

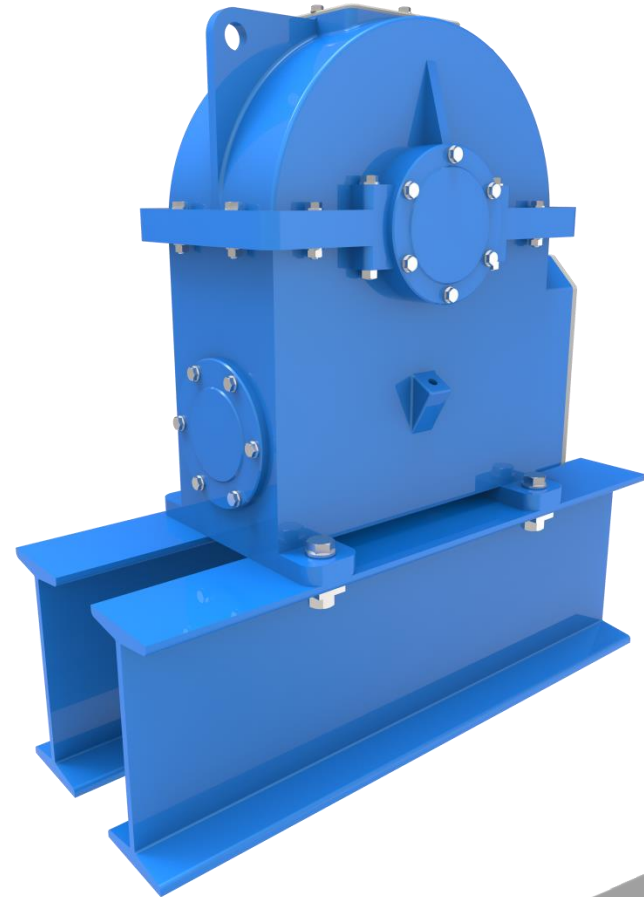
Intelligent Fastener

Basics



Configuration

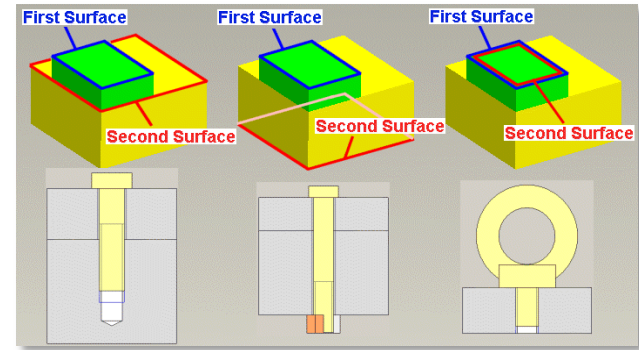
Customizing Library

- Assemble Fasteners
 - Fastener Definition
 - Use of Orientation
 - Inserts
- Edit Fasteners
 - Reassemble
 - Redefine
 - Delete
 - Check
- File structure of IFX
 - configuration
 - parts/screws_and_pins



