



Tutorial

AISC 360-10 Bolts (14th, 2010)

Updated on: October 25th 2023

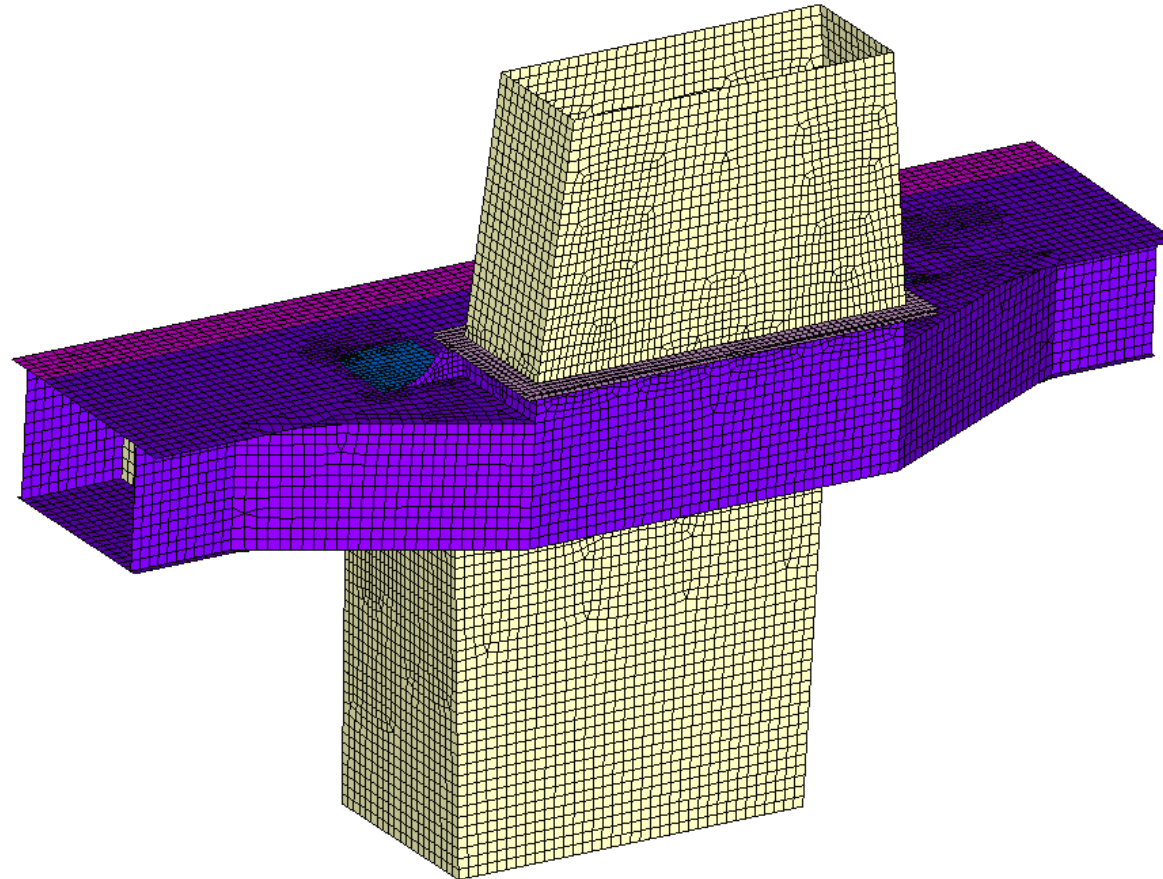
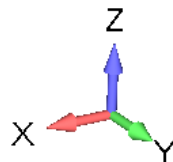
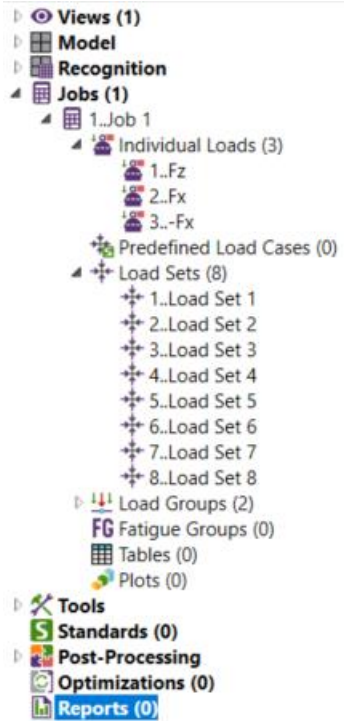
Tested with: SDC Verifier 2023 R2

Simcenter Femap with Nastran 2022.2 MP2


- In this tutorial, AISC 360-10 Bolts (14th, 2010) Check is reviewed in details.
- A plate model (bolts modeled as beams) structure has been used as a start FEM model.
- An Extreme table, showing the worst result on selection, has been created;
- Criteria Plot with Utilization factor overall has been previewed

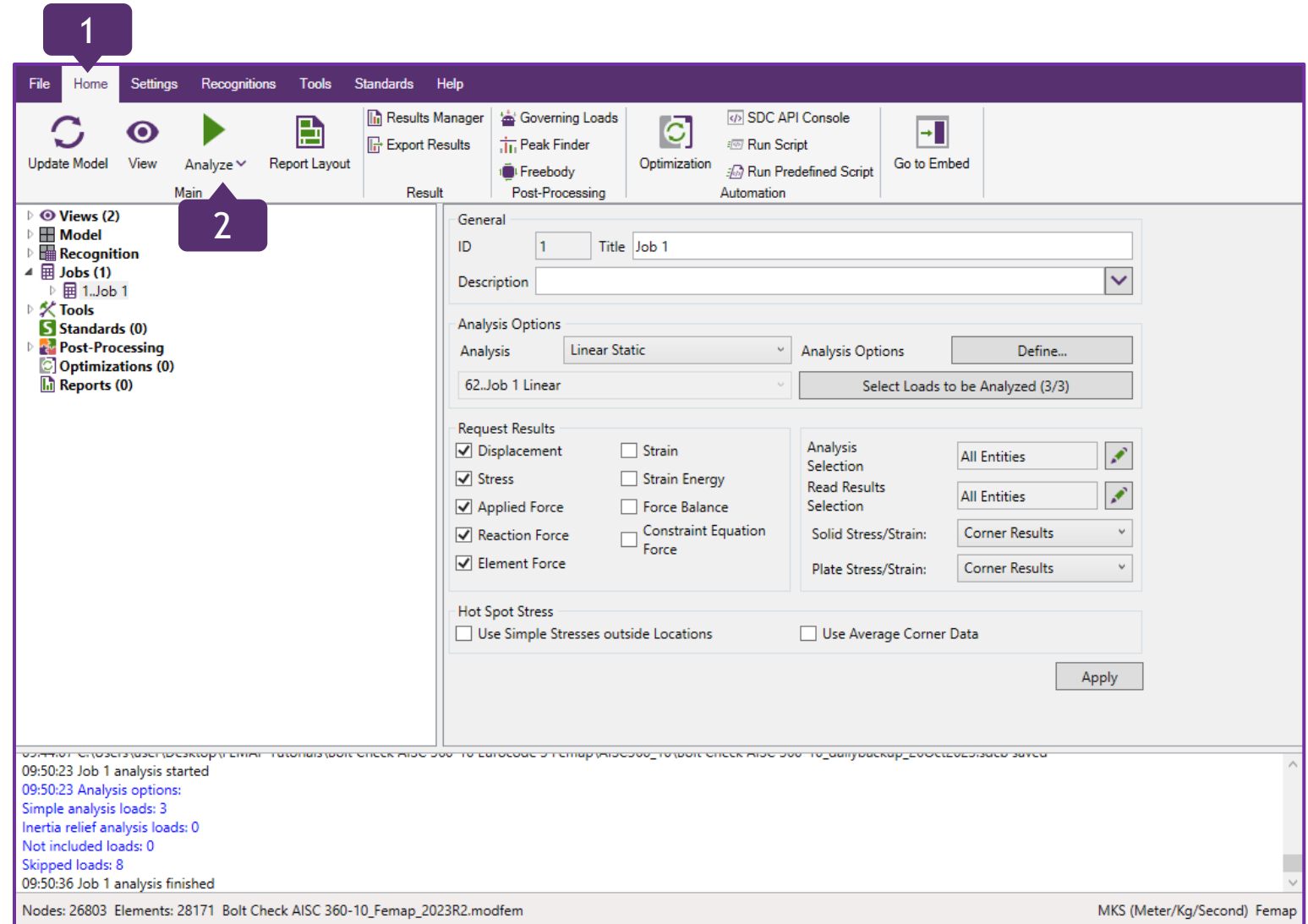
-
- The screenshot shows the SDC Verifier 2023 R2.1 application window. The 'Open' dialog box is active, displaying the file 'Bolt check.sdcv' in the 'Desktop > tutorials from Vira > bolt check Femap' directory. A red arrow points to the file name. Another red arrow points to the 'Open' button. The background shows the SDC Verifier project tree and a status bar at the bottom indicating the project is open.

The project in this tutorial has predefined boundary conditions, load combinations and load groups. The model contains plate and beam elements. Bolts are modeled as beam elements.



Run Analysis

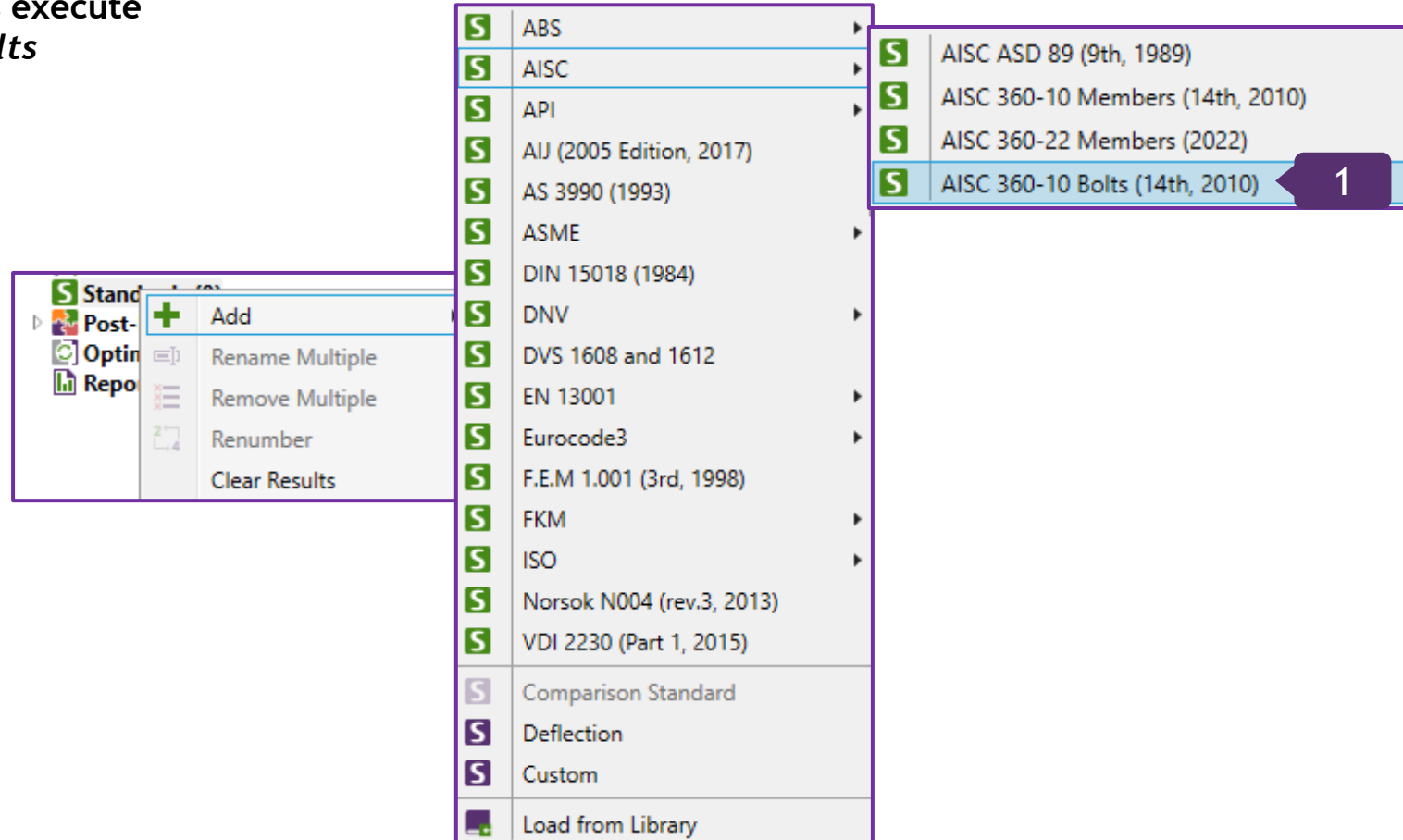
- 1 Go to *Home* section on the Ribbon.
- 2 Press  on the toolbar to analyze job.



