modified
razorScooter_GOI-hybrid-GOI_Test_01-pics	10/20/2023 3:26 PM
GOI_Test_01.tfu	10/15/2023 6:19 AM
known_01.grp	9/29/2023 12:11 PM
known_01.qse	9/29/2023 12:11 PM
known_01.tfu	9/29/2023 12:11 PM
razorScooter_GOI-hybrid-GOI_Test_01.html	10/20/2023 3:29 PM
razorScooter_GOI-hybrid-GOI_Test_01.qse	10/20/2023 3:29 PM
razorScooter_GOI-hybrid-GOI_Test_01.tfu	10/20/2023 3:29 PM
razorScooter_GOI-hybrid-GOI_Test_01-SimMes.tfu	10/20/2023 3:29 PM

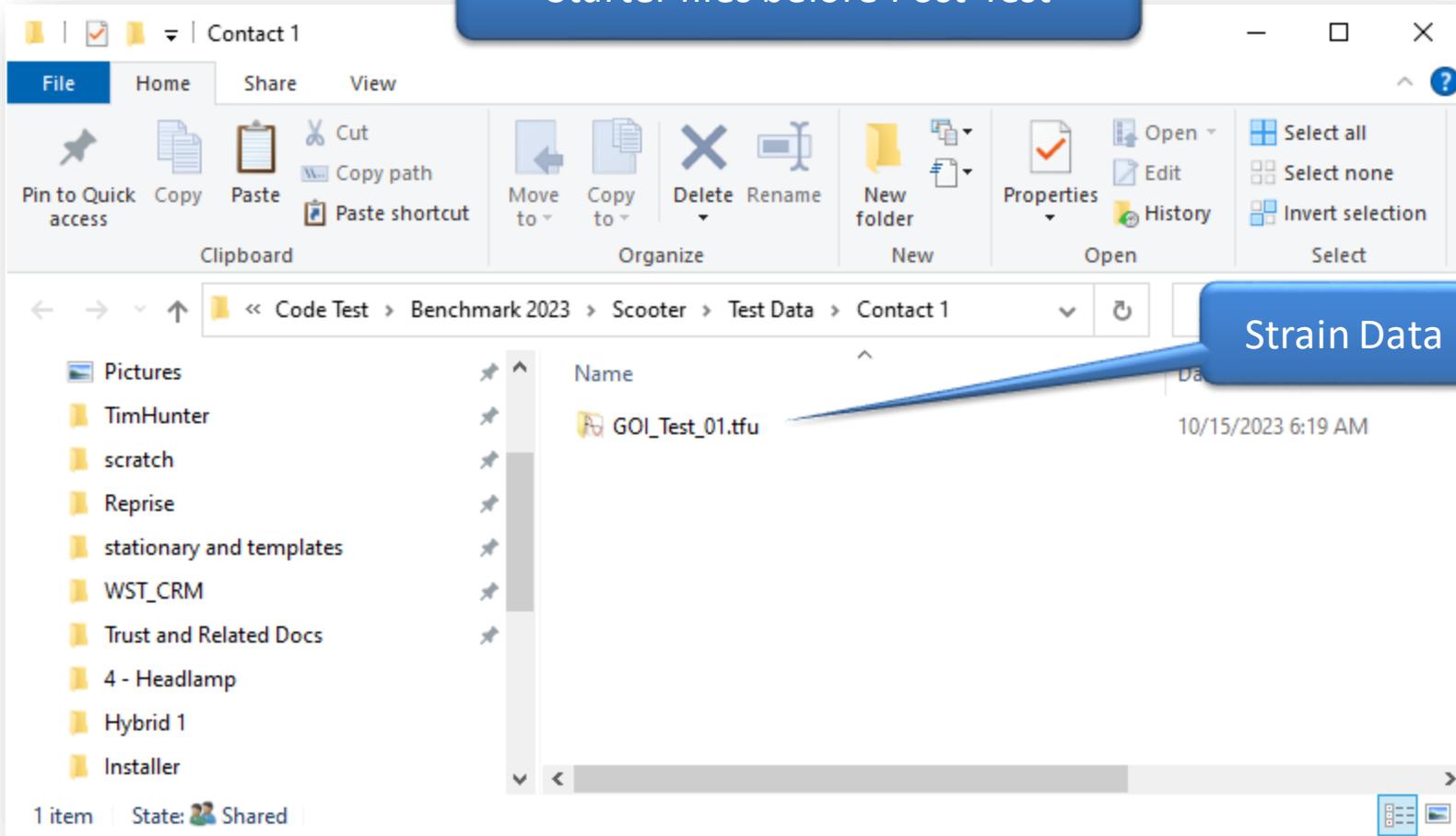
Intermediate Files





# Contact Control Example

Starter files before Post-Test



Strain Data





# Contact Control Example

Purge Intermediate Files Option - UnChecked

Name	Date modified
razorScooter_GOI-GOI_Test_01-pics	10/20/2023 3:39 PM
razorScooter_GOI-hybrid-GOI_Test_01-pics	10/20/2023 3:26 PM
Ctrl-razorScooter_GOI-GOI_Test_01.qse	10/20/2023 3:39 PM
Ctrl-razorScooter_GOI-GOI_Test_01.tfu	10/20/2023 3:39 PM
GOI_Test_01.tfu	10/15/2023 6:19 AM
razorScooter_GOI-GOI_Test_01.grp	10/20/2023 3:39 PM
razorScooter_GOI-GOI_Test_01.html	10/20/2023 3:39 PM
razorScooter_GOI-GOI_Test_01.qse	10/20/2023 3:39 PM
razorScooter_GOI-GOI_Test_01.tfu	10/20/2023 3:39 PM
razorScooter_GOI-GOI_Test_01-SimMes.tfu	10/20/2023 3:40 PM
razorScooter_GOI-hybrid-GOI_Test_01.html	10/20/2023 3:44 PM