Fastener Definition

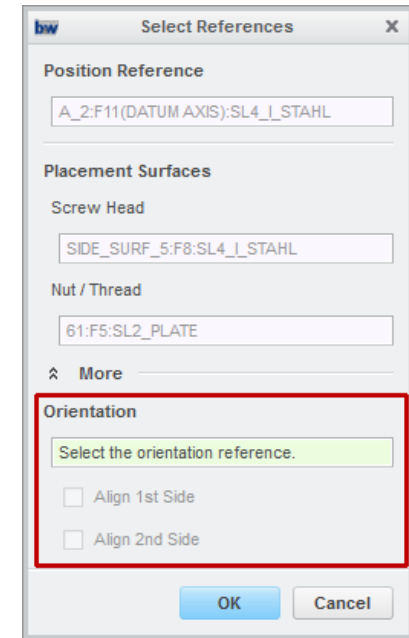
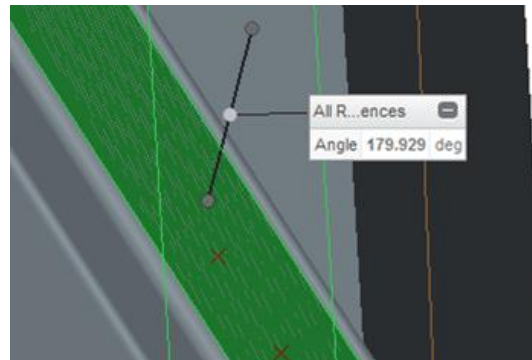
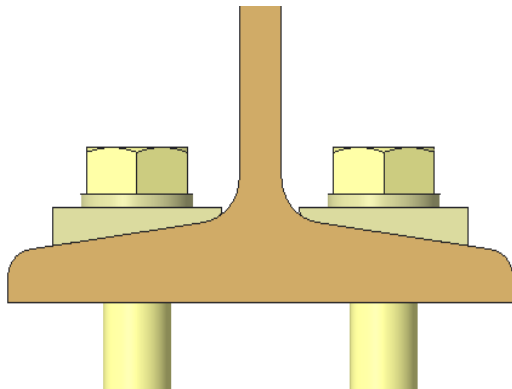
- Select placement references
 - Point, Axis or Cylindrical Surface
 - Single, Pattern or Multi Ref.
 - Surfaces defines connection type
- Configure fastener
 - Measure Diameter 
 - Autolength 
 - Preview
- Select pattern option
- Assemble fastener and create holes
- Questions?



Select References - Orientation

You may need this if the selected surfaces are not parallel.

- Example: I-Beam – with orientation
 - Square Taper Washer for I-Beams
 - Counterbore
 - Use surface only for orientation
- Example: Power Pole – without orientation

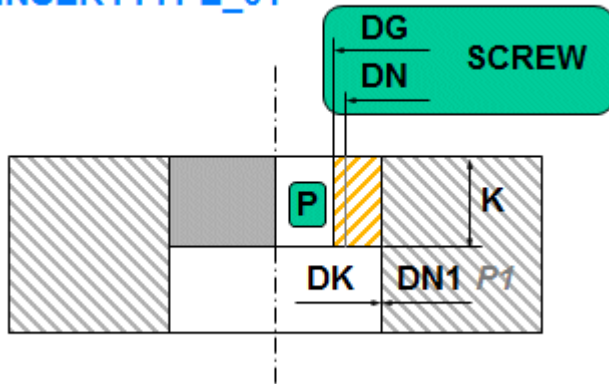


Inserts

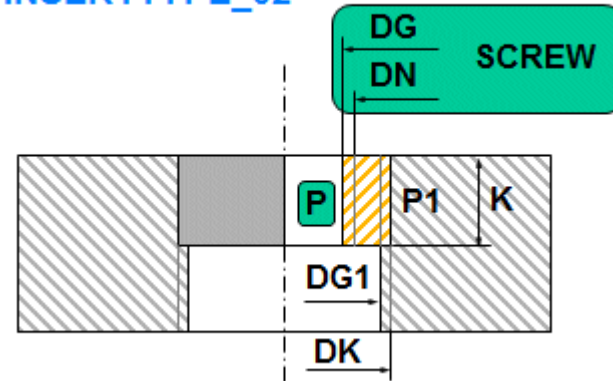
New enhancement – only by request

- Two new insert types
- Special hole files necessary

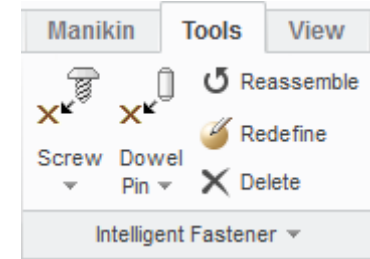
INSERTTYPE_01



INSERTTYPE_02



- Reassemble
 - Reassembled fasteners are “grouped”
- Redefine
- Delete
 - ONLY with IFX Delete! Not with regular Creo functionality.
- Check
 - Verify the length of your screw fasteners.