Add AISC 360-10 Bolts (14th, 2010) Standard

1

In the *Model tree*, in Standards execute
Add => AISC => AISC 360-10 Bolts
(14th,2010)



Reference tables of AISC 360-10 Bolts (14th, 2010)

TABLE J3.2 Nominal Strength of Fasteners and Threaded Parts, ksi (MPa)		
Description of Fasteners	Nominal Tensile Strength, F_{nt} , ksi (MPa) ^[a]	Nominal Shear Strength in Bearing-Type Connections, F_{nv} , ksi (MPa) ^[b]
A307 bolts	45 (310)	27 (188) ^{[c] [d]}
Group A (e.g., A325) bolts, when threads are not excluded from shear planes	90 (620)	54 (372)
Group A (e.g., A325) bolts, when threads are excluded from shear planes	90 (620)	68 (457)
Group B (e.g., A490) bolts, when threads are not excluded from shear planes	113 (780)	68 (457)
Group B (e.g., A490) bolts, when threads are excluded from shear planes	113 (780)	84 (579)
Threaded parts meeting the requirements of Section A3.4, when threads are not excluded from shear planes	$0.75F_u$	$0.450F_u$
Threaded parts meeting the requirements of Section A3.4, when threads are excluded from shear planes	$0.75F_u$	$0.563F_u$

TABLE J3.1M Minimum Bolt Pretension, kN*		
Bolt Size, mm	Group A (e.g., A325M Bolts)	Group B (e.g., A490M Bolts)
M16	91	114
M20	142	179
M22	176	221
M24	205	257
M27	267	334
M30	326	408
M36	475	595

*Equal to 0.70 times the minimum tensile strength of bolts, rounded off to nearest kN, as specified in ASTM specifications for A325M and A490M bolts with UNC threads.

TABLE J3.3M Nominal Hole Dimensions, mm				
Bolt Diameter, mm	Hole Dimensions			
	Standard (Dia.)	Oversize (Dia.)	Short-Slot (Width × Length)	Long-Slot (Width × Length)
M16	18	20	18 × 22	18 × 40
M20	22	24	22 × 26	22 × 50
M22	24	28	24 × 30	24 × 55
M24	27 ^[a]	30	27 × 32	27 × 60
M27	30	35	30 × 37	30 × 67
M30	33	38	33 × 40	33 × 75
≥ M36	$d + 3$	$d + 8$	$(d + 3) \times (d + 10)$	$(d + 3) \times 2.5d$

^[a] Clearance provided allows the use of a 1-in. bolt if desirable.

- 2..AISC 360-10 Bolts
 - Input
 - Constants (7)
 - Types (3)
 - Characteristic (9)
 - Classifications (0)
 - Standard Tables (0)
 - Checks (4)
 - 1..Bolt Check
 - 2..Bolt Check ASD
 - 3..Bolt Check LRFD
 - 4..Bolt Overall

Standard contains 4 checks:

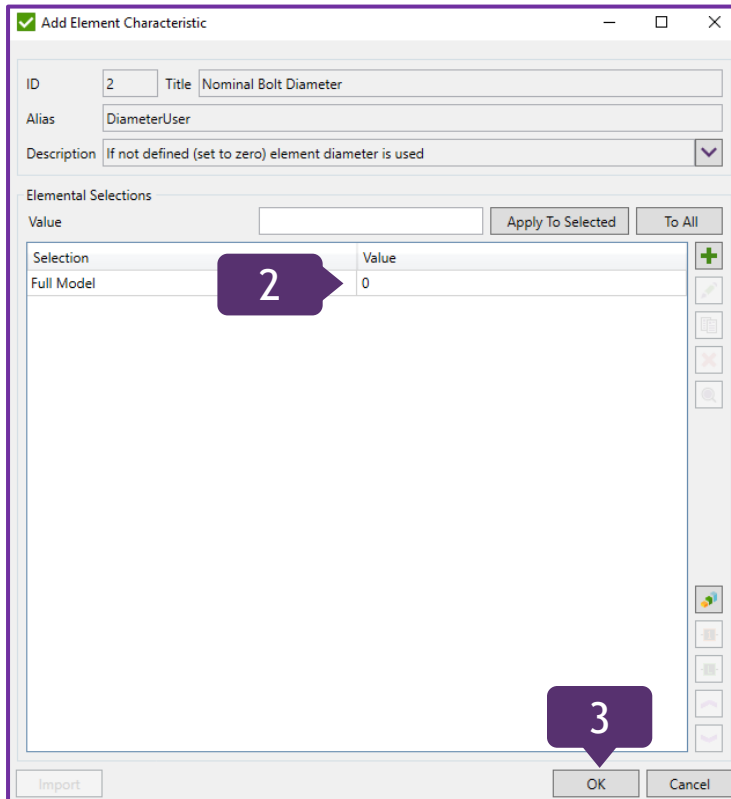
- 1 - Bolt Check;
- 2 - Bolt Check ASD;
- 3 - Bolt Check LRFD;
- 4 - Bolt Overall.

Define Nominal Bolt Diameter

1 Press  in Nominal Bolt Diameter

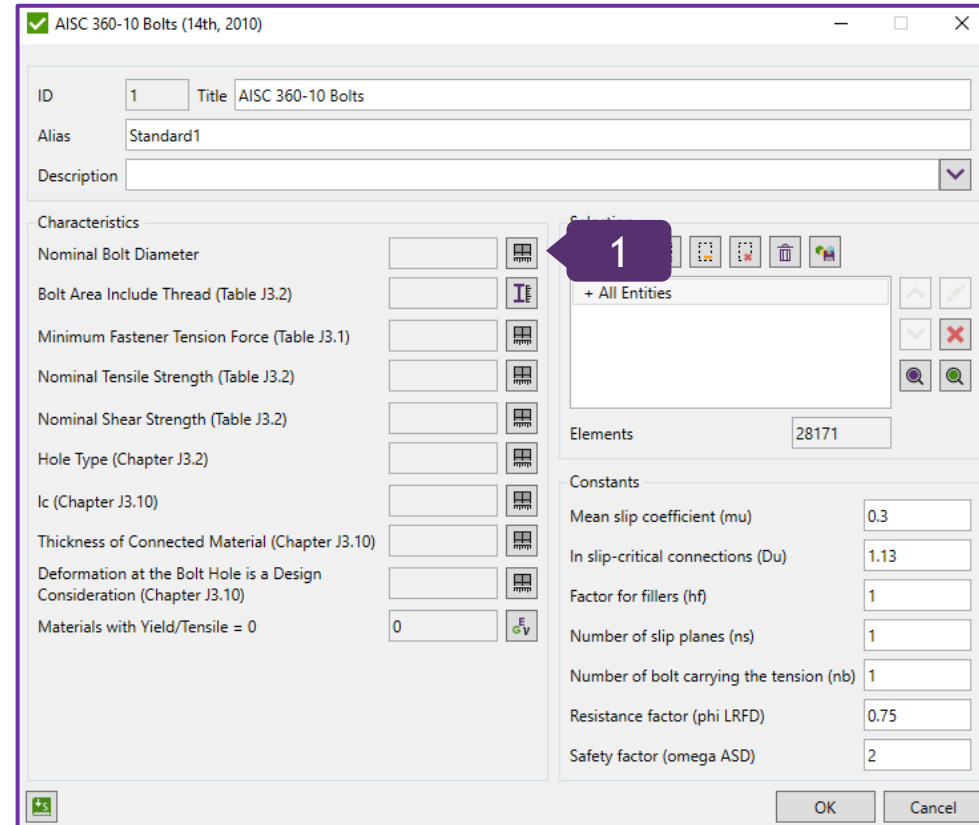
2 Selection Value: 0

3 Press OK



Selection	Value
Full Model	0

Nominal Bolt Diameter - diameter of bolt in connection, if not defined (set to zero) element diameter is used



Characteristics	Value
Nominal Bolt Diameter	
Bolt Area Include Thread (Table J3.2)	
Minimum Fastener Tension Force (Table J3.1)	
Nominal Tensile Strength (Table J3.2)	
Nominal Shear Strength (Table J3.2)	
Hole Type (Chapter J3.2)	
Ic (Chapter J3.10)	
Thickness of Connected Material (Chapter J3.10)	
Deformation at the Bolt Hole is a Design Consideration (Chapter J3.10)	
Materials with Yield/Tensile = 0	0

Constants	Value
Mean slip coefficient (μ)	0.3
In slip-critical connections (D_u)	1.13
Factor for fillers (h_f)	1
Number of slip planes (n_s)	1
Number of bolt carrying the tension (n_b)	1
Resistance factor (ϕ LRFD)	0.75
Safety factor (ω ASD)	2

Define Bolt Area Include Thread (Table J3.2)

1

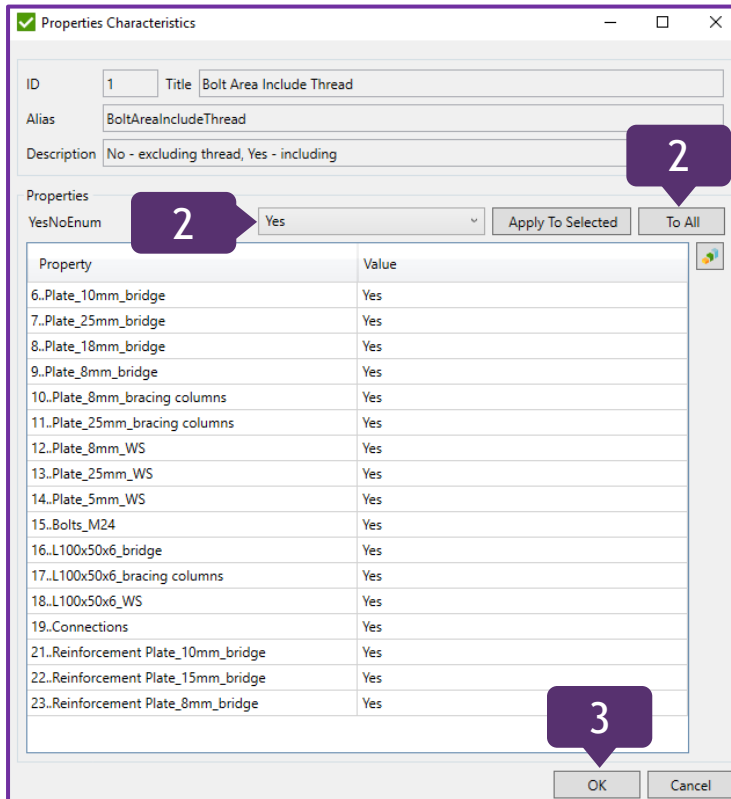
Press  in Bolt Area Include Thread (Table J3.2)

