



# Tutorial

## **AISC 360-10**

**Simcenter 3D**

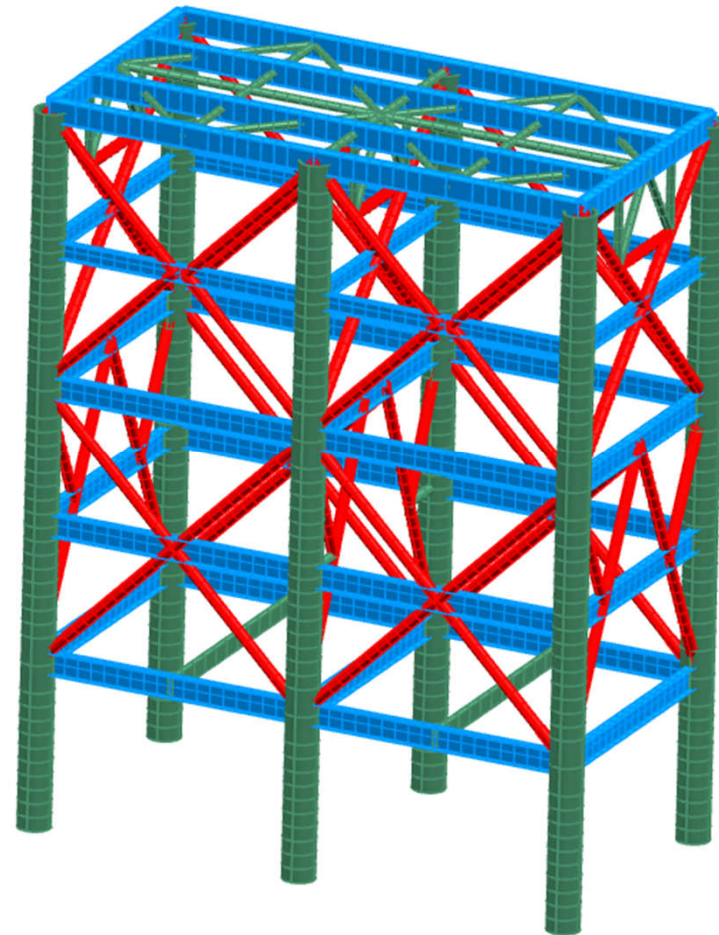
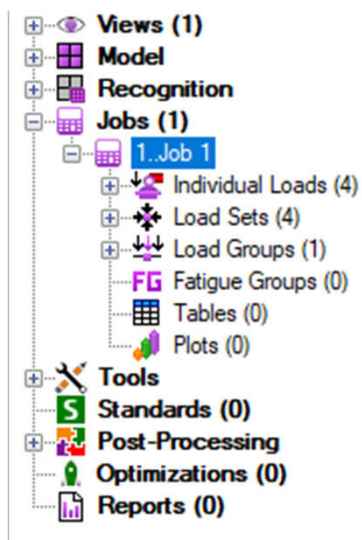
14 Jan 2021  
version 2020.0.2

- ▶ In this tutorial, AISC 360-10 Beam Design Checks are reviewed in details.
- ▶ A beam model structure has been used as a start FEM model.
- ▶ Beam member finder was used to recognize beam member dimensions.
- ▶ Report was automatically generated in SDC Verifier Report to represent beam checks results according AISC 360-10 standard.

- 3 ) Project: **AISC360.simv**



# Predefined project



This tutorial uses project with predefined boundary condition, load combinations and load group.  
The model contains only beam elements of the following types: I-Beam, Circular and Rectangular Tubes

# Explanation of Joints

Joint – location where different beam members connect. They are used to recognize beam member length by Beam Member Finder Tool.

There are 6 types of Joints:

1D Joint – 2 beam members that lie on the curve but with different properties;

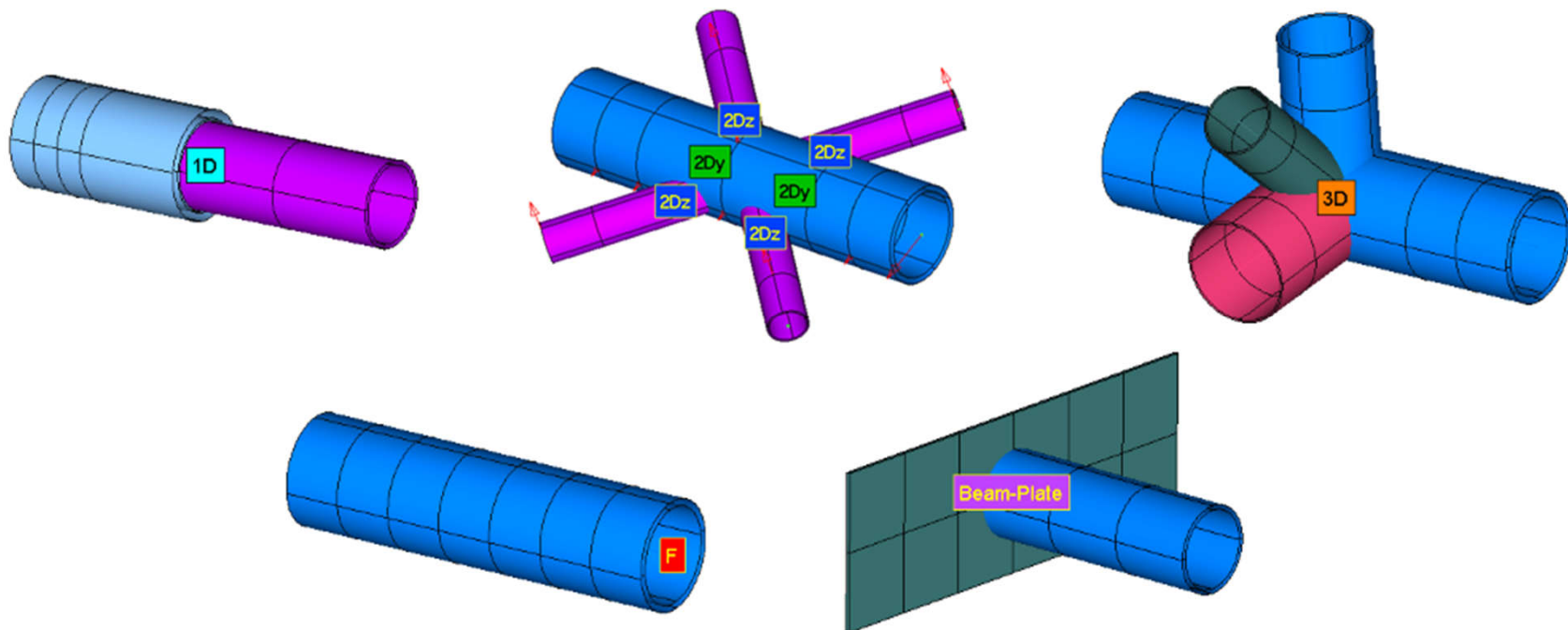
2D Joint – beam members connected in one plane;

3D Joint – beam members connected in space;

Free Joint – node which belongs only to one element (free);

Beam-Plate Joint – beam member connected to plates (perpendicularly);

User Defined;