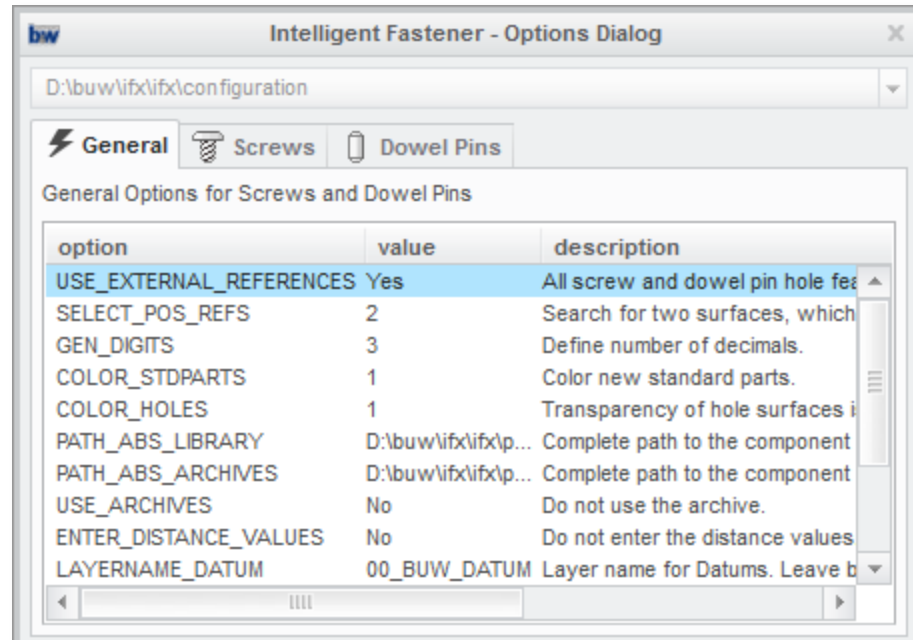
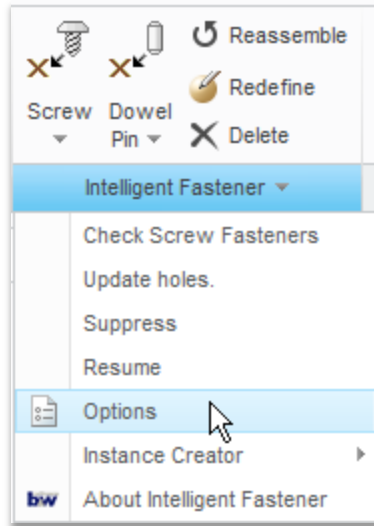


Folder: configuration

- In this folder you find ...
 - configuration files
 - sl_options.cfg
 - sl_data.cfg
 - sl_tolerance.cfg
 - templates for fasteners
 - insert
 - nut
 - pin
 - screw
 - washer

sl_options.cfg

- Contains all IFX options.
- To modify this, use the option dialog only!



sl_data.cfg - **#THREAD**

- If **DG** and **P** are not defined in the fastener *.dat file, then the values are taken from the sl_data.cfg #THREAD list.

- Example:

- *Fastener.dat*
MM / DN=1.6

- *sl_data.cfg*
DG = 1.25
P = 0.35

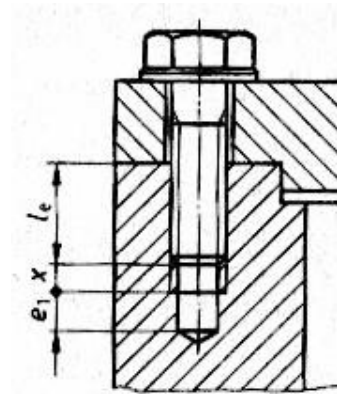
...						
UNI T	MM					
...						
SYMBOL	STRI NG	DN	LG	DK	K	
...						
DI N84- M1_6x2- 4_8	M1.6	1.6	2	3	1.1	

#THREAD	DN	DG	P	
MM	1	0.75	0.25	
...				
MM	1.6	1.25	0.35	
...				