2

Properties YesNoEnum: Yes and press *To All*

3

Press *OK*



Properties Characteristics

ID: 1 Title: Bolt Area Include Thread

Alias: BoltAreaIncludeThread

Description: No - excluding thread, Yes - including

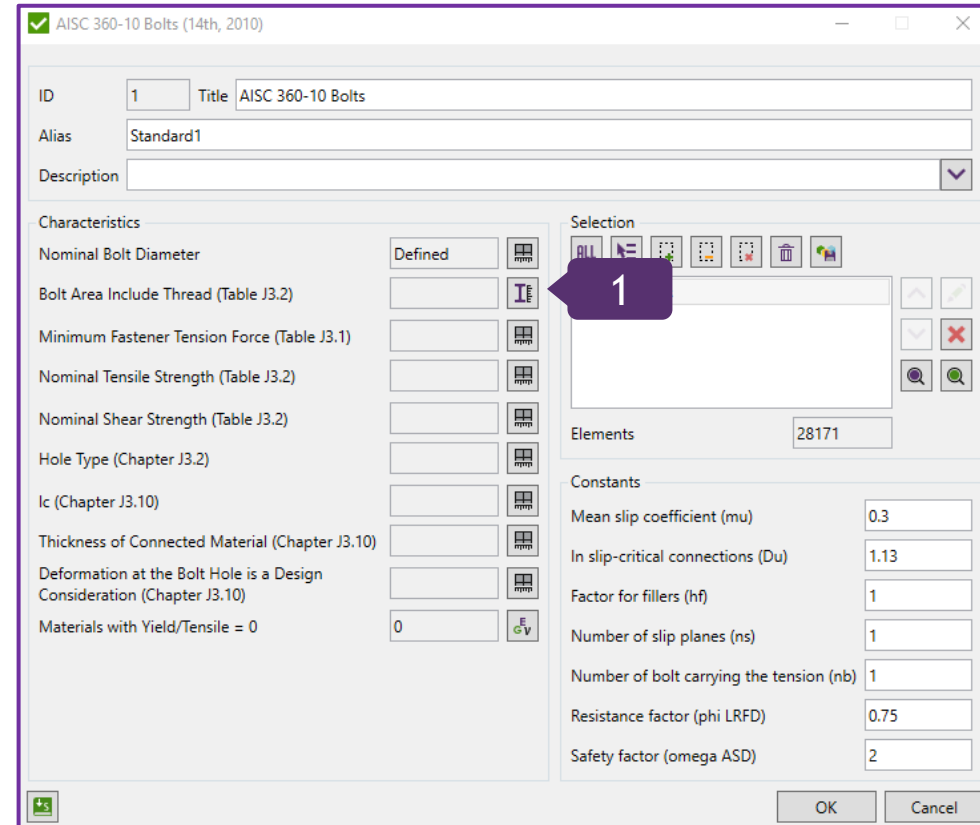
Properties

YesNoEnum: Yes Apply To Selected To All

Property	Value
6..Plate_10mm_bridge	Yes
7..Plate_25mm_bridge	Yes
8..Plate_18mm_bridge	Yes
9..Plate_8mm_bridge	Yes
10..Plate_8mm_bracing columns	Yes
11..Plate_25mm_bracing columns	Yes
12..Plate_8mm_WS	Yes
13..Plate_25mm_WS	Yes
14..Plate_5mm_WS	Yes
15..Bolts_M24	Yes
16..L100x50x6_bridge	Yes
17..L100x50x6_bracing columns	Yes
18..L100x50x6_WS	Yes
19..Connections	Yes
21..Reinforcement Plate_10mm_bridge	Yes
22..Reinforcement Plate_15mm_bridge	Yes
23..Reinforcement Plate_8mm_bridge	Yes

OK Cancel

Bolt Area Include Thread - set Yes to take into account of bolt thread/ No if do not take into account (Table J3.2)



AISC 360-10 Bolts (14th, 2010)


ID: 1 Title: AISI 360-10 Bolts

Alias: Standard1

Description:

Characteristics

Nominal Bolt Diameter: Defined

Bolt Area Include Thread (Table J3.2):  1

Minimum Fastener Tension Force (Table J3.1): Defined

Nominal Tensile Strength (Table J3.2): Defined

Nominal Shear Strength (Table J3.2): Defined

Hole Type (Chapter J3.2): Defined

Ic (Chapter J3.10): Defined

Thickness of Connected Material (Chapter J3.10): Defined

Deformation at the Bolt Hole is a Design Consideration (Chapter J3.10): Defined

Materials with Yield/Tensile = 0: 0

Selection

Elements: 28171

Constants

Mean slip coefficient (mu): 0.3

In slip-critical connections (Du): 1.13

Factor for fillers (hf): 1

Number of slip planes (ns): 1

Number of bolt carrying the tension (nb): 1


Resistance factor (phi LRFD): 0.75

Safety factor (omega ASD): 2

OK Cancel

Define Minimum Fastener Tension Force (Table J3.1)

1

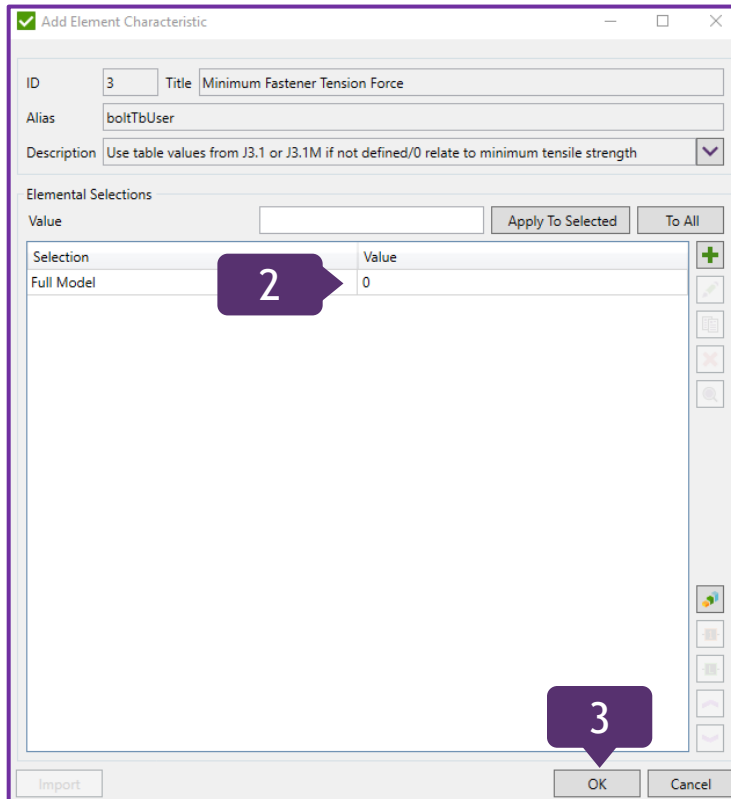
Press  in Minimum Fastener Tension Force (Table J3.1)

2

Selection Value: 0

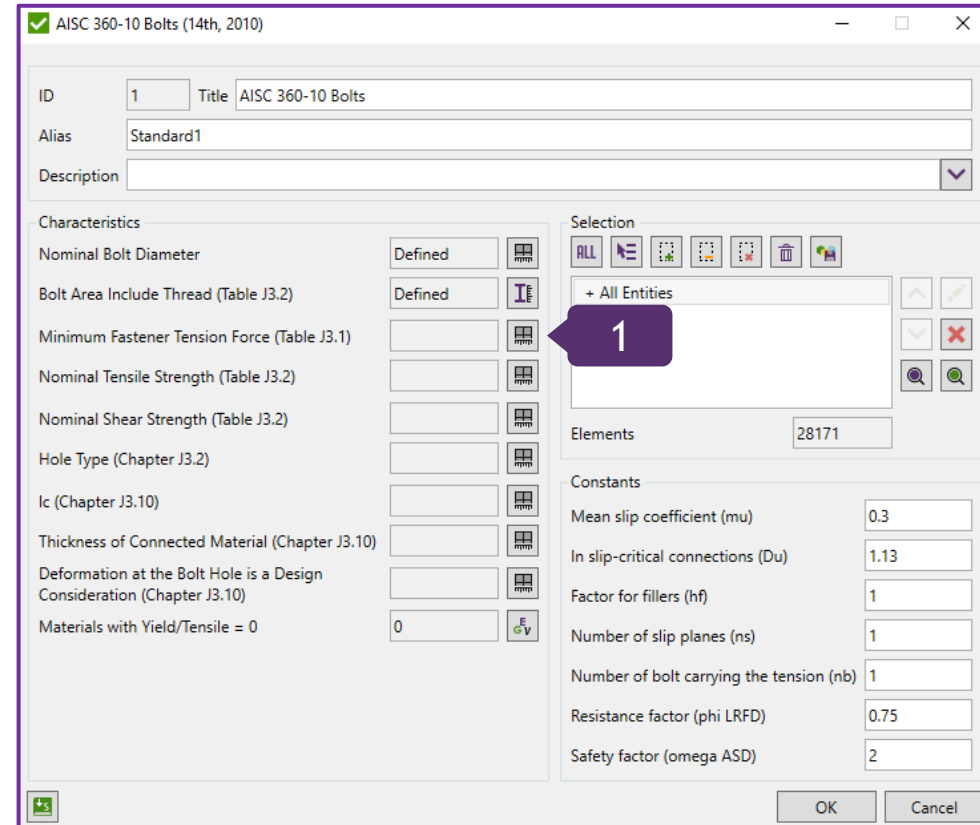
3

Press OK



Selection	Value
Full Model	0

Minimum Fastener Tension Force - values from J3.1 or J3.1M if not defined/0 relate to minimum tensile strength




Characteristic	Value
Nominal Bolt Diameter	Defined
Bolt Area Include Thread (Table J3.2)	Defined
Minimum Fastener Tension Force (Table J3.1)	
Nominal Tensile Strength (Table J3.2)	
Nominal Shear Strength (Table J3.2)	
Hole Type (Chapter J3.2)	
Ic (Chapter J3.10)	
Thickness of Connected Material (Chapter J3.10)	
Deformation at the Bolt Hole is a Design Consideration (Chapter J3.10)	
Materials with Yield/Tensile = 0	0

Constant	Value
Mean slip coefficient (μ)	0.3
In slip-critical connections (D_u)	1.13
Factor for fillers (h_f)	1
Number of slip planes (n_s)	1
Number of bolt carrying the tension (n_b)	1
Resistance factor (ϕ LRFD)	0.75
Safety factor (ω ASD)	2

Define Nominal Tensile Strength (Table J3.2)

1

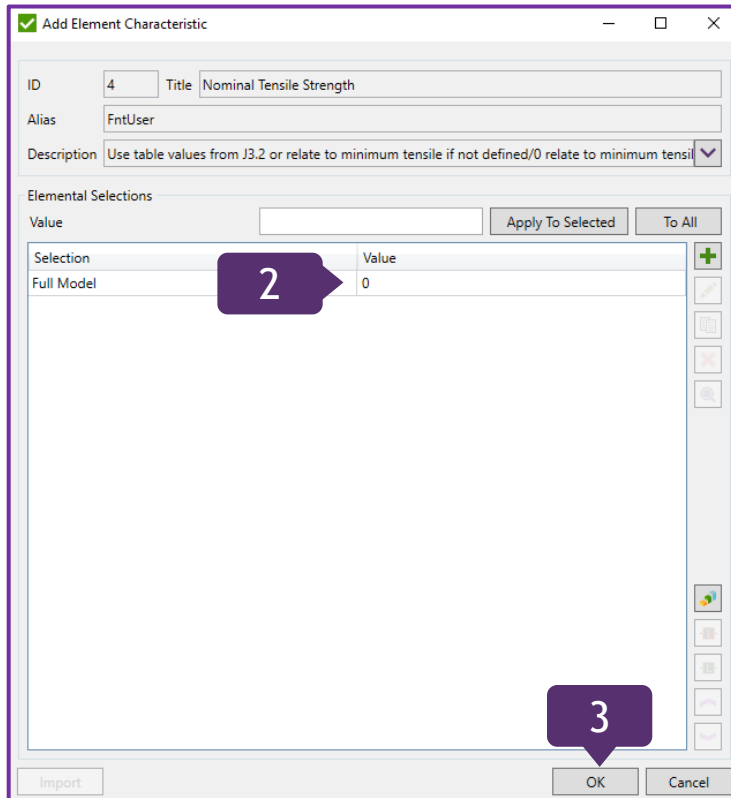
Press  in Nominal Tensile Strength (Table J3.2)