razorScooter_GOI-hybrid-GOI_Test_01.qse	10/20/2023 3:44 PM
razorScooter_GOI-hybrid-GOI_Test_01.tfu	10/20/2023 3:44 PM
razorScooter_GOI-hybrid-GOI_Test_01-SimMes.tfu	10/20/2023 3:44 PM

Purge Intermediate Files Option - Checked

Name	Date modified
razorScooter_GOI-hybrid-GOI_Test_01-pics	10/20/2023 3:50 PM
GOI_Test_01.tfu	10/15/2023 6:19 AM
razorScooter_GOI-hybrid-GOI_Test_01.html	10/20/2023 3:52 PM
razorScooter_GOI-hybrid-GOI_Test_01.qse	10/20/2023 3:52 PM
razorScooter_GOI-hybrid-GOI_Test_01.tfu	10/20/2023 3:52 PM
razorScooter_GOI-hybrid-GOI_Test_01-SimMes.tfu	10/20/2023 3:52 PM

Intermediate Files





# Purge Intermediate Files Benefits

- Saves disk space from unneeded files
- Greatly reduces confusion in interpreting results. I have had customers use the wrong files after Contact Control, because they didn't understand which file was the "Answer".



# FEA Browse





# QSE: Browse for DB

True-QSE

Event (QSE) File:

FEA DB:

Event Definition

FEA: Step	FEA: Frame	Scale Factor	Model
1 Unit-Loads:Load Case: GRAV-10GX-(1)	1001	1.0	<TFU File> SimTe
2 Unit-Loads:Load Case: GRAV-10GX-(2)	1002		<TFU File> SimTe
3 Unit-Loads:Load			SimTe

Step: Unit-Loads:Incremer Scale: 1. Amplitude: SimTest-try1\_tfu==>U

Results Generation

Include Pre-Load

Add Pre-Load

Subtract Pre-Load

Pre-Load State:

Unit-Loads:Increment 0: Base State-l

Help Options

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Select model files

Windows (C:) > scratch > ceeTron\_dev > Code Test

Organize New folder

Name	Date	Type
Multi	9/7/2023 9:49 AM	File fol
Time	8/30/2023 11:04 AM	File fol
hLamp	8/21/2023 8:55 AM	File fol
STL F	8/16/2023 11:15 AM	File fol
razor	5/10/2023 3:37 PM	File fol
razor	5/10/2023 3:36 PM	File fol
Contac	5/10/2023 2:10 PM	File fol
hLampLoadsODB-hybrid-SimTest-try1	4/27/2023 9:11 AM	File fol
annieTestGaugeName-SimTest-try1-D4-D5-p	4/27/2023 9:04 AM	File fol
__pycache__	4/5/2023 9:39 AM	File fol
WST_scratch	4/5/2023 9:23 AM	File fol
New---	4/4/2023 8:52 AM	File fol
Scratch files	4/4/2023 8:03 AM	File fol
ANI TEST	3/29/2023 3:57 PM	File fol
hLamp_LoadCOL_hLampLoadsODB_drop0_SimTest-try1_SimMe	3/29/2023 3:25 PM	File fol

File name:  ABAQUS ODB File (\*.odb)

Open Cancel

Filtered on Current FEA DB File Type

Browse for new FEA DB





# Pre: Browse for DB

The image shows the True-Load/Pre-Test software interface. The 'FEA DB' field is set to 'C:\scratch\ceeTron\_dev\Code Test\headlamp-G-loads.odb'. A blue callout bubble with the text 'Browse for new FEA DB' points to a button in the 'Session Tools' section. Overlaid on this is a 'Select model files' dialog box. The dialog box shows a file list filtered by type. A second blue callout bubble with the text 'Filtered on Current FEA DB File Type' points to the file type dropdown menu, which is currently set to 'ABAQUS ODB File (\*.odb)'. The 'File name' field is empty, and the 'Open' and 'Cancel' buttons are visible at the bottom.

Name	Date	Type
	9/7/2023 9:49 AM	File folder
	8/30/2023 11:04 AM	File folder
	8/21/2023 8:55 AM	File folder
	8/16/2023 11:15 AM	File folder
	5/10/2023 3:37 PM	File folder
	5/10/2023 3:36 PM	File folder
	5/10/2023 2:10 PM	File folder
Contact Control Test	5/10/2023 2:10 PM	File folder
hLampGloadsODB-hybrid-SimTest-try	4/27/2023 9:11 AM	File folder
annieTestGaugeName-SimTest-try1-D4-D5	4/27/2023 9:04 AM	File folder
__pycache__	4/5/2023 9:39 AM	File folder
WST_scratch	5/7/2023 9:23 AM	File folder
New---	5/7/2023 8:52 AM	File folder
Scratch files	4/4/2023 8:03 AM	File folder
ANI TEST	3/29/2023 7:57 PM	File folder
hLamp_TlandCOL_hLampGloadsODB_drop0_SimTest	3/29/2023 3:55 PM	File folder