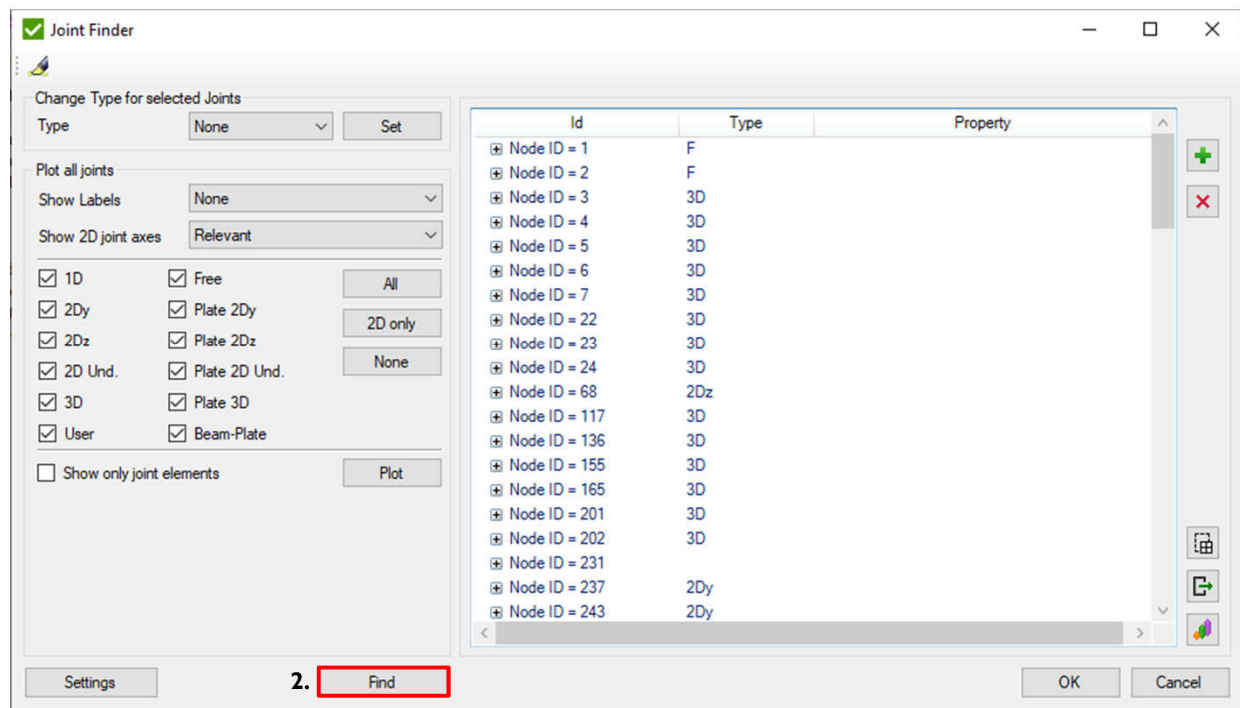
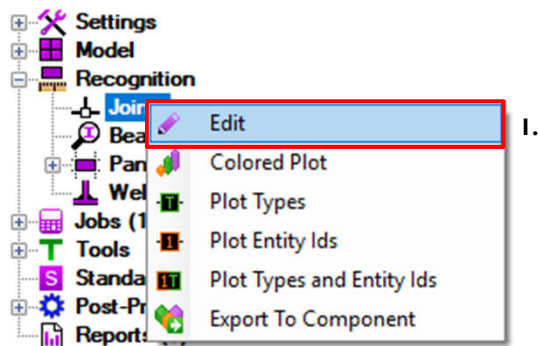


# Joint Recognition

1 Execute *Edit* from *Joints* context menu

2 Press *Find*.

When performing the joint recognition there are 3 options for existing joints. Default option: Keep only modified– remove all joints except edited by user. Keep all existing options should be used when additional elements were added to the model

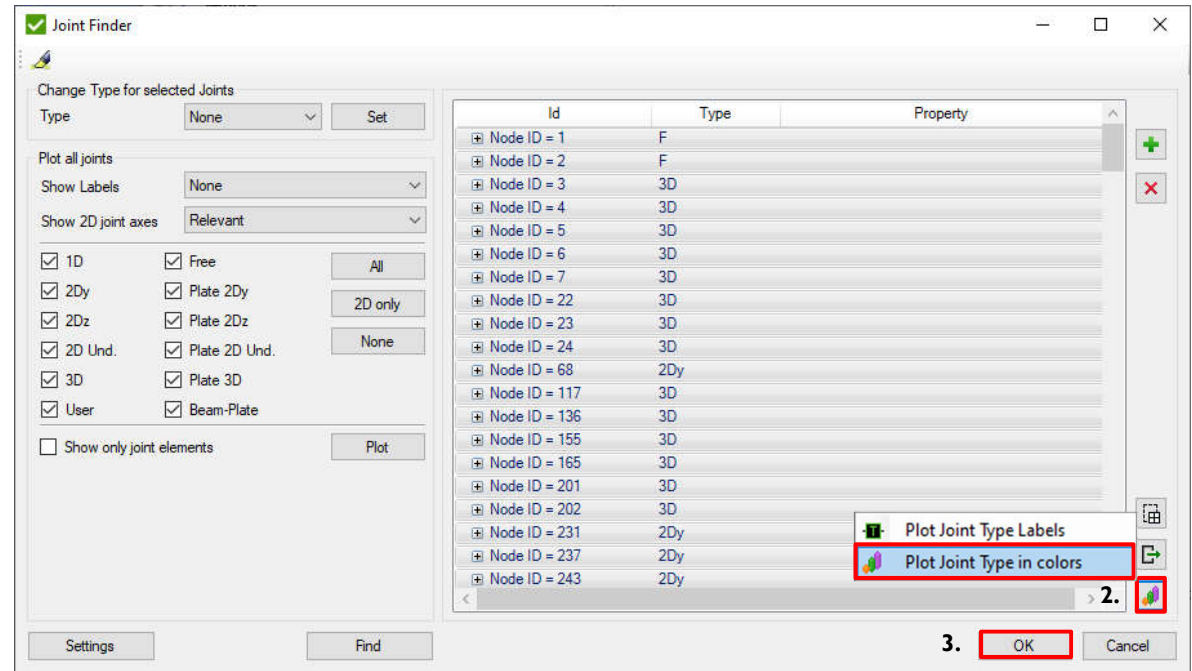
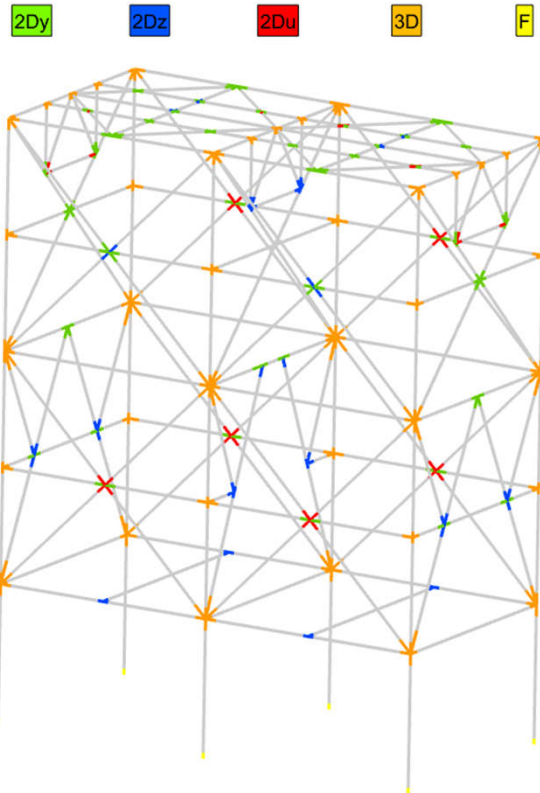


# Joints Plot

1 Select All Joints (Ctrl+A).

2 Press 

3 Press OK



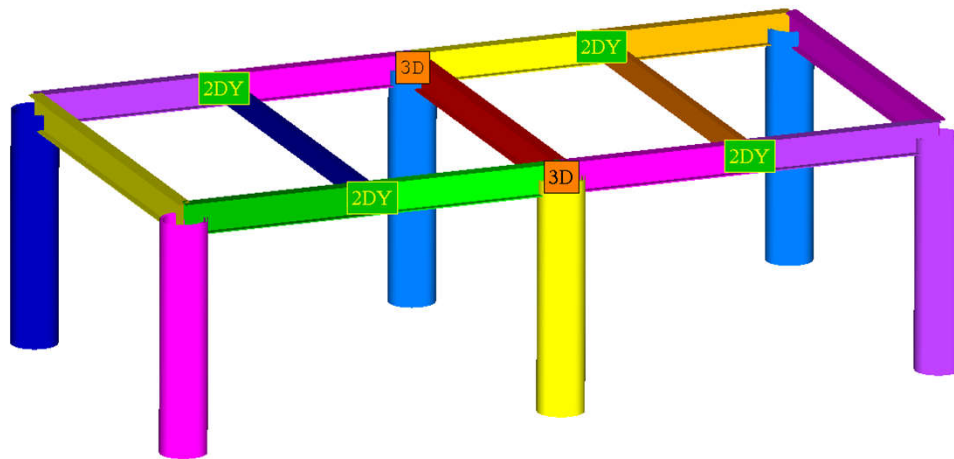
Modify Joint Type:

Change Type for selected Joints

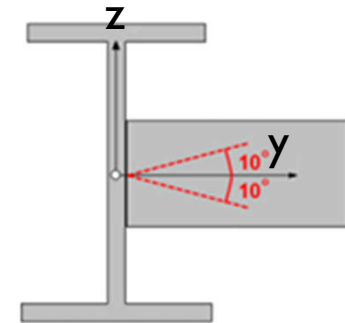
Type

# Beam Member Lengths in 2 directions

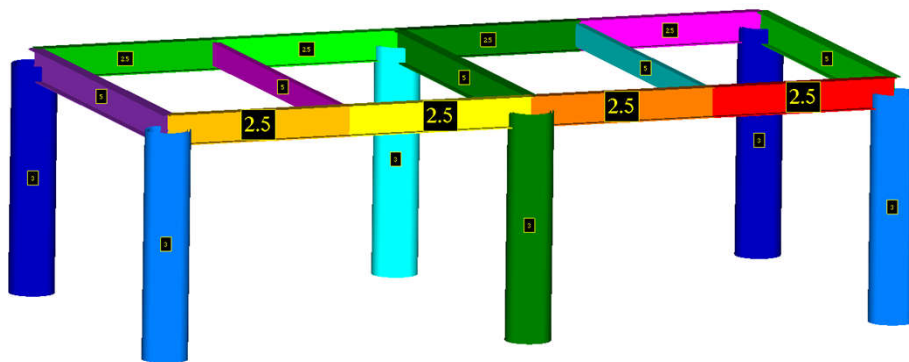
Beam Member Finder recognizes beam members and (buckling) lengths for different directions (Y, Z and Torsional).



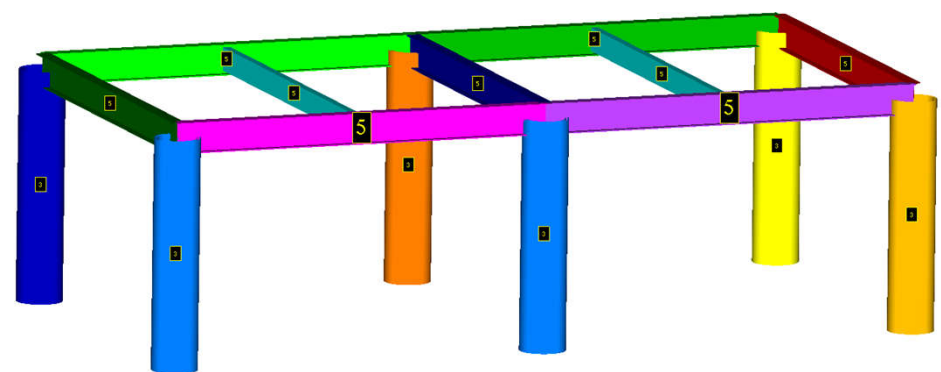
2DY  
Joint



Length Y – 4 Beam Members with  $L = 2.5$



Length Z – 2 Beam Members with  $L = 5$



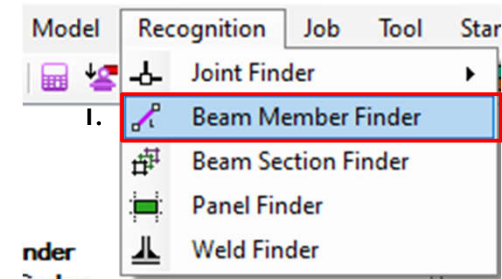


# Recognize Length

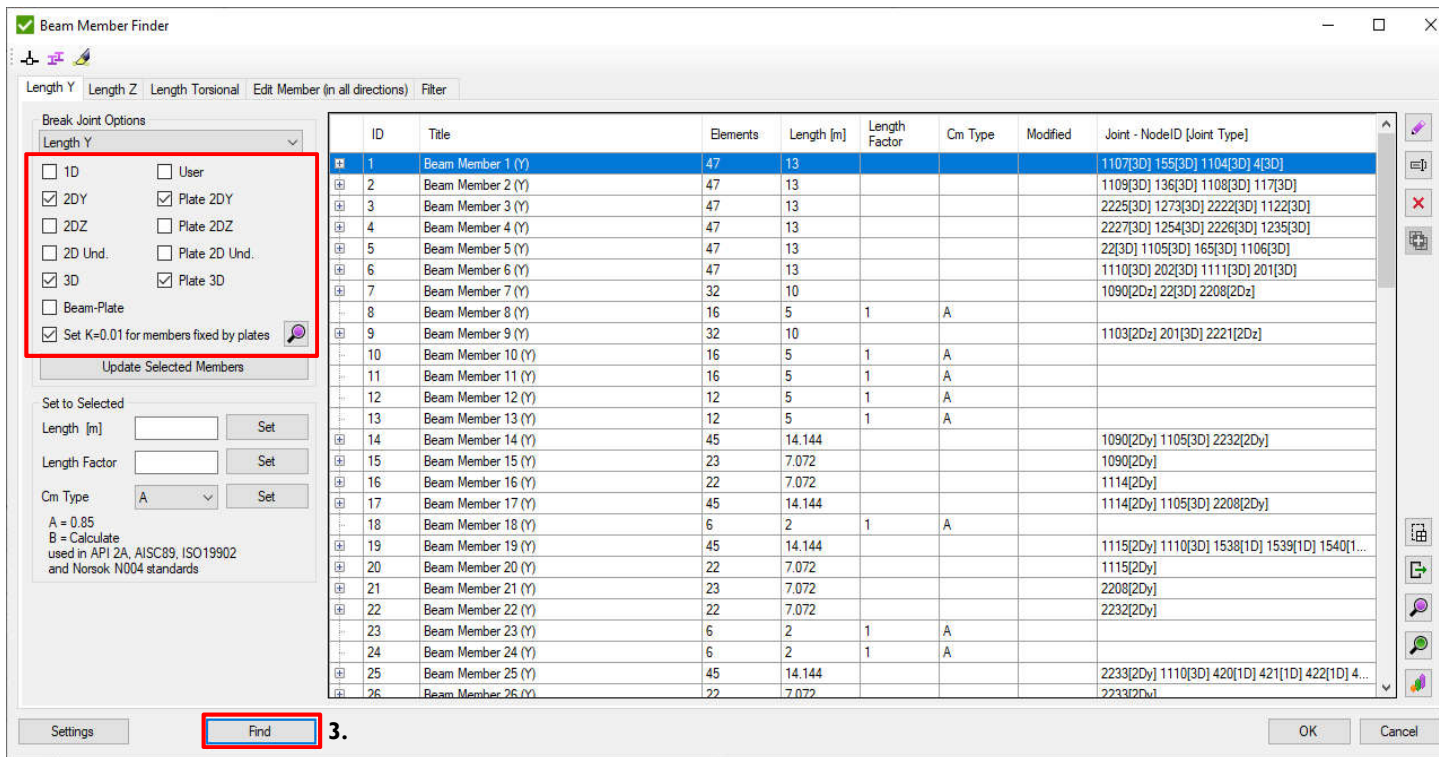
1 Execute *Recognition – Beam Member Finder*

2 Break Joint Options:  
Length Y – 2DY, 3D, Plate 2DY, Plate 3D  
Length Z – 2DZ, 3D, Plate 2DZ, Plate 3D  
Length Y – 2DY, 2DZ, 2D Und, 3D

3 Press *Find*.



2.