2

Selection Value: 0

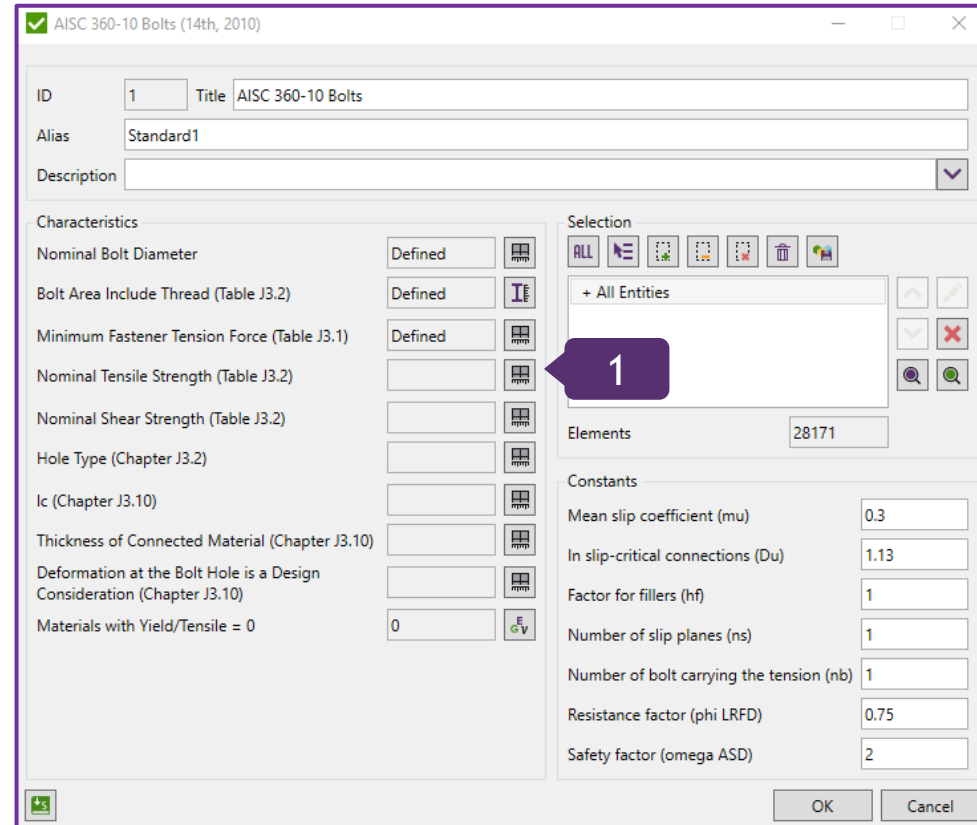
3

Press OK



Selection	Value
Full Model	0

Nominal Tensile Strength - values from J3.2 or relate to minimum tensile if not defined/0 relate to minimum tensile strength




Characteristics	Defined
Nominal Bolt Diameter	Defined
Bolt Area Include Thread (Table J3.2)	Defined
Minimum Fastener Tension Force (Table J3.1)	Defined
Nominal Tensile Strength (Table J3.2)	
Nominal Shear Strength (Table J3.2)	
Hole Type (Chapter J3.2)	
Ic (Chapter J3.10)	
Thickness of Connected Material (Chapter J3.10)	
Deformation at the Bolt Hole is a Design Consideration (Chapter J3.10)	
Materials with Yield/Tensile = 0	0

Constants	Value
Mean slip coefficient (mu)	0.3
In slip-critical connections (Du)	1.13
Factor for fillers (hf)	1
Number of slip planes (ns)	1
Number of bolt carrying the tension (nb)	1
Resistance factor (phi LRFD)	0.75
Safety factor (omega ASD)	2

Define Nominal Shear Strength (Table J3.2)

1

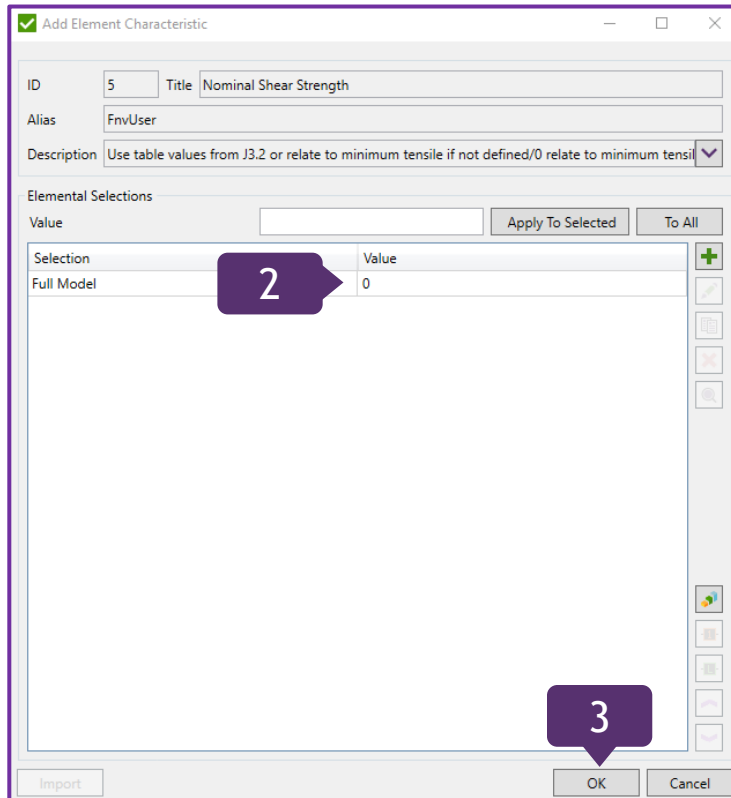
Press  in Nominal Shear Strength (Table J3.2)

2

Selection Value: 0

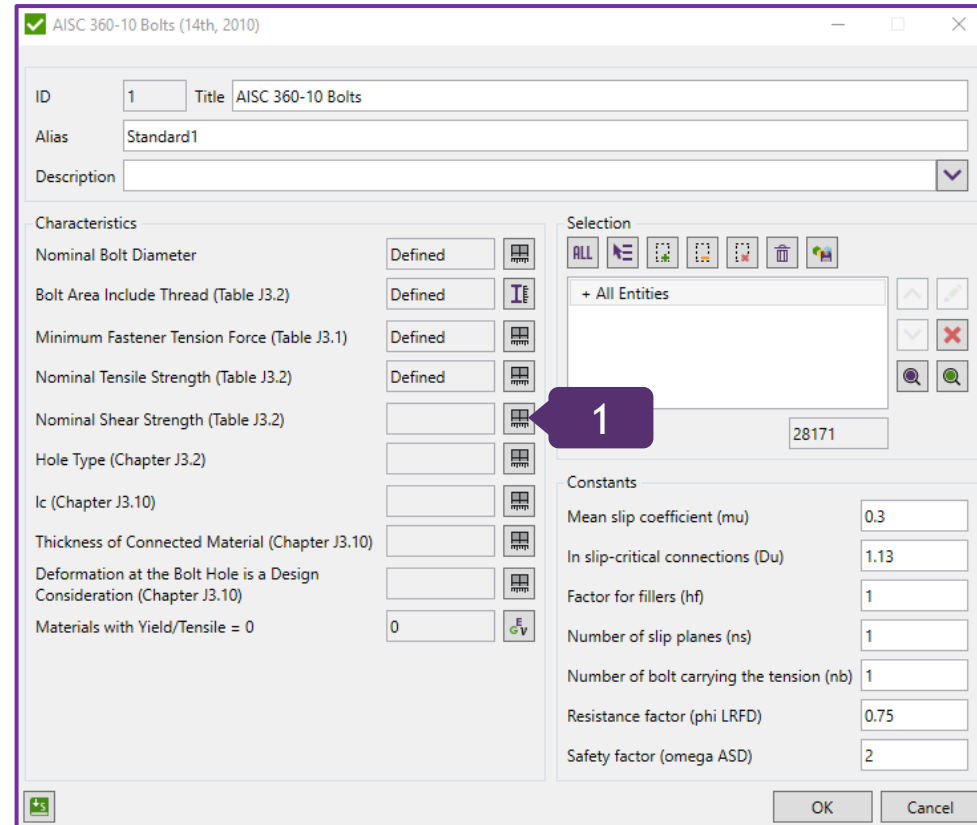
3

Press OK



Selection	Value
Full Model	0

Nominal Shear Strength - values from J3.2 or relate to minimum tensile if not defined/0 relate to minimum tensile strength



Characteristic	Value
Nominal Bolt Diameter	Defined
Bolt Area Include Thread (Table J3.2)	Defined
Minimum Fastener Tension Force (Table J3.1)	Defined
Nominal Tensile Strength (Table J3.2)	Defined
Nominal Shear Strength (Table J3.2)	
Hole Type (Chapter J3.2)	
Ic (Chapter J3.10)	
Thickness of Connected Material (Chapter J3.10)	
Deformation at the Bolt Hole is a Design Consideration (Chapter J3.10)	
Materials with Yield/Tensile = 0	0

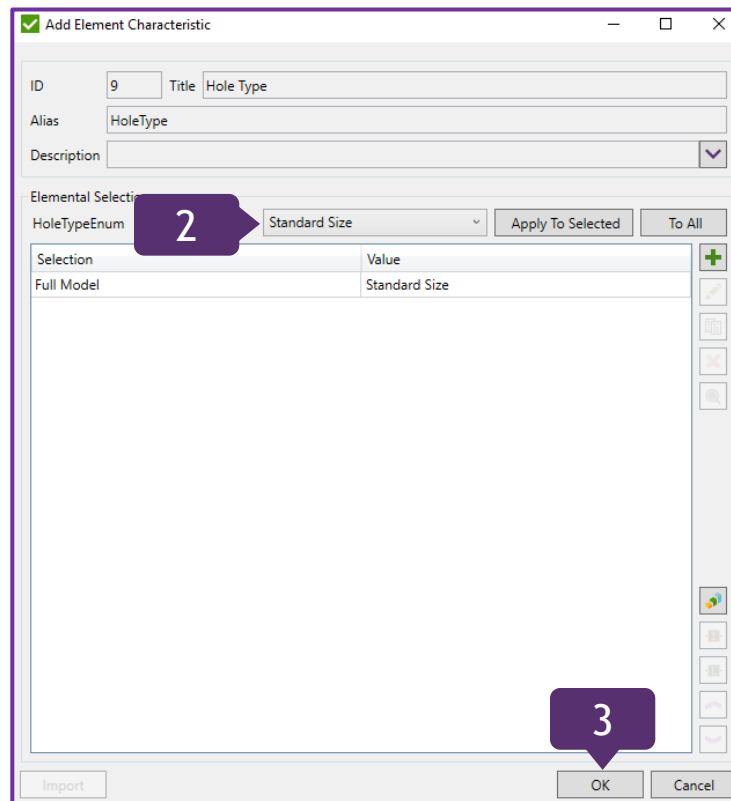
Constant	Value
Mean slip coefficient (mu)	0.3
In slip-critical connections (Du)	1.13
Factor for fillers (hf)	1
Number of slip planes (ns)	1
Number of bolt carrying the tension (nb)	1
Resistance factor (phi LRFD)	0.75
Safety factor (omega ASD)	2

Define Hole Type (Chapter J3.2)

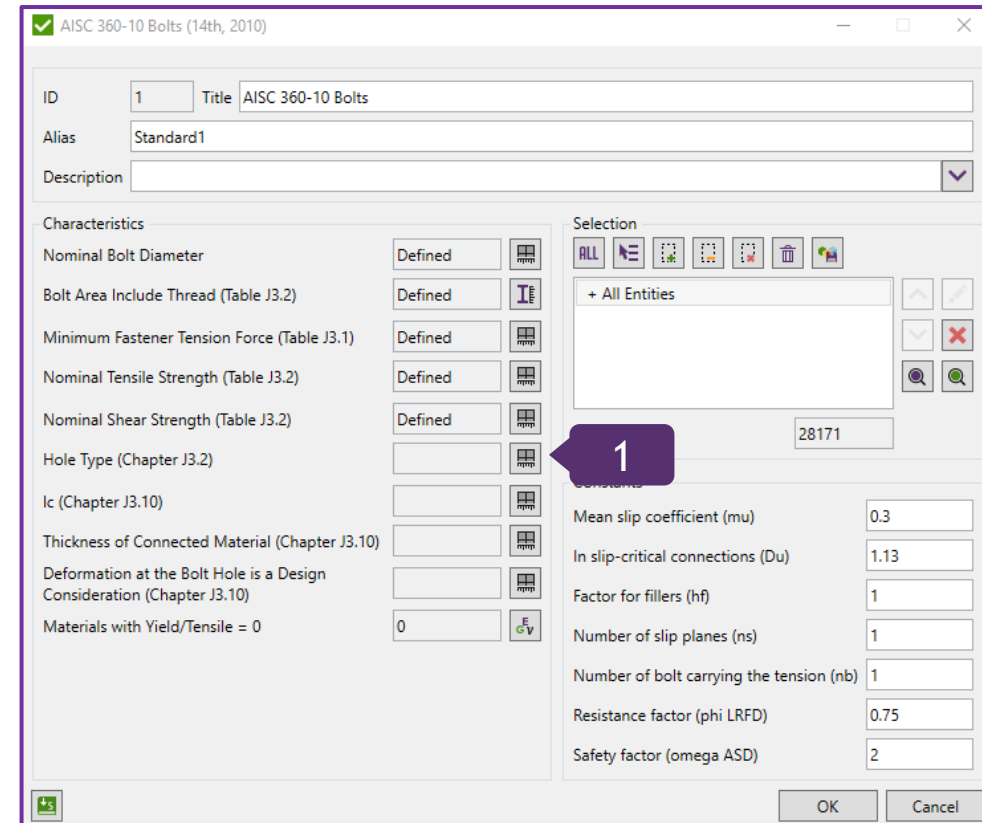
1 Press  in Hole Type (Chapter J3.2)