sl_data.cfg - **#RUNOUT**

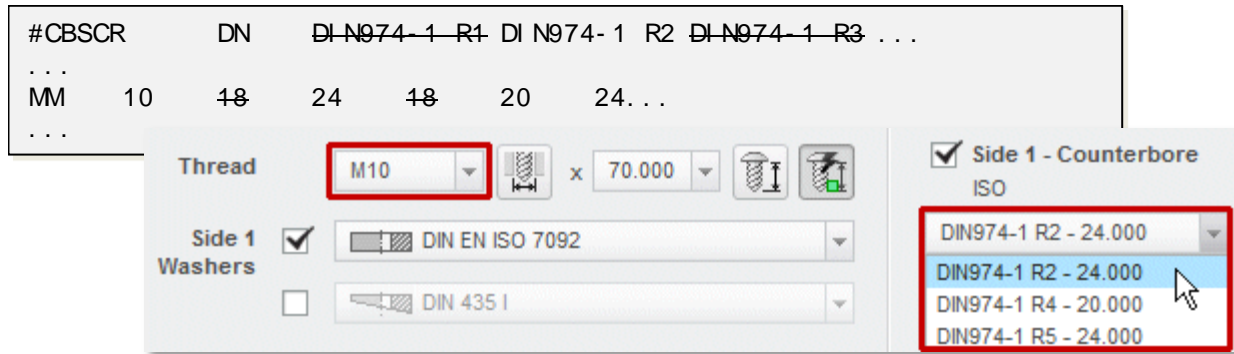
- Defines the **additional** thread depth (X) and the thread runout (E1)

```
!-----  
!   THREAD RUNOUT  
!  
!   X - ADDI TI ONAL THREADDEPTH  
!   E1 - THREAD RUNOUT  
!-----  
#RUNOUT   DN   X   E1  
MM   1   0.75  1.5  
MM   1.2  0.75  1.5  
....
```



sl_data.cfg - **#CBSCR and CBNUT**

- Defines the list for the option menu in the screw definition dialog. If DN is smaller than the head or washer diameter, then the value is not shown in the option menu.



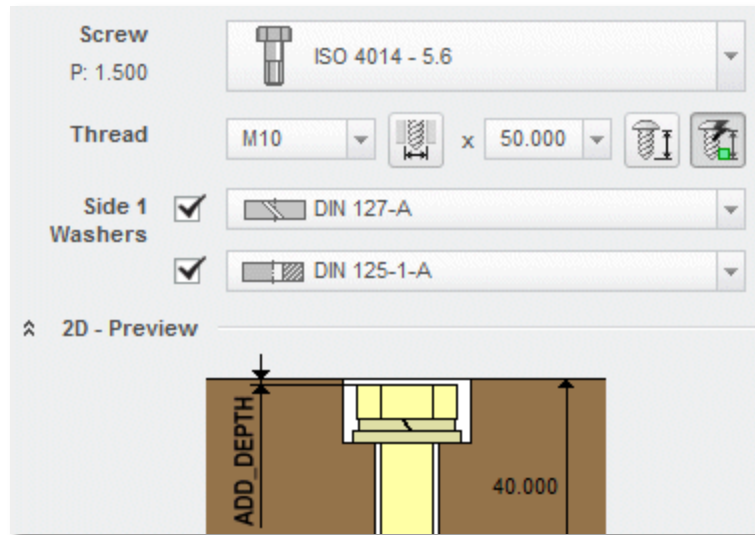
- Set the default you want to use for your fastener in the top of your *.dat file with #CBSCR and #CBNUT.
- Example for a washer:

```
...  
SURFACE      28  
AXIS         71  
CBSCR      DIN974-1 R5  
CBNUT     DIN974-2 R2  
...
```

sl_data.cfg - **#ADDCB**

- $\text{COUNTERBOREDEPTH} = \text{HEADHEIGHT} + \text{WASHERHEIGHT} + \text{ADD_DEPTH}$