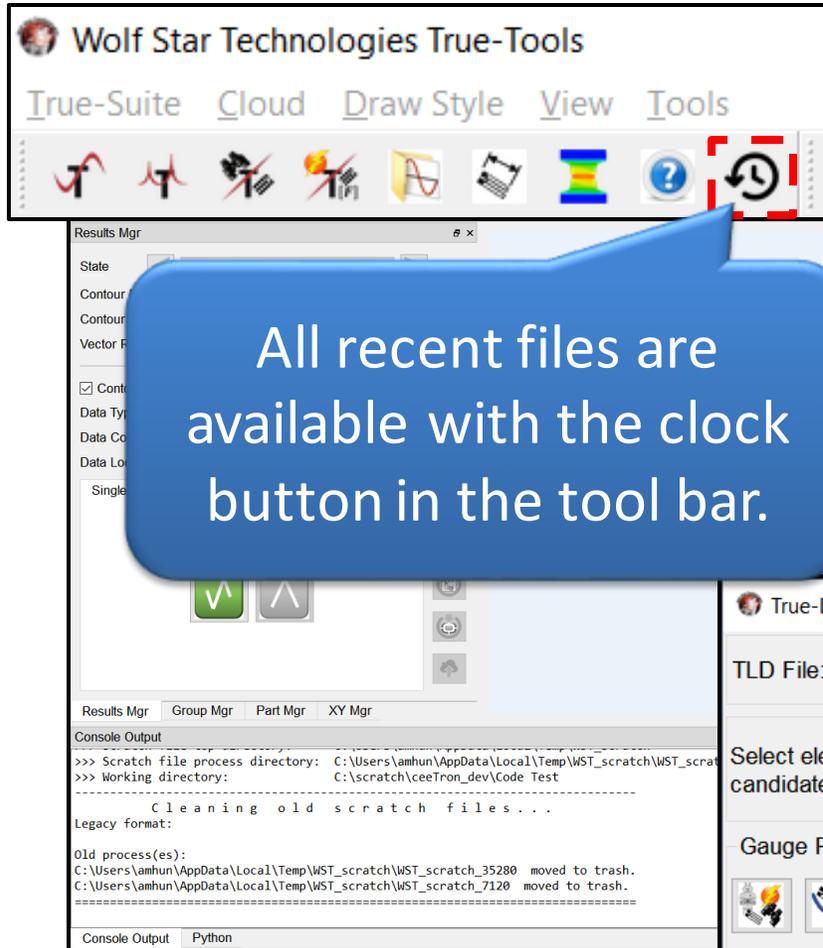


# Recent Files





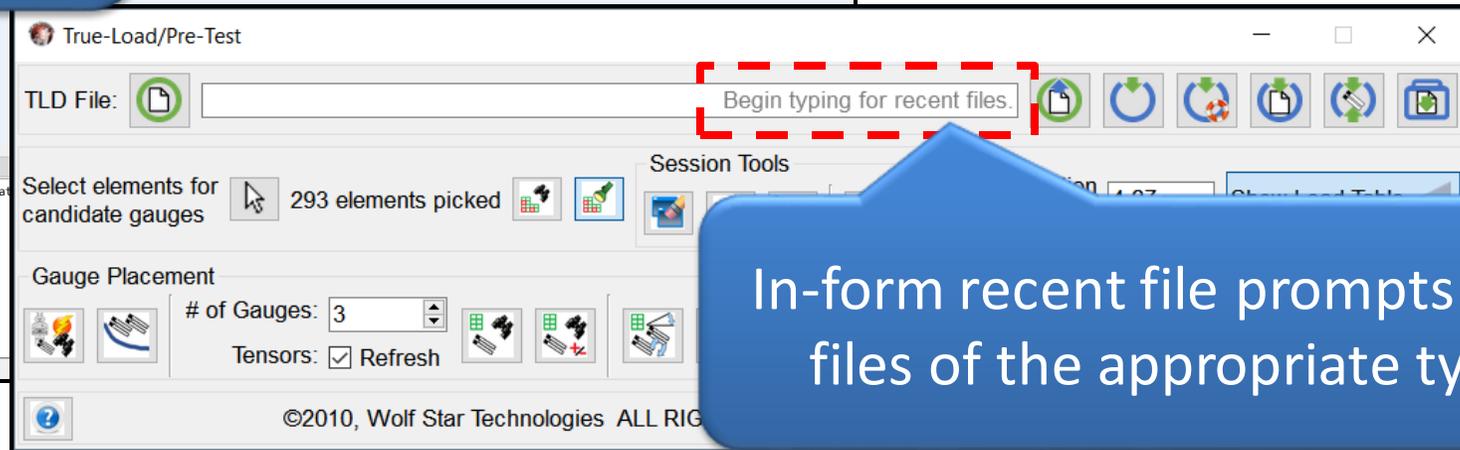
# Recent Files



Recently used files are available for quick loading throughout the True-Load environment (persistent across sessions).

Recent files are available anywhere there is a recent file prompt ("Begin typing for recent files.") or a clock icon.

The 10 most recent files for each category are displayed.





# Recent Files

Recent files menus with the clock icon show paths relative to the working directory. Hovering shows the full file path.