2 Elemental Selections HoleTypeEnum:
Standard Size

3 Press *OK*



Hole Type - type of hole has to be defined (Table J3.3)



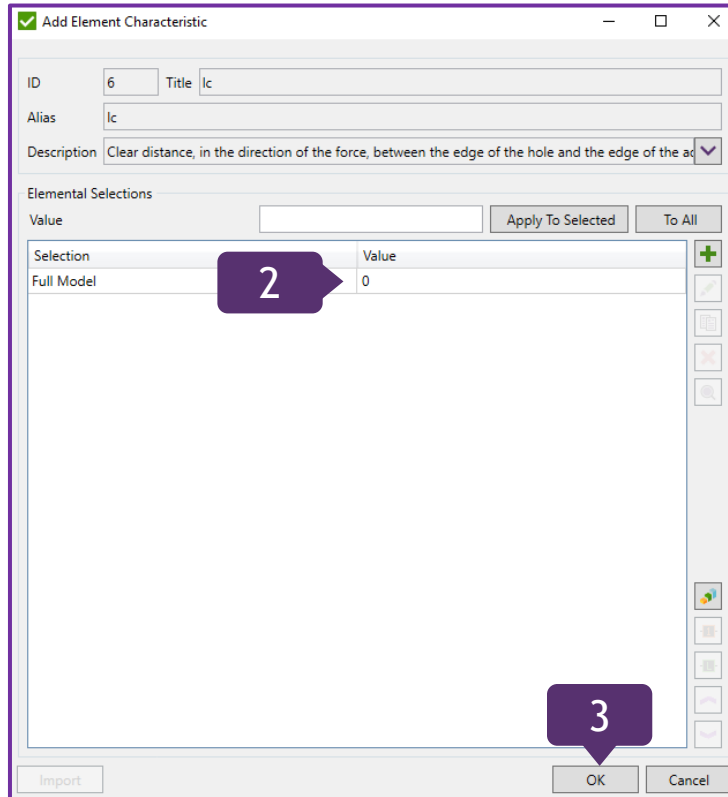
Define Ic (Chapter J3.10)

1 Press  in Ic (Chapter J3.10)

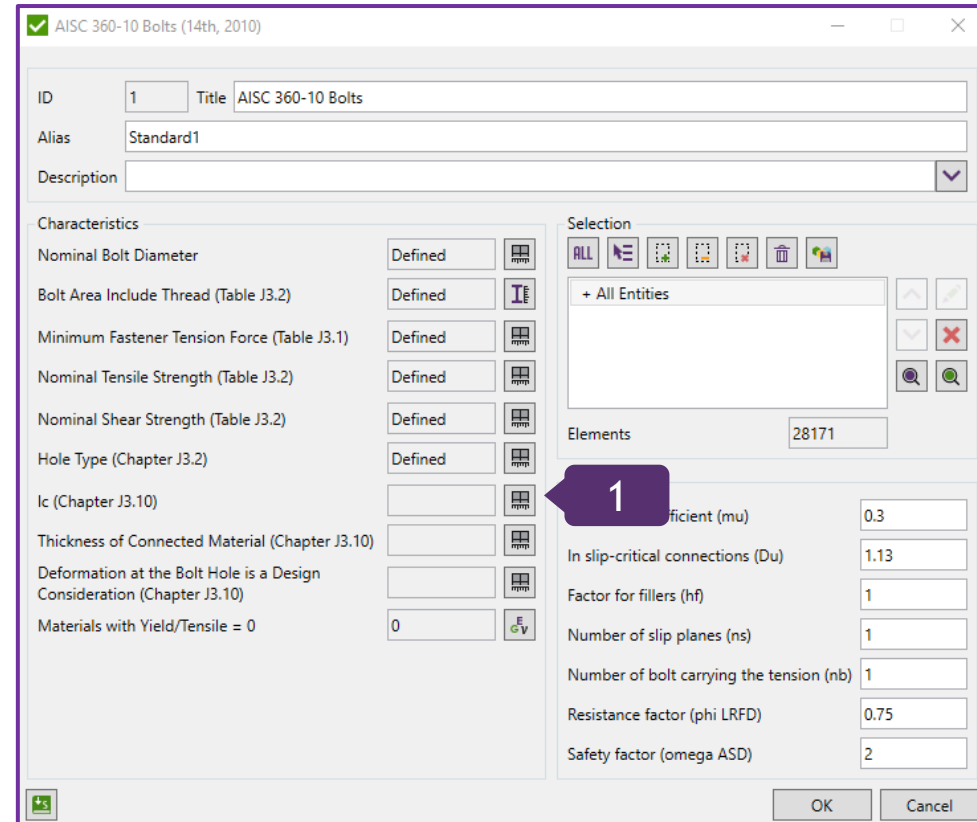
2 Selection Value: 0

3 Press OK

Ic - clear distance, in the direction of the force, between the edge of the hole and the edge of the adjacent hole or edge of the material (Chapter J3.10)



Selection	Value
Full Model	0



Characteristic	Value
Nominal Bolt Diameter	Defined
Bolt Area Include Thread (Table J3.2)	Defined
Minimum Fastener Tension Force (Table J3.1)	Defined
Nominal Tensile Strength (Table J3.2)	Defined
Nominal Shear Strength (Table J3.2)	Defined
Hole Type (Chapter J3.2)	Defined
Ic (Chapter J3.10)	Defined
Thickness of Connected Material (Chapter J3.10)	Defined
Deformation at the Bolt Hole is a Design Consideration (Chapter J3.10)	Defined
Materials with Yield/Tensile = 0	0

Property	Value
Friction coefficient (mu)	0.3
In slip-critical connections (Du)	1.13
Factor for fillers (hf)	1
Number of slip planes (ns)	1
Number of bolt carrying the tension (nb)	1
Resistance factor (phi LRFD)	0.75
Safety factor (omega ASD)	2

Define Thickness of Connected Material (Chapter J3.10)

1

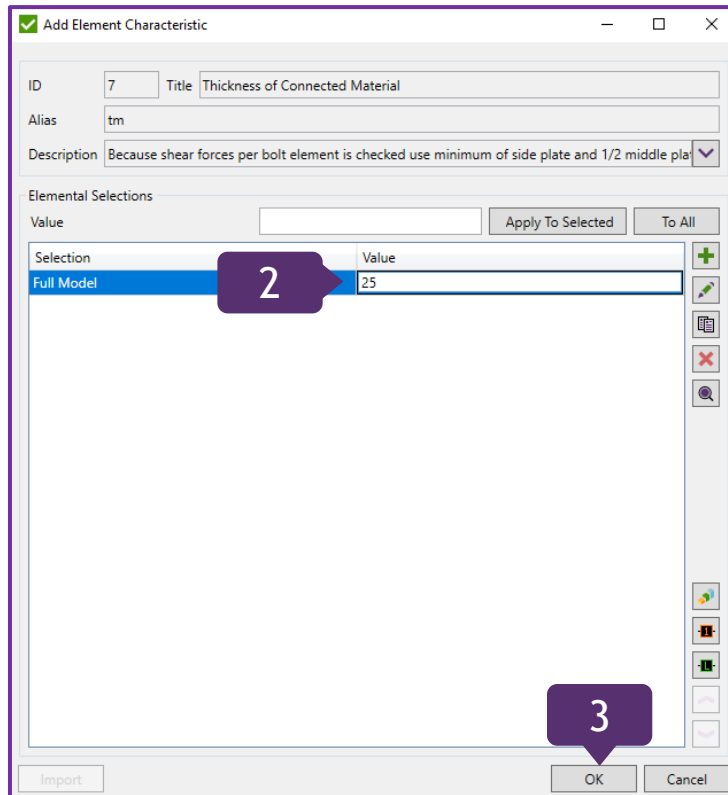
Press  in Thickness of Connected Material (Chapter J3.10)

2

Selection Value: 25

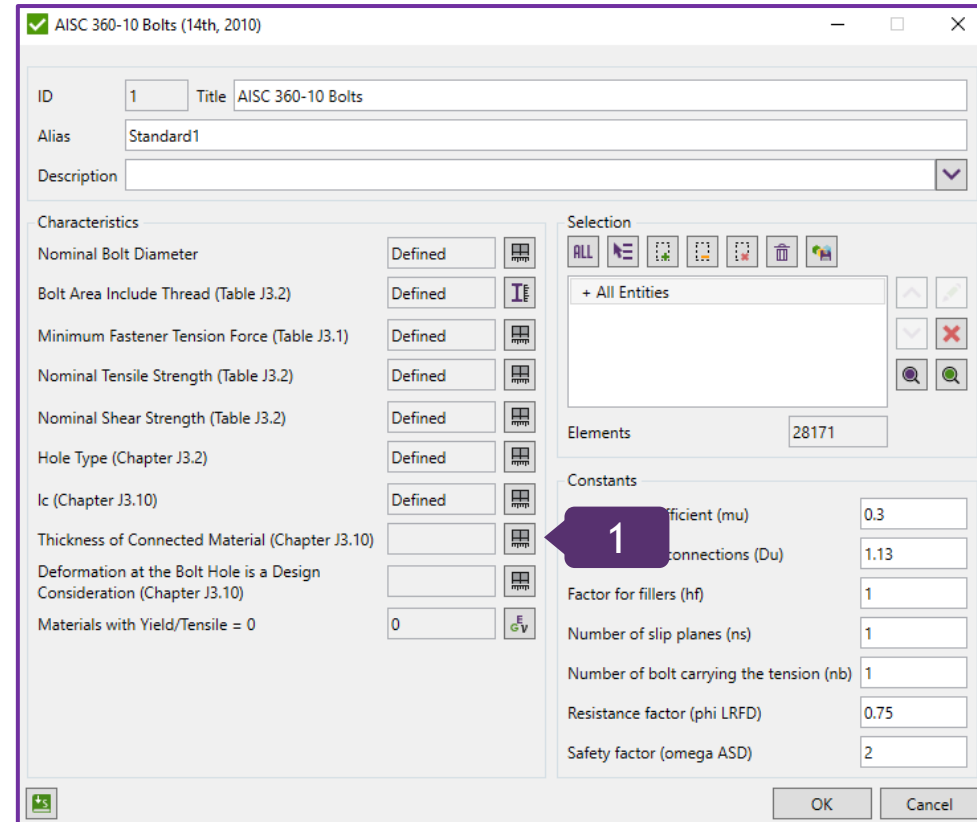
3

Press OK



Selection	Value
Full Model	25

Thickness of Connected Material - because shear forces per bolt element are checked, use minimum of side plate and 1/2 middle plate (Chapter J3.10)




Characteristics	Defined
Nominal Bolt Diameter	Defined
Bolt Area Include Thread (Table J3.2)	Defined
Minimum Fastener Tension Force (Table J3.1)	Defined
Nominal Tensile Strength (Table J3.2)	Defined
Nominal Shear Strength (Table J3.2)	Defined
Hole Type (Chapter J3.2)	Defined
Ic (Chapter J3.10)	Defined
Thickness of Connected Material (Chapter J3.10)	
Deformation at the Bolt Hole is a Design Consideration (Chapter J3.10)	
Materials with Yield/Tensile = 0	0