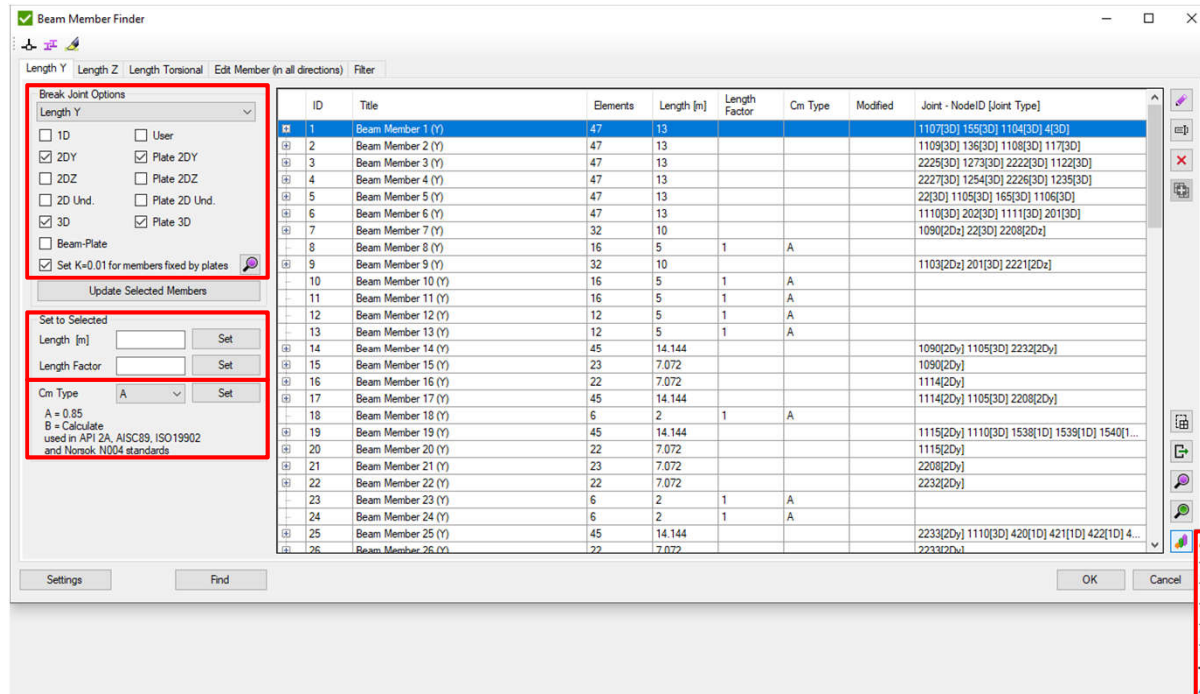
3.

# Beam Member Finder interface

Break Options define what joints are used to split beam members

Change Length/Factor for selected beam members

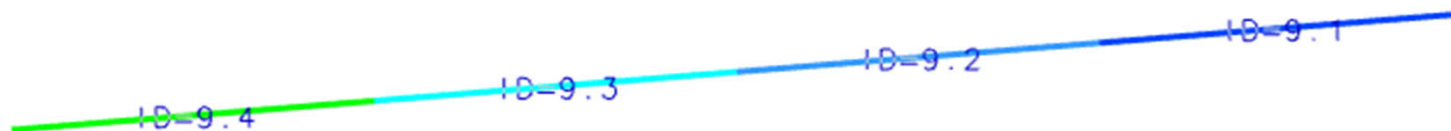
Cm Type is used in API 2A, ISO 19902 and Norsok N004 standards



Colored Plot of members with labels (ID, Length, Factor or Cm Type).



Beam Member – straight line. If it contains joints it is split on sub members

9	Beam Member 9	32	10000				1103[2Dz] 201[3D] 2221[2Dz]
9.1	Sub Member 9.1	8	2500	1	A		
9.2	Sub Member 9.2	8	2500	1	A		
9.3	Sub Member 9.3	8	2500	1	A		
9.4	Sub Member 9.4	8	2500	1	A		

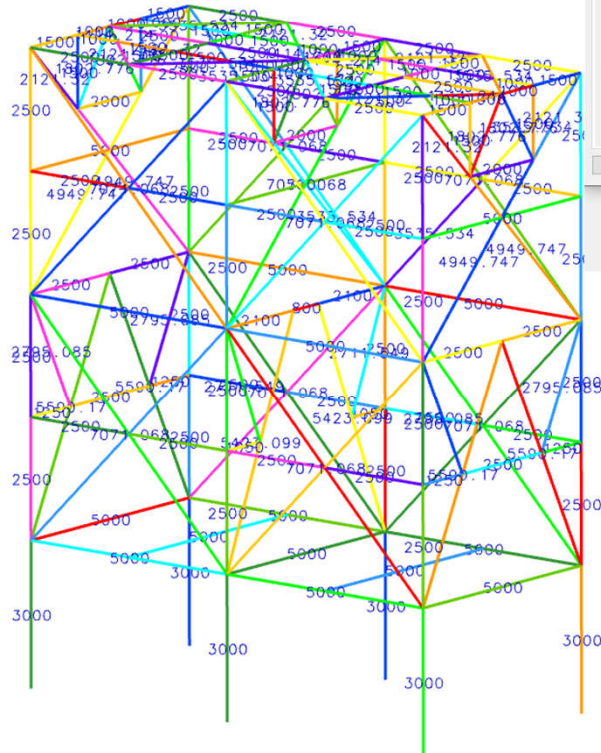
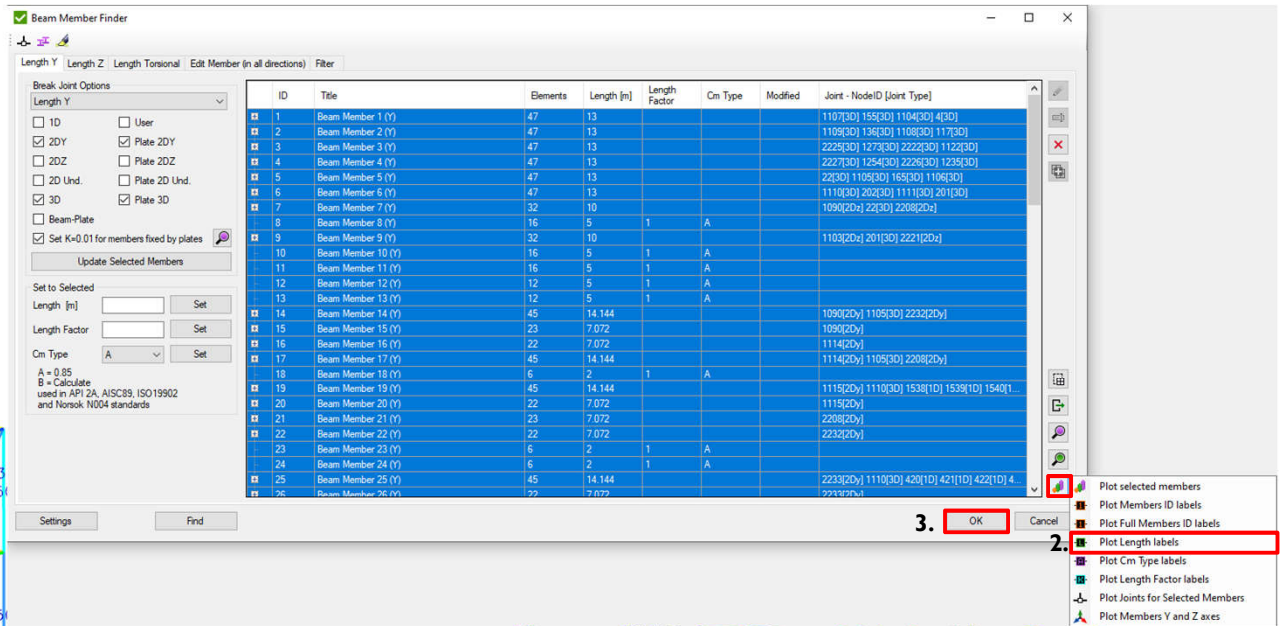



# Beam Member's Length Plot

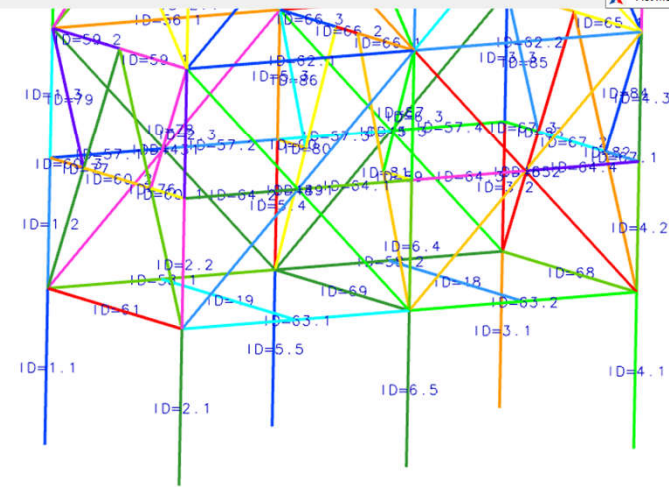
1 Select All Beam Members (Ctrl+A)