Relative File Path

Wolf Star Technologies True-Tools

True-Suite Cloud Draw Style View Tools Debug Tools

Results Mgr

State Increment 0: Base S

Contour Result No selection

Contour Style Contour

Vector Result No selection

Filter

Contour  Vector

Data Type

Data Component

Data Location

- Contact Control Test\razorScooter\_update-newTest.qse
- LDE Files\hLamp-Time.Ide
- odbNormal.tld
- setSquareTest.tfu
- hLampGloadsODB.tfu
- hLampGloadsODB.tld
- Razor Scooter\razo
- hLampGloadsODB-
- noisyData.tfu
- SimTest-try1.tfu

C:\scratch\ceeTron\_dev\Code Test\Contact Control Test\razorScooter\_update-newTest.qse

All Recent Files Menu

Full File Path





# Recent Files

In-field prompts show full paths to recent files when anything is typed in the field.

The screenshot shows the True-Load/Pre-Test software interface. The 'TLD File:' field is highlighted with a red dashed box and contains the text 'Begin typing for recent files.'. A blue callout bubble points to this field with the text 'Recent file prompt'. Another blue callout bubble points to the text 'Type anything' above the field. Below the field, a list of recent TLD files is displayed, with a blue callout bubble pointing to the list and the text 'Recent TLD files'. The interface also shows a 'Select elements for candidate gauges' section with 293 elements, a 'Gauge Placement' section with 3 gauges, and a 'Tensors: Refresh' checkbox. The footer of the software window reads '©2010, Wolf Star Technologies ALL RIGHTS RESERVED Version: C'.





# Recent Files – Python Scripts

Select a recent file from a menu with a click or arrow and ENTER keys.

OR

Clicking a file in a recent files menu within a module opens it in that module.

```
Python
Scripts\plotMany.py
Scripts\plotFunction.py
Scripts\helloWorld.py
C:\scratch\ceeTron_dev\Code Test\Scripts\helloWorld.py
>>>
```

```
Python
runcode(open('C:\scratch\ceeTron_dev\Code Test\Scripts\helloWor:'))
<
>>>
```

```
Console Output
-----
Loading Groups...
-----
Storing: WST_Gauges
Storing: WST_Candidates
-----
Groups loaded
-----
>>> Checking in Reprise...
>>> Reprise Check In OK
>>>
Module:True-Load
>>> Reprise Check In Status:0
Hello World
```





# Recent Files

The image shows three overlapping screenshots of the True-Load/Pre-Test software interface, illustrating the process of selecting a recent file. The top screenshot shows the 'TLD File' field with a prompt 'Begin typing for recent files'. The middle screenshot shows a dropdown menu with several file paths, including 'C:\scratch\ceeTron\_dev\Code Test\odbNormal.tld' and 'C:\scratch\ceeTron\_dev\Code Test\hLampGloadsODB.tld'. The bottom screenshot shows the same dropdown menu with 'C:\scratch\ceeTron\_dev\Code Test\hLampGloadsODB.tld' selected. A blue callout box with a mouse cursor icon and the word 'OR' is positioned over the selected file path. Below the callout box is a keyboard icon.

Select a recent file from a prompt with a click or arrow and ENTER keys.

OR





# Recent Files From True-Load Desktop

Tools

Contact Control Test\razorScooter\_update-newTest.qse

LDE Files\hLamp-Time.Ide

odbNormal.tld

setSquareTest

hLampGloads

hLampGloadsODB.tld

Razor Scooter\razorScooter\_update.tld

hLampGloadsODB-SimTest-try1.qse

noisyData.tfu

SimTest-try1.tfu

True-Load/Pre-Test

TLD File: C:\scratch\ceeTron\_dev\Code Test\hLampGloadsODB.tld

FEA: C:\scratch\ceeTron\_dev\Code Test\headlamp-G-loads-ODB.odb

Load Shells Only  Open as VTFx  Store FEA DB Relative Path

Select elements for candidate gauges 293 elements picked

Condition Number 4.27

Stationary Loads Moving Loads

Step	Frame	Scale Factor
1 Unit-Loads:Load Case: GRAV-10GX-(1)	1001	1.28322147179344
2 Unit-Loads:Load Case: GRAV-10GY-(2)	1002	3.693800501153427
3 Unit-Loads:Load Case: GRAV-10GZ-(3)	1003	1.0

Unit-Loads:Increment 0: Base State-(0) Scale: 1.0

Shell Surface:  Top SPOS  Bottom SNEG Min Distance between Gauges: 0.0

Gauge Placement # of Gauges: 3 Tensors:  Refresh

Test Simulation Event File Name C:\scratch\ceeTron\_dev\Code Test\hLampGloadsODB-hLampGloadsODB-D4-D5.qse

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Selecting a file in the All Recent Files menu opens that file in its associated module.