Constants	Value
Coefficient (mu)	0.3
Connections (Du)	1.13
Factor for fillers (hf)	1
Number of slip planes (ns)	1
Number of bolt carrying the tension (nb)	1
Resistance factor (phi LRFD)	0.75
Safety factor (omega ASD)	2

Define Deformation at the Bolt Hole is a Design Consideration

1

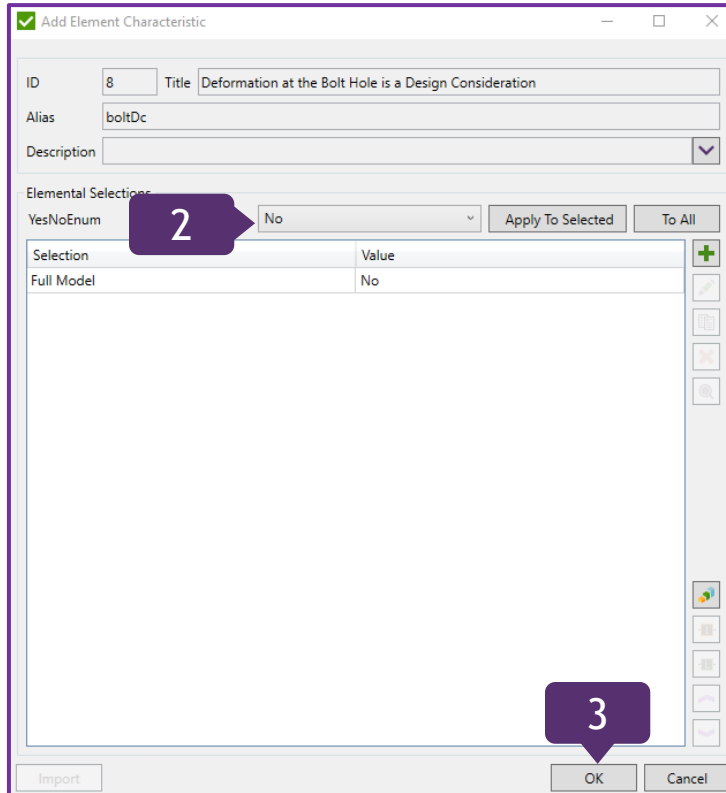
Press  in Deformation at the Bolt Hole is a Design Consideration (Chapter J3.10)

2

Elemental Selections YesNoEnum: No

3

Press OK



✓ Add Element Characteristic

ID: 8 Title: Deformation at the Bolt Hole is a Design Consideration

Alias: boltDc

Description:

Elemental Selections:

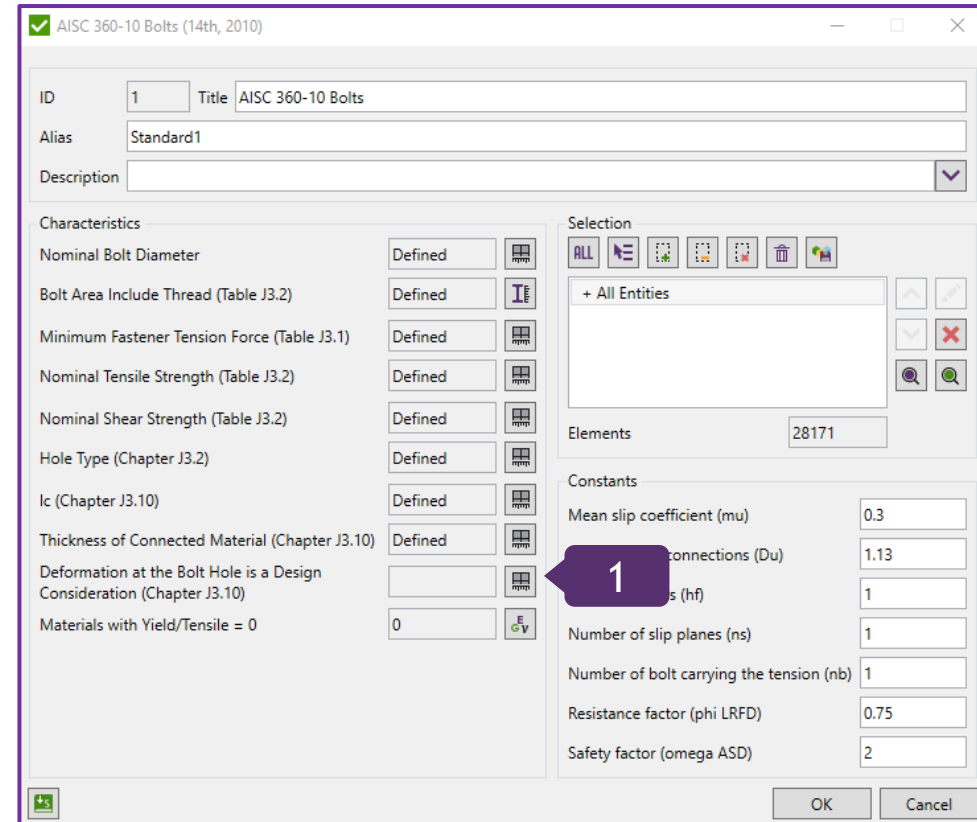
YesNoEnum: No

Selection:

Selection	Value
Full Model	No

Import OK Cancel

Deformation at the Bolt Hole is a Design Consideration - set Yes if it is provided for design of construction



✓ AISC 360-10 Bolts (14th, 2010)

ID: 1 Title: AISC 360-10 Bolts

Alias: Standard1

Description:

Characteristics:

Characteristic	Value	Defined
Nominal Bolt Diameter		Defined
Bolt Area Include Thread (Table J3.2)		Defined
Minimum Fastener Tension Force (Table J3.1)		Defined
Nominal Tensile Strength (Table J3.2)		Defined
Nominal Shear Strength (Table J3.2)		Defined
Hole Type (Chapter J3.2)		Defined
Ic (Chapter J3.10)		Defined
Thickness of Connected Material (Chapter J3.10)		Defined
Deformation at the Bolt Hole is a Design Consideration (Chapter J3.10)		Defined
Materials with Yield/Tensile = 0	0	Defined

Selection:

+ All Entities

Elements: 28171

Constants:

Constant	Value
Mean slip coefficient (mu)	0.3
Connections (Du)	1.13
Connections (hf)	1
Number of slip planes (ns)	1
Number of bolt carrying the tension (nb)	1
Resistance factor (phi LRFD)	0.75
Safety factor (omega ASD)	2

OK Cancel

The Explanation of Constants

✓ AISC 360-10 Bolts (14th, 2010)

ID: 1 Title: AISC 360-10 Bolts

Alias: Standard1

Description:

Characteristics

Nominal Bolt Diameter	Defined	
Bolt Area Include Thread (Table J3.2)	Defined	
Minimum Fastener Tension Force (Table J3.1)	Defined	
Nominal Tensile Strength (Table J3.2)	Defined	
Nominal Shear Strength (Table J3.2)	Defined	
Hole Type (Chapter J3.2)	Defined	
Ic (Chapter J3.10)	Defined	
Thickness of Connected Material (Chapter J3.10)	Defined	
Deformation at the Bolt Hole is a Design Consideration (Chapter J3.10)	Defined	
Materials with Yield/Tensile = 0	0	

Selection

+ All Entities

Elements: 28171

Constants

Mean slip coefficient (mu)	0.3
In slip-critical connections (Du)	1.13
Factor for fillers (hf)	1
Number of slip planes (ns)	1
Number of bolt carrying the tension (nb)	1
Resistance factor (phi LRFD)	0.75
Safety factor (omega ASD)	2

OK Cancel

mu - a coefficient of friction between plates needs for slip check;
Du - multiplier that reflects the ratio of the mean installed bolt pretension to the specified minimum bolt pretension;
hf - factor for fillers;
ns - number of slip planes required to permit the connection to slip;
nb - number of bolts carrying the applied tension;
phi LRFD - factor for calculation by LRFD method;
Omega ASD - factor for calculation by ASD method;

Change Selection

1

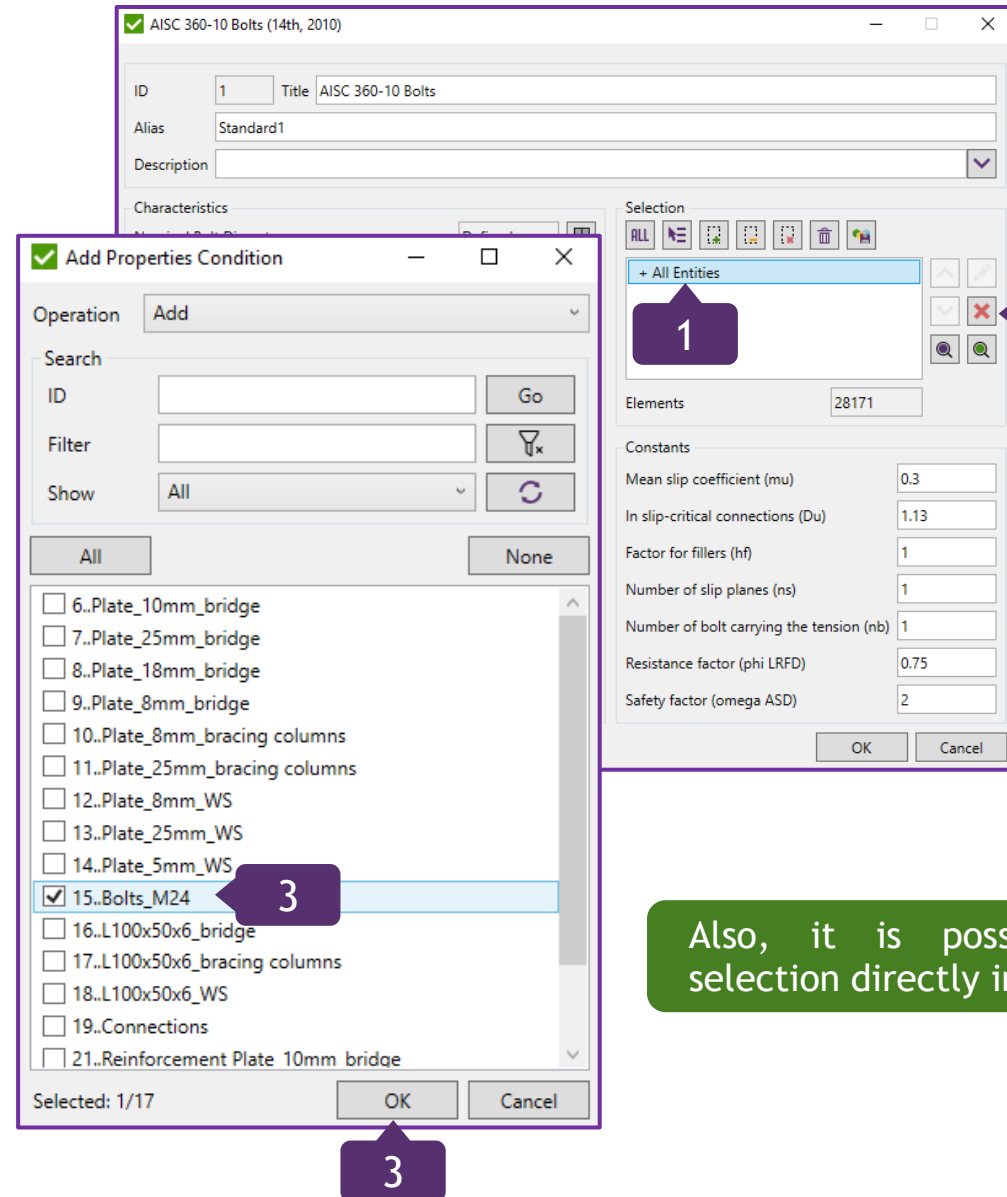
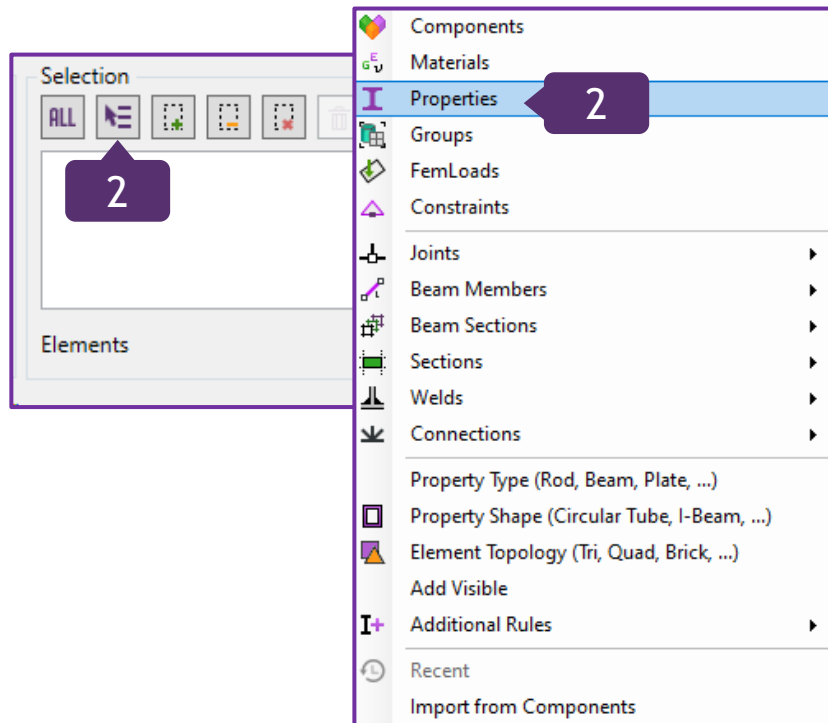
Select **+All Entities** and press  to remove them

2

In Selection, press  and select **Properties**

3

Select **Property 15.Bolts_M24** and press **OK**



Also, it is possible to change selection directly in Check settings.