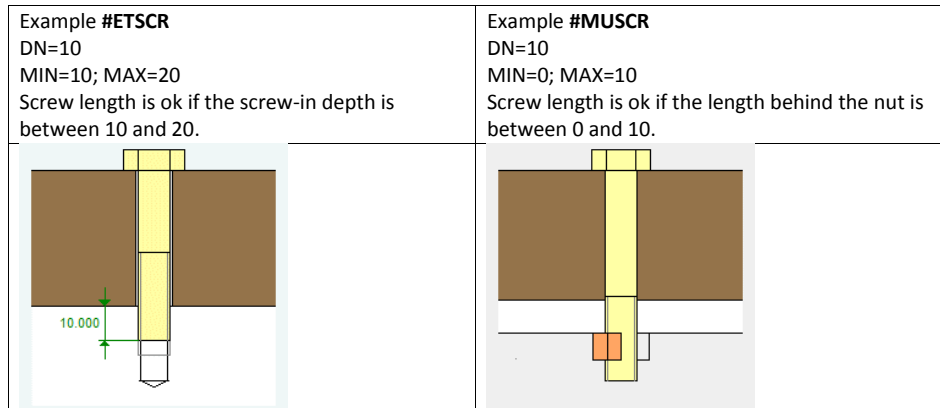
#ADDCB	DN	ADD_DEPTH
...		
MM	8	1.0
MM	10	1.0
MM	12	1.0
...		



sl_data.cfg - **#ETSCR** and **#MUSCR**

These values are used to set the length automatically and to check the length in the Check Screw Fasteners dialog.

#ETSCR	DN	MIN	MAX
...			
MM	8	8	16
MM	10	10	20
MM	12	12	24
...			
#MUSCR	DN	MIN	MAX
...			
MM	8	0	8
MM	10	0	10
MM	12	0	12
...			



sl_tolerance.cfg – #TOL

- Define the tolerance for the dowel pin holes

The screenshot shows a CAD software interface with a 2D preview of a hole. The hole has a diameter of 10.000 and a depth of 9.000. The preview shows a yellow hole in a grey block, with dimensions 40.000 and 30.000. A table of tolerances is displayed, and a red box highlights the 'Tolerance' section of the configuration dialog.

#TOL	DN	STRING	NOM	LOWER	UPPER
...					
MM	10	H7	10	-	-
MM	10	H8	10	-	-
MM	10	JS8	10	-	-
MM	10	±0.01	10	-0.01	0.01
MM	10	±0.02	10	-0.02	0.02
...					

hole type
Through Hole Drill Diameter 10

Tolerance
±0.01 Upper Tolerance 0.01
H7 Lower Tolerance -0.01
H8
JS8
±0.01
±0.02

Preview OK Cancel

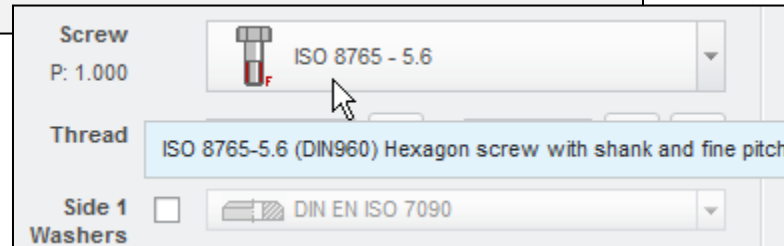
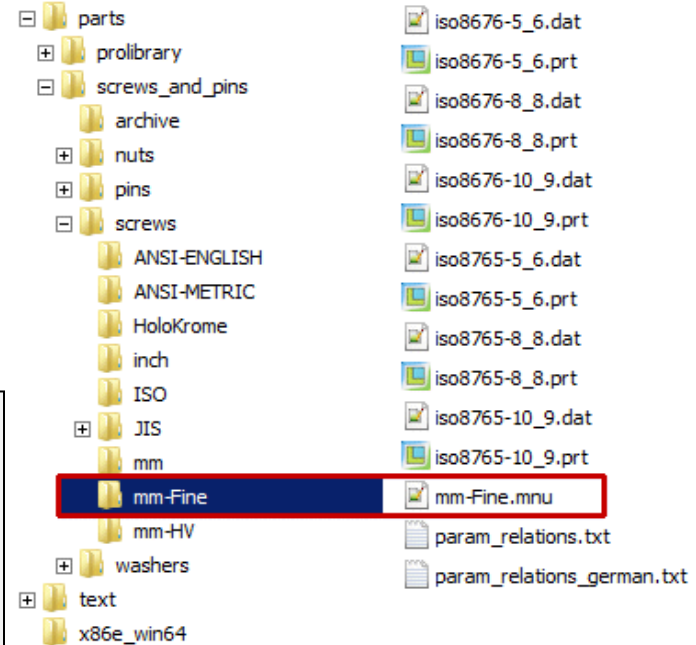
Folder: parts/screws_and_pins