2 Press  and  Plot Length labels to display Length Plot

3 Press OK



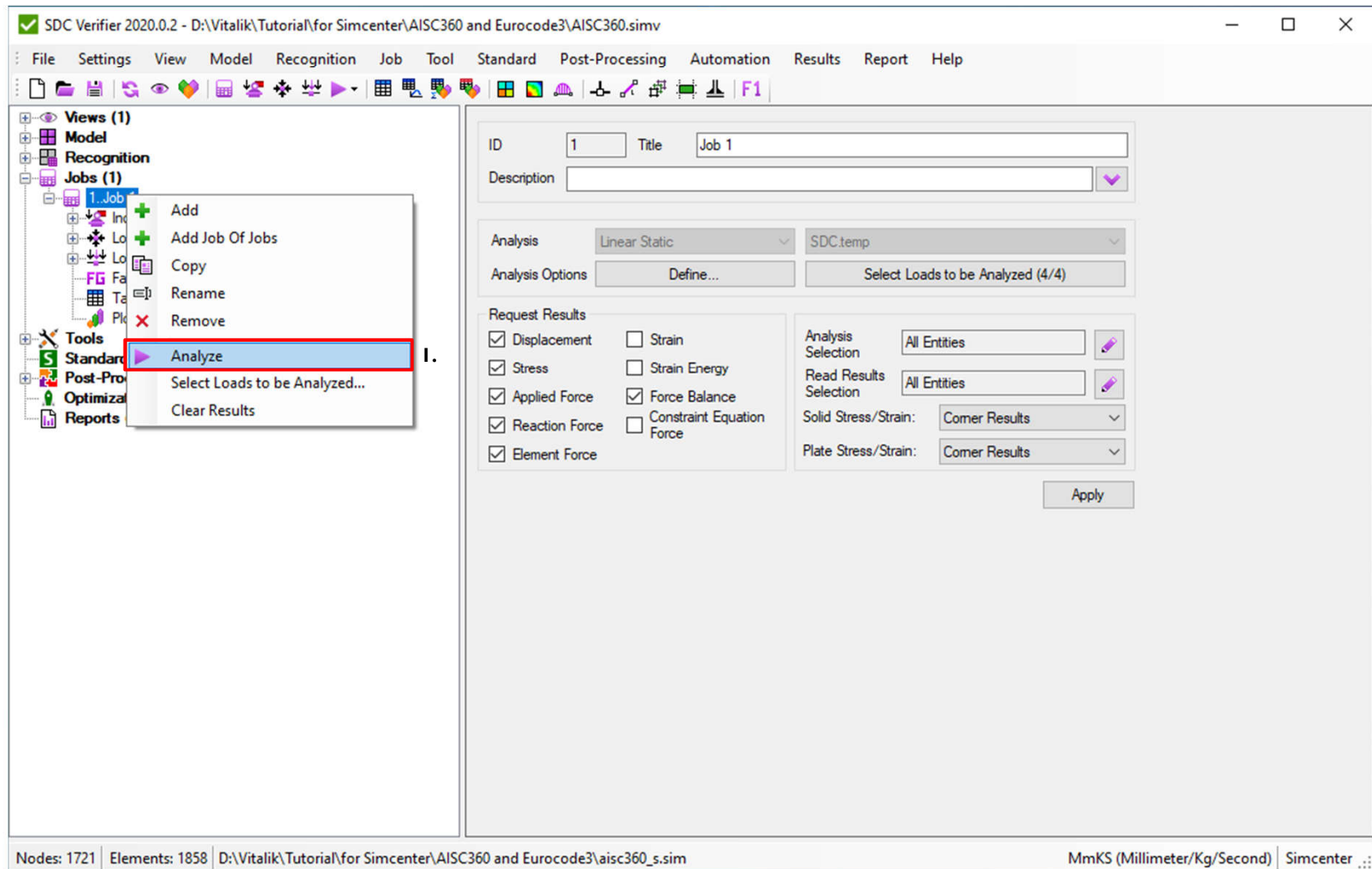
Also it is possible to display beam members IDs by pressing 



# Analyze Job

1

Execute ► **Analyze** from Job1 context menu



## STEEL CONSTRUCTION



## MANUAL

AMERICAN INSTITUTE  
OF  
STEEL CONSTRUCTION  
INC.

THIRTEENTH EDITION

ANSI/AISC 360-10 - an American national standard "Specification for Structural Steel Buildings", released on June 22, 2010. Checks are performed according to the provisions for load and resistance factor design (LRFD) and allowable strength design (ASD). The standard implements checks for design of members for tension, compression, bending, shear and combined.

## Specification for Structural Steel Buildings

March 9, 2005

Supersedes the *Load and Resistance Factor Design Specification for Structural Steel Buildings* dated December 27, 1999, the *Specification for Structural Steel Buildings—Allowable Stress Design and Plastic Design* dated June 1, 1989, including Supplement No. 1, the *Specification for Allowable Stress Design of Single-Angle Members* dated June 1, 1989, the *Load and Resistance Factor Design Specification for Single-Angle Members* dated November 10, 2000, and the *Load and Resistance Factor Design Specification for the Design of Steel Hollow Structural Sections* dated November 10, 2000, and all previous versions of these specifications.

Approved by the AISC Committee on Specifications and issued by the AISC Board of Directors

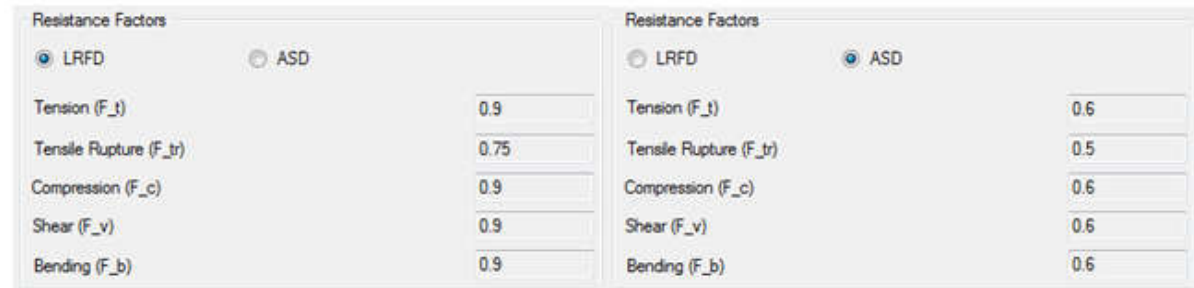


AMERICAN INSTITUTE OF STEEL CONSTRUCTION, INC.  
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Chicago, Illinois 60601-1802



# LRFD vs ASD

It is possible to check a design according to load and resistance factor design (LRFD) or allowable strength design (ASD). The difference between 2 designs is in load combinations and resistance factors:



Resistance Factors	LRFD	ASD
Tension (F <sub>t</sub> )	0.9	0.6
Tensile Rupture (F <sub>tr</sub> )	0.75	0.5
Compression (F <sub>c</sub> )	0.9	0.6
Shear (F <sub>v</sub> )	0.9	0.6
Bending (F <sub>b</sub> )	0.9	0.6

## Design for Strength Using Load and Resistance Factor Design (LRFD)

Design will be performed in accordance with Equation B3-1:

$$R_u \leq \phi R_n \text{ (B3-1),}$$

where:

$R_u$  = required strength using LRFD load combinations;

$R_n$  = nominal strength, specified in Chapters B through K;

$\phi$  = resistance factor, specified in Chapters B through K;

$\phi R_n$  = design strength.

## Design for Strength Using Allowable Strength Design (ASD)

Design will be performed in accordance with Equation B3-2:

$$R_a \leq R_n / \Omega \text{ (B3-2),}$$

where:

$R_a$  = required strength using ASD load combinations;

$R_n$  = nominal strength, specified in Chapters B through K;

$\Omega$  = safety factor, specified in Chapters B through K;

$R_n / \Omega$  = allowable strength.

According to the standard Design Strength is multiplied by LRFD factor and divided by ASD factor.

For tensile yielding in the gross section:

$$P_n = F_y A_g \quad (D2-1)$$

$$\phi_t = 0.90 \text{ (LRFD)} \quad \Omega_t = 1.67 \text{ (ASD)}$$

In SDC Verifier multiplication is always used ASD factor is converted to  $1 / S_f$  (ASD). For example: tensile resistance factor ( $F_t$ ) =  $1 / 1.67 = 0.6$ .

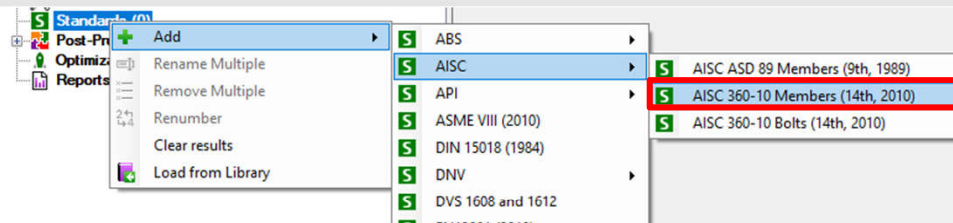
# Add AISC360-10 standard

1

Execute **Standards => Add => AISC360-10** from context menu

2

Resistance Factors: **LRFD**



1.