1

Press OK

Custom Check (built-in, not editable)

ID: 1 Title: Bolt Check

Alias: BoltCheck

Description: AISC Chapter J3. BOLTS AND THREADED PARTS

☒ Show Parameter Description

Options

☐ Calculate Results over Directions

☒ Calculate Results over Points

Load Calculation: All Loads

Selection: Beam '15..Bolts_M24'

Parameters (13) / Replacements (0)

```
Parameter = d (Nominal Bolt Diameter)
if(DiameterUser > 0, DiameterUser, R * 2)

Parameter = Ab (Nominal Unthreaded Body Area of Bolt)
PI * pow(d, 2) / 4

Parameter = boltTb (Minimum Fastener Tension Force)
Description: Table J3.1
if(boltTbUser = 0, Tensile * 0.7 * Ab, boltTbUser)

Parameter = Fnt (Nominal Tensile Strength)
Description: Table J3.2
if(FntUser = 0, Tensile * 0.75, FntUser)

Parameter = Fnv (Nominal Shear Strength)
Description: Table J3.2
if(FnvUser = 0, if(BoltAreaIncludeThread = YesNoEnum.No, Tensile * 0.563, Tensile * 0.45),
FnvUser)

Parameter = RnTensile (Limit States of Tension Rupture)
```

Clear results

OK Cancel

AISC 360-10 Bolts (14th, 2010)

ID: 1 Title: AISC 360-10 Bolts

Alias: Standard1

Description:

Characteristics

Nominal Bolt Diameter	Defined	
Bolt Area Include Thread (Table J3.2)	Defined	
Minimum Fastener Tension Force (Table J3.1)	Defined	
Nominal Tensile Strength (Table J3.2)	Defined	
Nominal Shear Strength (Table J3.2)	Defined	
Hole Type (Chapter J3.2)	Defined	
Ic (Chapter J3.10)	Defined	
Thickness of Connected Material (Chapter J3.10)	Defined	
Deformation at the Bolt Hole is a Design Consideration (Chapter J3.10)	Defined	
Materials with Yield/Tensile = 0	0	

Selection

ALL

+ Beam '15..Bolts_M24'

Elements: 154

Constants


Mean slip coefficient (mu)	0.3
In slip-critical connections (Du)	1.13
Factor for fillers (hf)	1
Number of slip planes (ns)	1
Number of bolt carrying the tension (nb)	1
Resistance factor (phi LRFD)	0.75
Safety factor (omega ASD)	2

1

OK Cancel

Create check parameters table

1

Execute  **Table (expand/extreme)** in Standards => Checks => 1..Bolt Check context menu

2

In Load Group, press 

3

Select **Load Group** => **1..Overall** and press **OK**

4

Table Type: **Extreme (worst result on selection)**

5

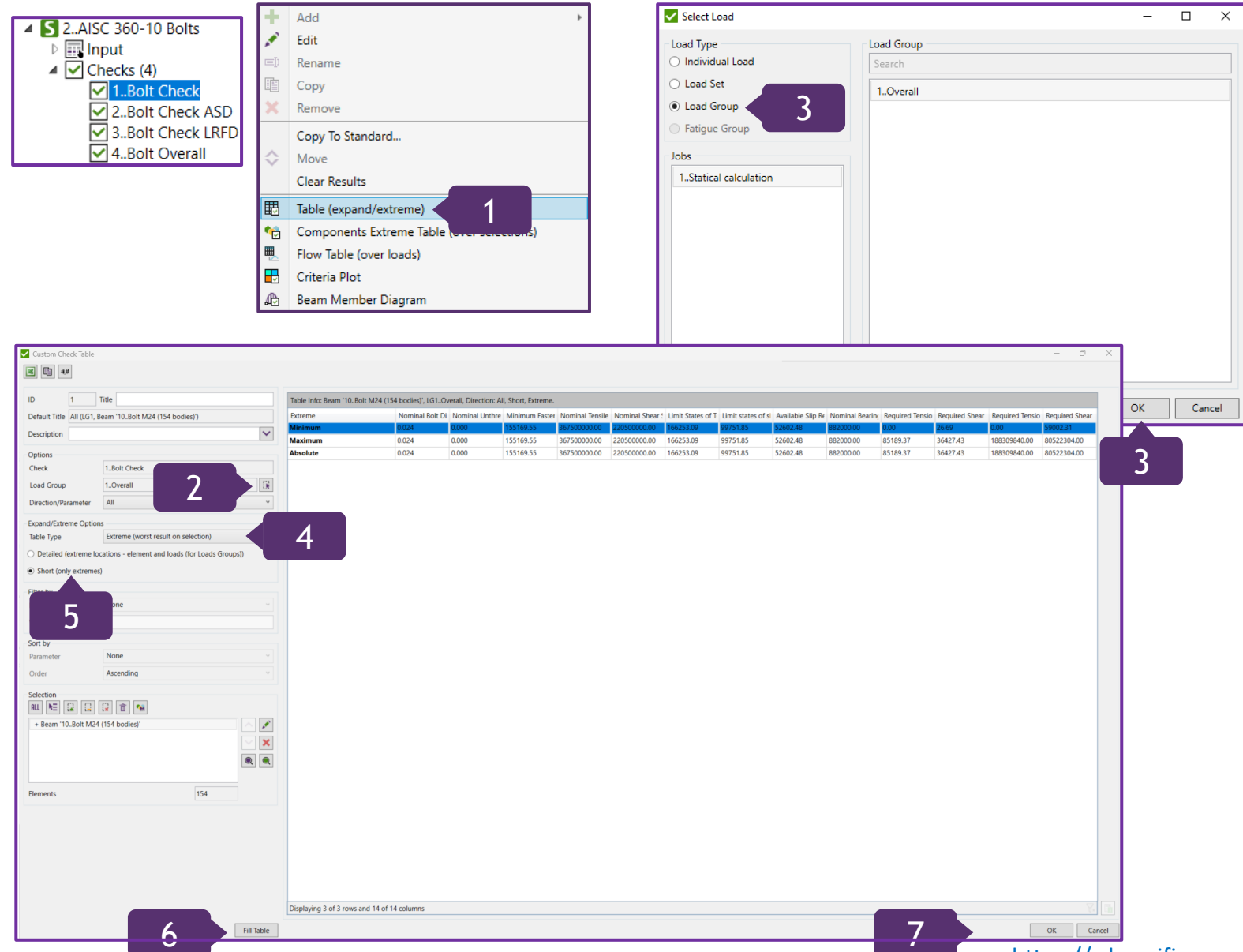
Table Type: **Short (only extremes)**- **ON**

6

Press **Fill Table**

7

Press **OK**




The screenshot displays the SDC Verifier software interface with several windows and callouts:

- Project Tree:** Shows a hierarchy with '2..AISC 360-10 Bolts' expanded to 'Checks (4)', where '1..Bolt Check' is selected.
- Context Menu:** Opened for '1..Bolt Check', showing options like 'Add', 'Edit', 'Rename', 'Copy', 'Remove', and 'Table (expand/extreme)' (callout 1).
- Select Load Dialog:** Shows 'Load Type' set to 'Load Group' (callout 3) and 'Load Group' set to '1..Overall'. 'OK' and 'Cancel' buttons are at the bottom.
- Custom Check Table Dialog:** The main window for configuring the table. It includes:
 - Options:** 'Check' set to '1..Bolt Check' (callout 2), 'Load Group' set to '1..Overall', and 'Direction/Parameter' set to 'All'.
 - Expand/Extreme Options:** 'Table Type' set to 'Extreme (worst result on selection)' (callout 4) and 'Short (only extremes)' checked (callout 5).
 - Fill Table:** A button to generate the table (callout 6).
 - Table Data:** A table with columns for various parameters and their values. The first row shows 'Minimum' values, and the second row shows 'Maximum' values.
 - Buttons:** 'OK' and 'Cancel' buttons at the bottom right (callout 7).

Create Extreme Table

1

Execute  **Table (expand/extreme)** in Standards => Checks => 4..Bolt Overall context menu

2

In Load Group, press 

3

Select **Load Group** => **1..Envelope** and press **OK**

4

Table Type: **Extreme** (worst result on selection)

5

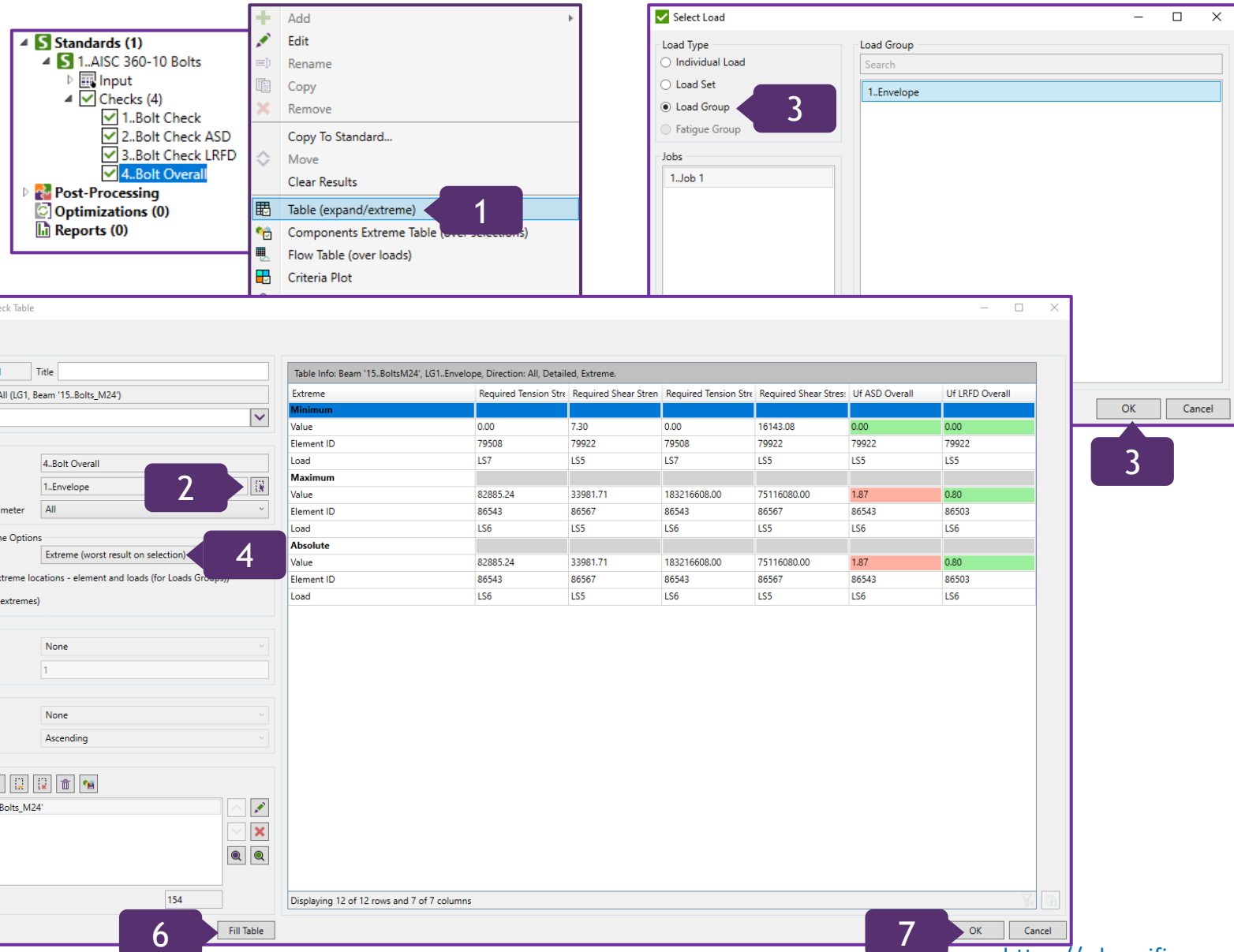
Table Type: **Extreme; Detailed** (extreme locations-element and load (for Load Groups)) - **ON**