- In this folder you will find various subfolders that contain the different types (screws, nuts, washers and pins).
- They are also grouped into catalogs like mm and inch.

The *.mnu files

- Each folder contain one *.mnu file with the same name as the folder.
- In the *.mnu file all fastener standards are listed.
- You can add a description for your standard to be shown as a tooltip.

```
MM-FINE
#
#
ISO8765-5_6.prt
ISO 8765-5.6 (DIN960) Hexagon screw with shank and fine pitch
ISO 8765-5.6 (DIN960) Sechskantschraube mit Schaft und Feingewinde
ISO8765-8_8.prt
ISO 8765-8.8 (DIN960) Hexagon screw with shank and fine pitch
ISO 8765-8.8 (DIN960) Sechskantschraube mit Schaft und Feingewinde
...
```



The *.dat files

- The *.dat files contain some basic information about the fastener in the top of the file and a list of instances with all necessary dimensions and parameters.

Name	Description
SCREWTYPE NUTTYPE WASHERTYPE PINTYPE	Enter the type of the standard part.
UNIT	The unit of the standard part. MM or INCH
SURFACE	The feature ID of the reference surface used for assemble
AXIS	The feature ID of the reference axis used for assemble.
ORIENT	The feature ID of the reference surface used for orientation (optional)
CBSCR	Insert the column name from the sl_data.cfg file, used for screws and washers (optional).
CBNUT	Insert the column name from the sl_data.cfg file, used for nuts and washers (optional).
INFO	Inset the value you want to show in the pull down for this standard part (optional).
SUBINFO	Allows a selection box if multiple instances with same diameter and length should be used (optional).

SYMBOL	STRING	DN	LG	B	S	K	DG	P	...
INSTANCE	STRING	DN	LG	B	S	K	DG	P	...
<mdl-name>	M8	8	40	22	13	5.3	7	1	...

The *.prt files

- The *.prt files are used like a generic file.
- If the instance doesn't exist, then this file is copied to the workspace. Then the dimensions and parameters are set and then the file is renamed.
- If all instances already exist (in a search_path or in Windchill), then the *.prt file is not necessary.
- Use the instance creator to create all instances in one step.

The *_icon.prt files

- You can add a custom icon for each fastener.

Some nice IFX options

- `PATH_ABS_LIBRARY` and `PATH_ABS_ARCHIVES`
- `USE_EXTERNAL_REFERENCES` and `SELECT_POS_REFS`
 - Update holes
- `COLOR_STDPARTS` and `COLOR_HOLES`
- `PROVIDE_LAST_REFERENCES`
- `*_THREAD_SERIES_*`
 - Use different hole charts
 - Use different hole notes
- Questions?

- Add new sizes to existing standard

- Add Length

SYMBOL	STRING	DN	LG	S	K
M8x70	M8	8	70	13	5.3
M8x80	M8	8	80	13	5.3

SYMBOL	STRING	DN	LG	S	K
M8x70	M8	8	70	13	5.3
M8x75	M8	8	75	13	5.3
M8x80	M8	8	80	13	5.3

- Add Diameter

Note: You have to make sure that the diameter exist in a Creo hole chart.