The screenshot shows the 'AISC 360-10 Members (14th, 2010)' dialog box. The 'ID' field is set to 1, and the 'Title' field is set to 'AISC 360-10 Members (14th, 2010)'. The 'Alias' field is set to 'Standard1'. The 'Description' field is empty. The 'Settings' section includes the following options: Resistance Factors (set to LRFD, highlighted with a red box), Section Build Type (set to User defined Cb), Calculate Cb (based on moment diagram, Chapter F1) (unchecked), User defined Cb (checked), Stiffener Distance (Chapter G2.1) (set to Defined), Net Area (Chapter D2.2) (set to Defined), Shear Lag Factor (Table D3.1) (set to Defined), and Calculate asymmetric shapes as symmetric (unchecked). The 'Selection' section includes the following options: ALL (checked), + 6 Shapes, and Elements (set to 1856). The 'Materials with Yield and Tensile = 0' field is set to 1. The 'Second order effects (APPENDIX 8)' section includes the following options: Take into account second-order effects (B1 multiplier) (unchecked), Use Cm = 1 (conservative) (unchecked), and Calculate Cm: case a = 0.6 - 0.4 \* M1 / M2, case b = 1.0 (checked). The 'Torsion' section includes the following options: Include Torsion check (unchecked), and Warping is neglected for the torsion check. Additional assessment is therefore required for open sections flagged with a UC=1234. SDC returns this error UC code for open sections with an UF.torsion exceeding: 0.3. The 'Preview Not Supported Elements' button is visible at the bottom left. The 'OK' and 'Cancel' buttons are at the bottom right.

# Section Build Type

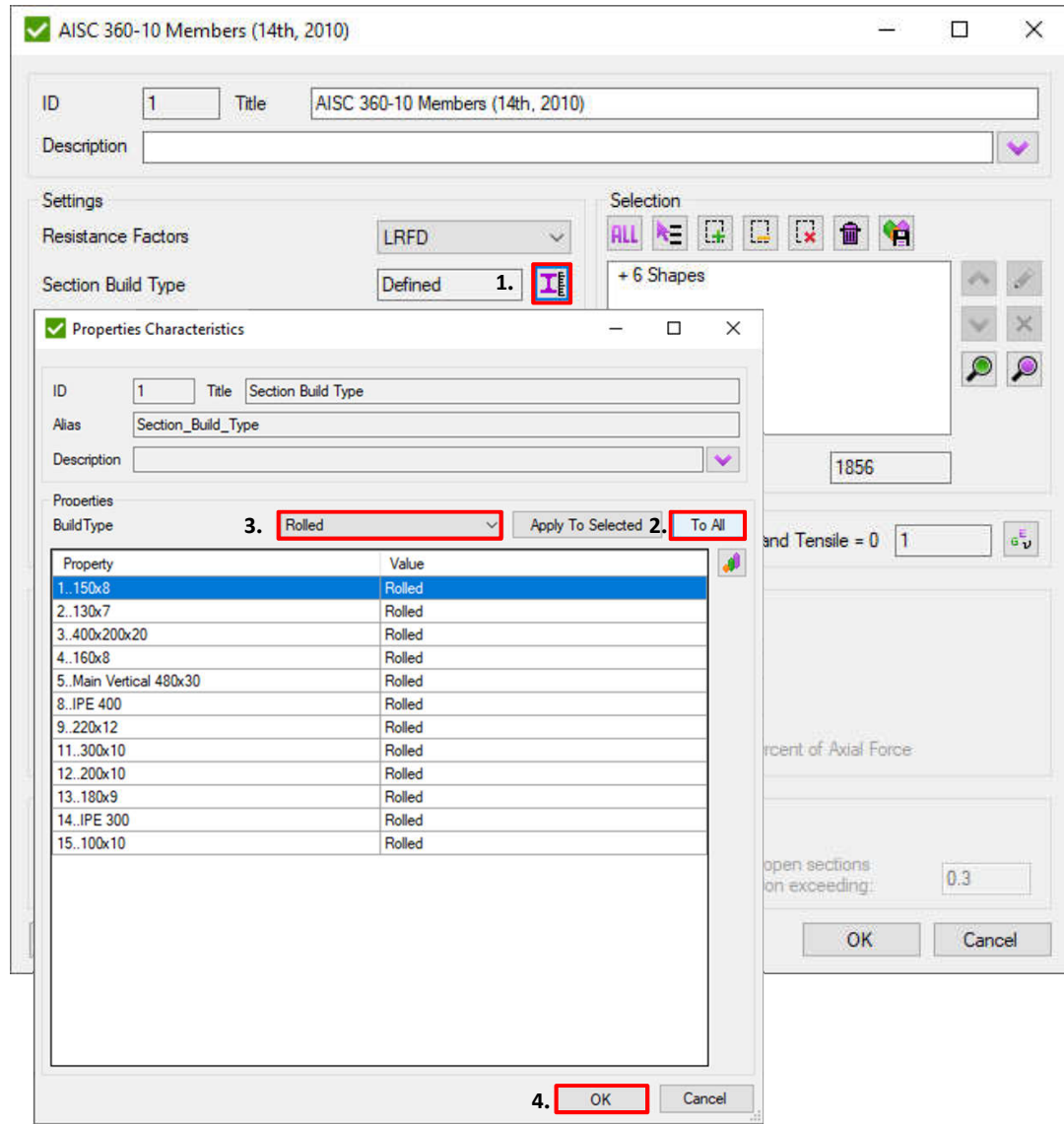
1 Press  for Section Build Type

2 Build Type: **Rolled**

3 Select *To All*

4 Press *OK*

Go to the next slide to Continue




**AISC 360-10 Members (14th, 2010)**


ID: 1 Title: AISC 360-10 Members (14th, 2010)

Description:

Settings

Resistance Factors: LRFD

Section Build Type: Defined 1. 

Selection: ALL  + 6 Shapes

**Properties Characteristics**

ID: 1 Title: Section Build Type

Alias: Section\_Build\_Type

Description:

Properties

BuildType: 3. **Rolled** Apply To Selected 2. **To All**

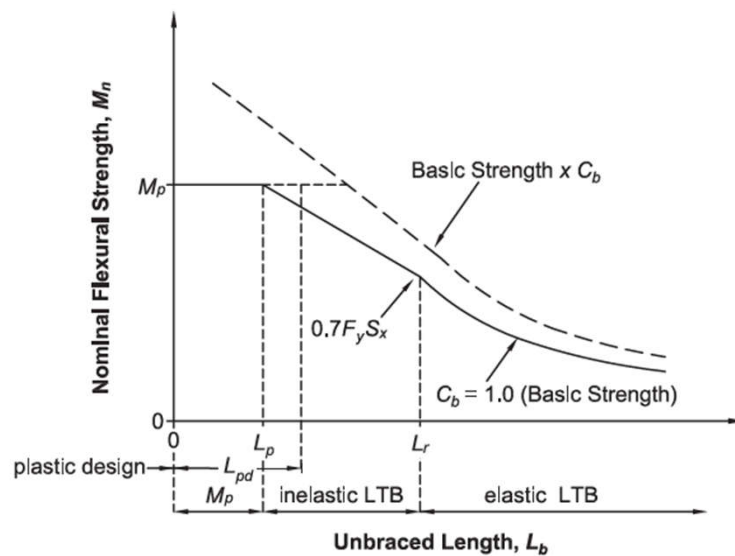
Property	Value
1..150x8	Rolled
2..130x7	Rolled
3..400x200x20	Rolled
4..160x8	Rolled
5..Main Vertical 480x30	Rolled
8..IPE 400	Rolled
9..220x12	Rolled
11..300x10	Rolled
12..200x10	Rolled
13..180x9	Rolled
14..IPE 300	Rolled
15..100x10	Rolled

OK Cancel



# Lateral-torsional buckling factor ( $C_b$ )

SDC Verifier follows conservative approach and uses  $C_b = 1.0$ .  $C_b$  is implemented as a characteristic which can be modified. For the details see Chapter F “Design of members for Flexure”, F1 General Provisions