If a file type is used in multiple modules, the most common module is chosen. For example, TLD files are opened in True-Load/Pre-Test even though they are also used in True-Load/Post-Test.



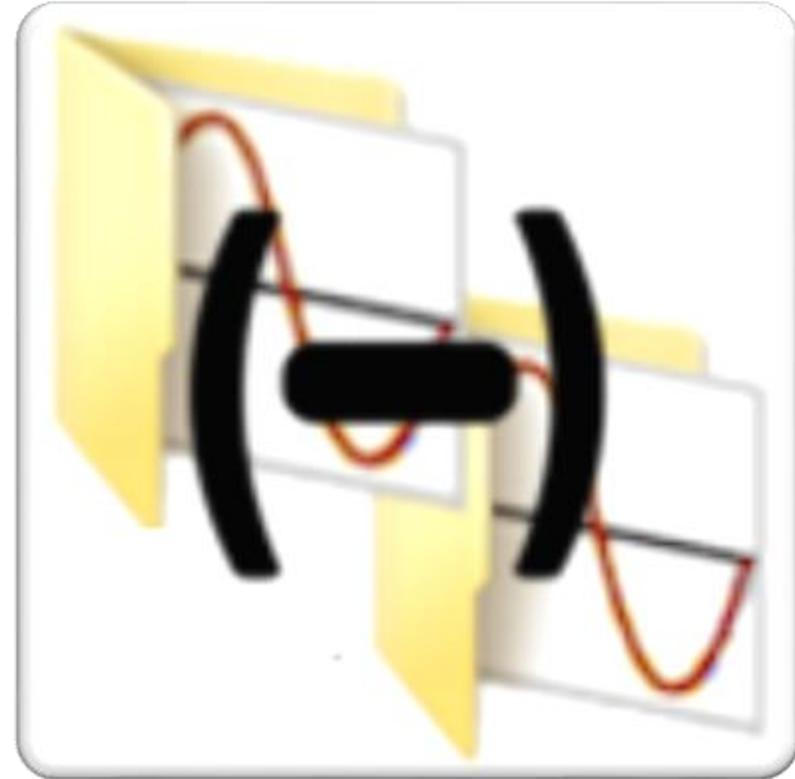


# Recent Files

- Recent files save a lot of time:
  - Folders don't have to be navigated so much
  - If TLD files and Test Data are kept in separate folders, then Post-Test is easier to use with less navigating.
  - This a big speed increase for such common thing that we use.



# Subtract Functions



# Subtract Functions



1 Select functions to operate on

2 Subtract Functions

3 Select function to subtract

4 Okay

Subtract one function from selected functions with the Subtract Functions tool.

# Subtract TFU Files

**Choose files**

**Subtract Files**

**File saved**

Subtract all functions in one file from all functions in another with the Subtract Files tool.

TFU Manager

TFU File

Select

**Subtract TFU Files** ? 2 X

First TFU File: Code Test/noisyData.tfu

Second TFU File: Test/SimTest-try1.tfu

Output TFU File Data\_minus\_SimTest-try1.tfu

Apply 3

Manage Math Import Export

Modify

Plot Options Simple Legend Title: None Font Size: 10 Scale / Grid Opts

Console Output

```
Updating function table ...
=====
Opening C:/scratch/ceeTron_dev/Code Test/noisyData.tfu
Opening C:/scratch/ceeTron_dev/Code Test/SimTest-try1.tfu
Subtracting C:/scratch/ceeTron_dev/Code Test/noisyData.tfu minus C:/scratch/ceeTron_dev/Code Test/SimTest-try1.tfu
>>> C:/scratch/ceeTron_dev/Code Test/noisyData.tfu minus C:/scratch/ceeTron_dev/Code Test/SimTest-try1.tfu saved.
Adding in new channels...
Saving...
C:/scratch/ceeTron_dev/Code Test/noisyData_minus_SimTest-try1.tfu saved.
```