6

Press **Fill Table**

7

Press **OK**



Standards (1)

- 1..AISC 360-10 Bolts
 - Input
 - Checks (4)
 - 1..Bolt Check
 - 2..Bolt Check ASD
 - 3..Bolt Check LRFD
 - 4..Bolt Overall
 - Post-Processing
 - Optimizations (0)
 - Reports (0)

Context Menu

- Add
- Edit
- Rename
- Copy
- Remove
- Copy To Standard...
- Move
- Clear Results
- Table (expand/extreme)**
- Components Extreme Table (over selections)
- Flow Table (over loads)
- Criteria Plot

Select Load

Load Type

- ☐ Individual Load
- ☐ Load Set
- ☒ Load Group
- ☐ Fatigue Group

Load Group

Search

1..Envelope

Jobs

1..Job 1

Custom Check Table

ID: 1 Title:

Default Title: All (LG1, Beam '15..Bolts_M24')

Description:

Options

Check: 4..Bolt Overall

Load Group: 1..Envelope

Direction/Parameter: All

Expand/Extreme Options

Table Type: **Extreme (worst result on selection)**

☒ Detailed (extreme locations - element and loads (for Load Groups))

Short (only extremes)

Value >: None

Sort by: None

Parameter: None

Order: Ascending

Selection

+ Beam '15..Bolts_M24'

Elements: 154



Table Info: Beam '15..BoltsM24', LG1..Envelope, Direction: All, Detailed, Extreme.

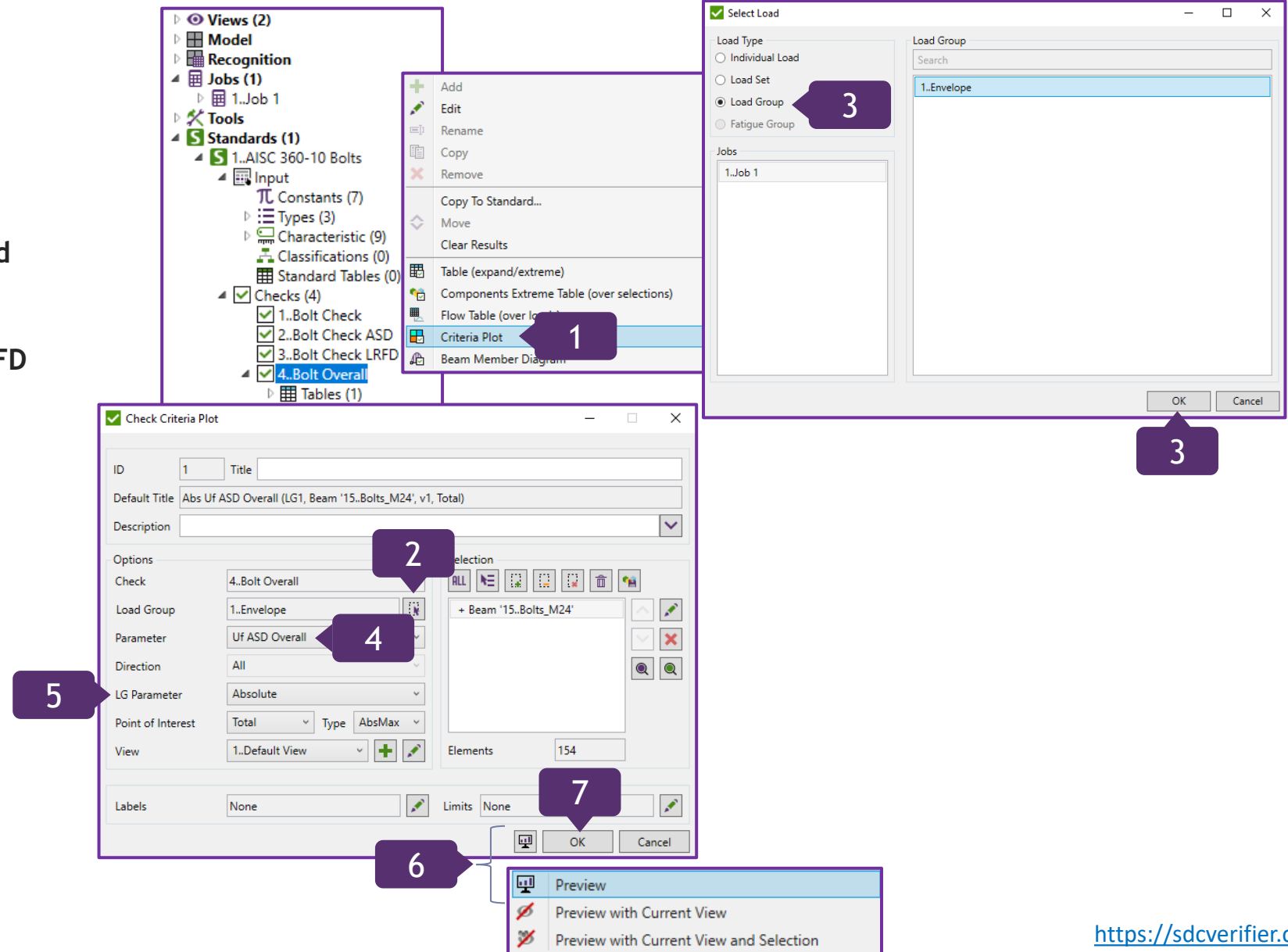
Extreme	Required Tension Str	Required Shear Str	Required Tension Str	Required Shear Str	UF ASD Overall	UF LRFD Overall
Minimum						
Value	0.00	7.30	0.00	16143.08	0.00	0.00
Element ID	79508	79922	79508	79922	79922	79922
Load	LS7	LS5	LS7	LS5	LS5	LS5
Maximum						
Value	82885.24	33981.71	183216608.00	75116080.00	1.87	0.80
Element ID	86543	86567	86543	86567	86543	86503
Load	LS6	LS5	LS6	LS5	LS6	LS6
Absolute						
Value	82885.24	33981.71	183216608.00	75116080.00	1.87	0.80
Element ID	86543	86567	86543	86567	86543	86503
Load	LS6	LS5	LS6	LS5	LS6	LS6

Displaying 12 of 12 rows and 7 of 7 columns

Buttons: OK, Cancel

Utilization Factor Plot

- 1 In Standards, Checks => 4..Bolt Overall, execute *Criteria Plot*
- 2 In Load Group, press 
- 3 Select *Load Group*, 1..Envelope and press *OK*
- 4 Parameter: Uf ASD Overall or Uf LRFD Overall methods
- 5 LG Parameter: Absolute
- 6 Press , and then *Preview*
- 7 Press *OK*

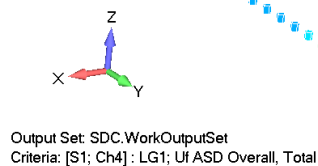


The screenshot illustrates the process of creating a Utilization Factor Plot in SDC Verifier. It shows three main windows: the 'Views' tree, the 'Select Load' dialog, and the 'Check Criteria Plot' dialog.

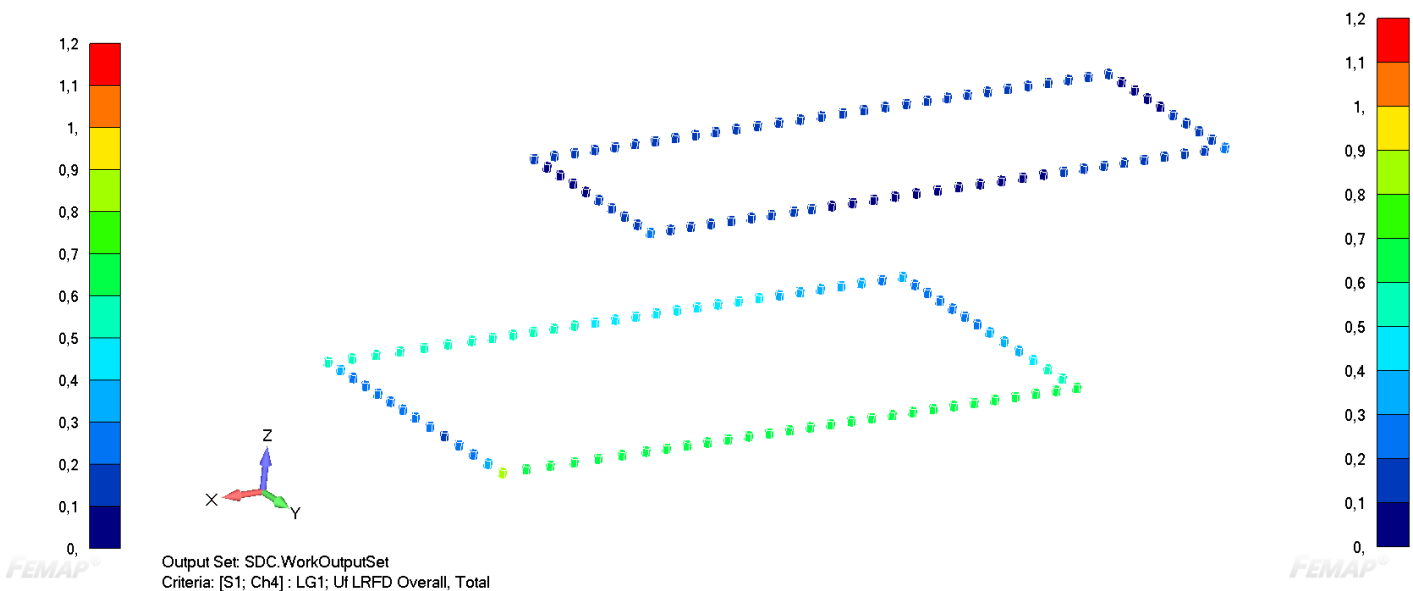
- Views (2) Tree:** The 'Checks (4)' folder is expanded, showing '1..Bolt Check', '2..Bolt Check ASD', '3..Bolt Check LRFD', and '4..Bolt Overall'. The 'Criteria Plot' option is highlighted in the context menu.
- Select Load Dialog:** The 'Load Group' radio button is selected, and '1..Envelope' is chosen in the 'Load Group' list. The 'OK' button is highlighted.
- Check Criteria Plot Dialog:** The 'Options' section shows 'Check' set to '4..Bolt Overall', 'Load Group' set to '1..Envelope', 'Parameter' set to 'Uf ASD Overall', 'Direction' set to 'All', and 'LG Parameter' set to 'Absolute'. The 'Point of Interest' is 'Total' and the 'Type' is 'AbsMax'. The 'View' is '1..Default View'. The 'Elements' list shows '154' elements. The 'Preview' button is highlighted.

Numbered callouts (1-7) correspond to the steps in the list on the left, indicating the sequence of actions to be performed.

The results of ASD calculation



The results of LRFD calculation



To learn how to obtain reports, please check a separate Tutorial that depicts the functionality of SDC Verifier Report Designer. It may be downloaded via this link:

<https://sdcverifier.com/tutorials/report-designer/>