✓ AISC 360-10 Members (14th, 2010)

ID: 1 Title: AISC 360-10 Members (14th, 2010)

Alias: Standard1

Description:

Settings

Resistance Factors: LRFD

Section Build Type: Defined

☒ Calculate  $C_b$  (based on moment diagram, Chapter F1)

☐ User defined  $C_b$ : Defined

Stiffener Distance (Chapter G2.1): Defined

Net Area (Chapter D2.2): Defined

Shear Lag Factor (Table D3.1): Defined

☐ Calculate asymmetric shapes as symmetric

Selection

+ 11 Shapes

Elements: 1856

☐ Use API 2A RP for tubular shapes

Materials with Yield and Tensile = 0

Second order effects (APPENDIX 8)

☐ Take into account second-order effects (B1 multiplier)

☐ Use  $C_m = 1$  (conservative)

☒ Calculate  $C_m$ : case a =  $0.6 - 0.4 * M1 / M2$ , case b = 1.0

Not subject to transverse loading (case a) when Shear Force < 0.1 Percent of Axial Force

Torsion

☐ Include Torsion check


Warping is neglected for the torsion check. Additional assessment is therefore required for open sections flagged with a UC=1234. SDC returns this error UC code for open sections with an UF.torsion exceeding: 0.3

Preview Not Supported Elements

OK Cancel

# Define Material Characteristics

1

Press  to set the material yield stress and tensile strength

2

Select All Materials (Ctrl+A)

3

Tensile Strength: **360e+6**

4

Yield Stress: **240e+6**

5

Press *Set*

6

Press *OK*

7

Press *OK*

**AISC 360-10 Members (14th, 2010)**

ID: 1 Title: AISC 360-10 Members (14th, 2010)

Alias: Standard1

Description:

Settings

Resistance Factors: LRFD

Section Build Type: Defined

☒ Calculate  $C_b$  (based on moment diagram, Chapter F1)

☐ User defined  $C_b$ : Defined

Stiffener Distance (Chapter G2.1): Defined

Net Area (Chapter D2.2): Defined

Shear Lag Factor (Table D3.1): Defined

☐ Calculate asymmetric shapes as symmetric

Selection

+ 11 Shapes

Elements: 1856

☐ Use API 2A RP for tubular shapes

Materials with Yield and Tensile = 0

Second order effects (APPENDIX 8)

☐ Take into account second-order effects (B1 multiplier)

☐ Use  $C_m = 1$  (conservative)

☒ Calculate  $C_m$ : case a =  $0.6 - 0.4 \cdot M1 / M2$ , case b = 1.0

Not subject to transverse loading (case a) when Shear Force < 0.1 Percent of Axial Force

**Material Fatigue Parameters**

Materials	Tensile Strength [KPa]	Yield Stress [KPa]
1. AISI 4340 Steel	360000	240000
2. AISI 4130 Steel	360000	240000

Properties

Tensile Strength [KPa]: 360e6

Yield Stress [KPa]: 240e6

**Set**

**OK** **Cancel**

1.

3.

4.

5.

6.

# Standard is created

It is possible to modify Safety Factors in Constants section.

Standard contains 16 checks:  
1 - Beam member characteristics;  
2-6 - calculation dimensions and factors for 5 different shapes;  
7-11 – strength for different shapes ;  
12 – tension and compression check;  
13 – additional shear check;  
14 – additional bending check;  
15 – torsion check;  
16 - All Checks together with combined.

The screenshot shows the 'Standards (1)' tree on the left with '1..AISC 360-10 Members (14th, 2010)' selected. The 'Edit Constants' dialog box is open, displaying a table of constants.

Id	Title (Alias)	Value	Description
1	CalculateCb	1	Set 1 to calculate Cb based on formula (F1-1). Set 0 to use
2	SecondOrderEffect	0	Set 1 to take into account second order analysis effect (App
3	PercentOfAxial	0.1	if shear force is lower than percent of axial force than memb
4	CalculateCm	1	Cm will be calculated only when second analysis order effec
5	IncludeTorsionCheck	0	Include torsion check with neglected warping?
6	F_t	0.9	Tension Resistance Factor
7	F_c	0.9	Compression Resistance Factor
8	F_v	0.9	Shear Resistance Factor
9	F_b	0.9	Shear Resistance Factor
10	F_tr	0.75	Tensile Rupture Resistance Factor
11	F_vl	1	Shear rolled IBeam Resistance Factor
12	F_tor	0.9	Torsional Resistance Factor
13	Alpha	1	LRFD force level adjustment factor. Used in (A-8-1)
14	UFTorsionLimit	0.3	Additional assessment on torsion is required for open section
15	UFTorsionCode	1234	Code is used for Torsional Utilization Factor when it is highe
16	rolled	1	
17	built_up	2	
18	nonslender	3	
19	slender	4	
20	NotSupported	12345678	
21	compact	5	
22	noncompact	6	

The screenshot shows the 'Standards (1)' tree with '1..AISC 360-10 Members (14th, 2010)' selected. The 'Checks (16)' section is highlighted with a red box, showing a list of 16 checks, all of which are checked.

- 1..Beam Characteristics
- 2..Circular Tube
- 3..Rectangular Tube
- 4..Bars
- 5..Section C
- 6..Section I
- 7..Axial Strength
- 8..Shear Strength
- 9..Bending Strength Bars
- 10..Bending Strength I-beams
- 11..Bending Strength Channels
- 12..Axial
- 13..Shear
- 14..Bending
- 15..Torsion
- 16..Overall

# Preview Table Results

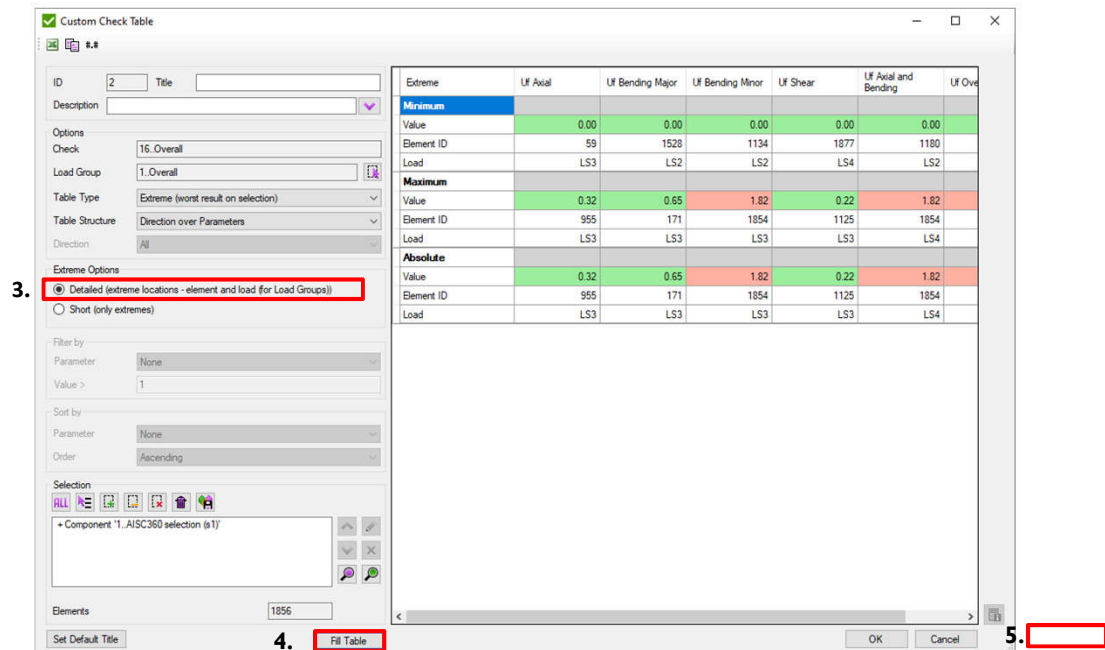
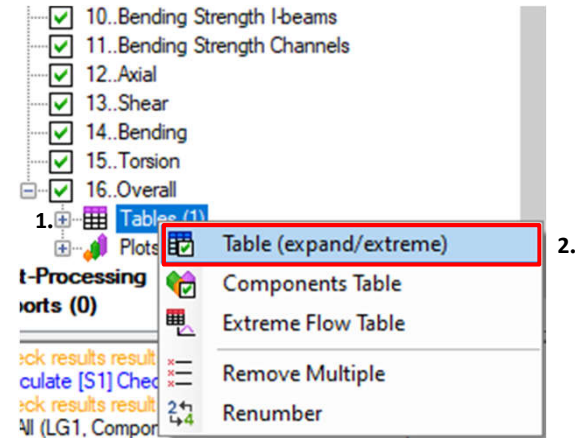
1 Select Tables