SYMBOL	DN	H	DN1	DN2
...				
DIN125-1-A30	30	4.3	31	56
DIN125-1-A36	36	5.6	37	66
DIN125-1-A39	39	6.0	40	72


- Add new standard


- Add to *.mnu

```
# your MNU file
#
#
xxx.prt
Description ...
Beschreibung ...
```

- Add dat, prt and gif files

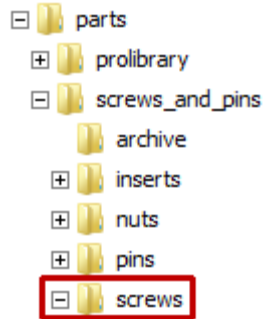
 xxx.dat

 xxx.prt

 xxx_icon.gif

- Add new catalog

- Add mm-rs to screws.mnu



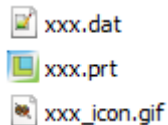
```
SCREW#LIBRARY
#
#
/mm
Screws and Bolts
Schrauben
/mm-rs
Screws and Bolts - for the B&W Roadshow
Schrauben - für die B&W Roadshow
/inch
Screws and Bolts
Schrauben
```

- Add new folder mm-rs and mm-rs.mnu with new standards






```
MM-RS
#
#
xxx.prt
Description ...
Beschreibung ...
```

- Add the dat, prt and gif files for the new standards



- Add legacy fastener

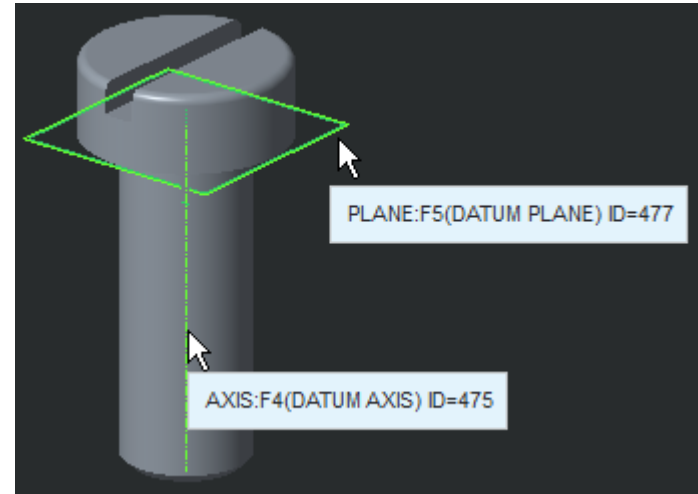
- Get IDs – use Creo option *show_selected_item_id*
- Add to mnu
- Add dat, prt and gif

-  legacy_screw.dat
-  legacy_screw.prt
-  legacy_screw_icon.gif

legacy_screw.prt
Legacy screw for Roadshow
Legacy screw for Roadshow

- Add fastener with family table

- Used Dimension Mapping with MUST and NOT filters
- Add instances to *.dat file



IFX – License Comparison

	IFX Free	IFX Paid	IFX + AFX
Assemble screws on PNT/AXIS/HOLE	✓	✓	✓
Assemble screws via mouse click	✓	✓	✓
Pattern fasteners	✓	✓	✓
Reassemble, redefine and delete fasteners	✓	✓	✓
Assemble dowel pins on PNT/AXIS/HOLE	✗	✓	✓
Assemble dowel pins via mouse click	✗	✓	✓
Change options	✗	✓	✓
Check screw fasteners	✗	✓	✓
Customize fastener components	✗	✓	✓
Assemble on all instances of a feature	✗	✓	✓
Select orientation for screws	✗	✓	✓
Assemble nuts in subassemblies	✗	✓	✓
Allow multiple instances of one size in one *.dat file	✗	✓	✓
Update holes when working without external references	✗	✓	✓
Define automatic hole creation	✗	✗	✓

- Increase productivity
 - Automate repetitive tasks
- Reduce part proliferation
 - Customize the comprehensive library of fasteners to include company or project specific hardware
 - Drive standardization
- Improve design workflows
 - Automatic creation of holes without assembly references
 - Removes requirement to manually align fastener holes which do not have assembly references
- Improve design accuracy
 - Validation tools to ensure fasteners are the correct length
 - Fully aligned mounting holes

- Questions?
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 - +49 9131 53387 04
 - oli@buw-soft.de