2 Execute Table (expand/extreme) in context menu


3 Select Extreme Options - Detailed

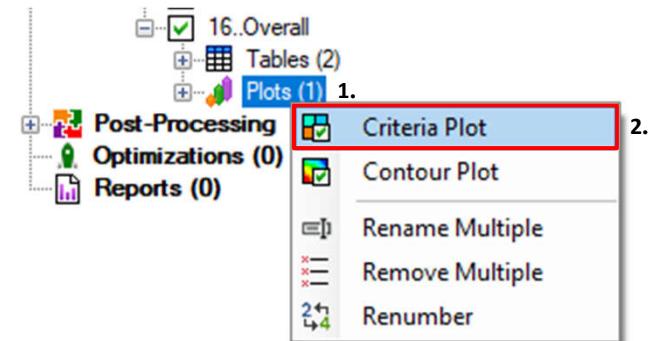
4 Press Fill Table

5 Press Ok

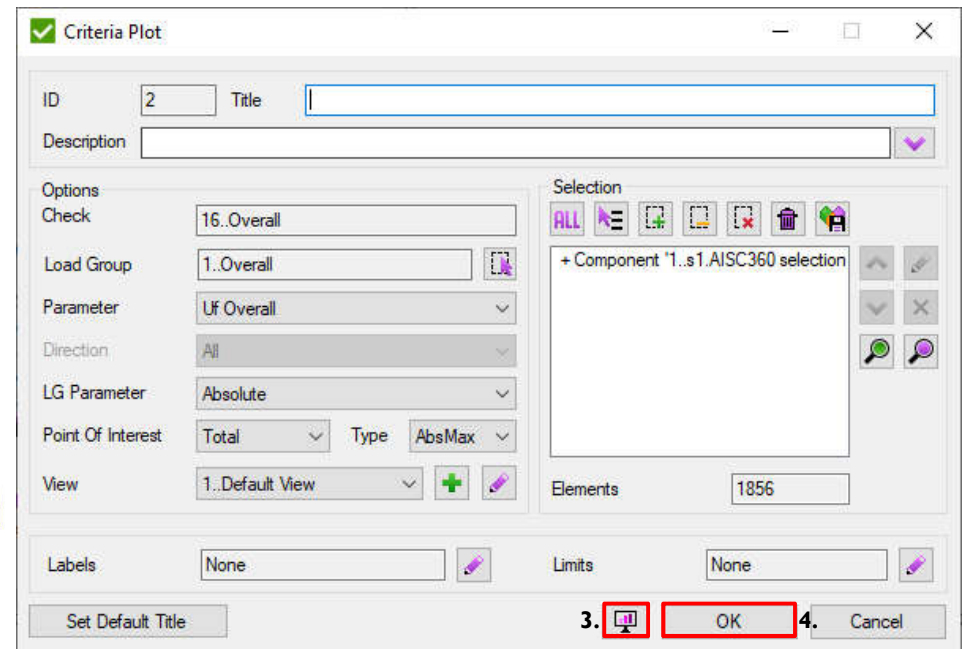
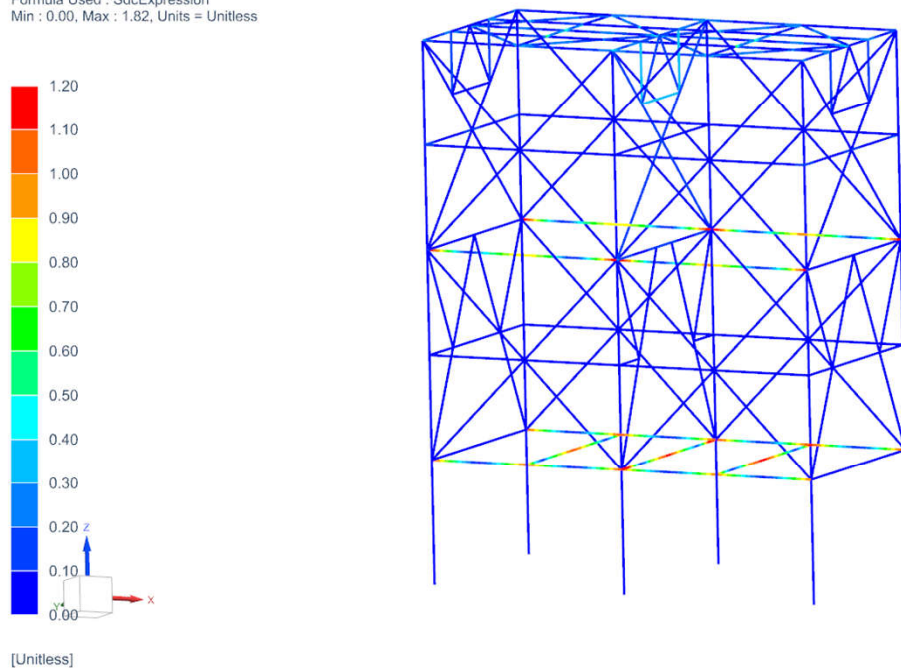


# Utilization Factor Plot

- 1 Select *Plots*
- 2 Execute *Criteria Plot* in context menu
- 3 Press  to preview Plot
- 4 Press *Ok*



aisc360\_s : Job 1 Linear Result  
SdcData, Static Step 1  
Member - Element-Nodal, Unaveraged, Scalar  
Formula Used : SdcExpression  
Min : 0.00, Max : 1.82, Units = Unitless



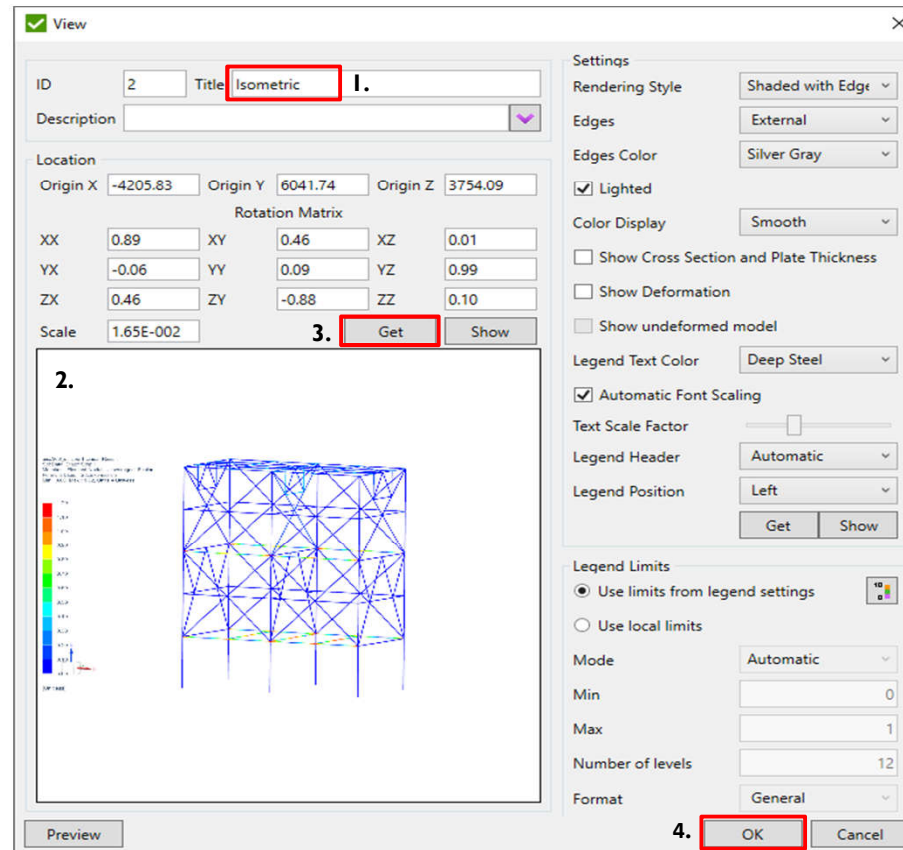
# Plot. Create View

1 Title: **Isometric**

2 Orient model in Simcenter as shown on the picture

3 Press *Get*


4 Press *OK*

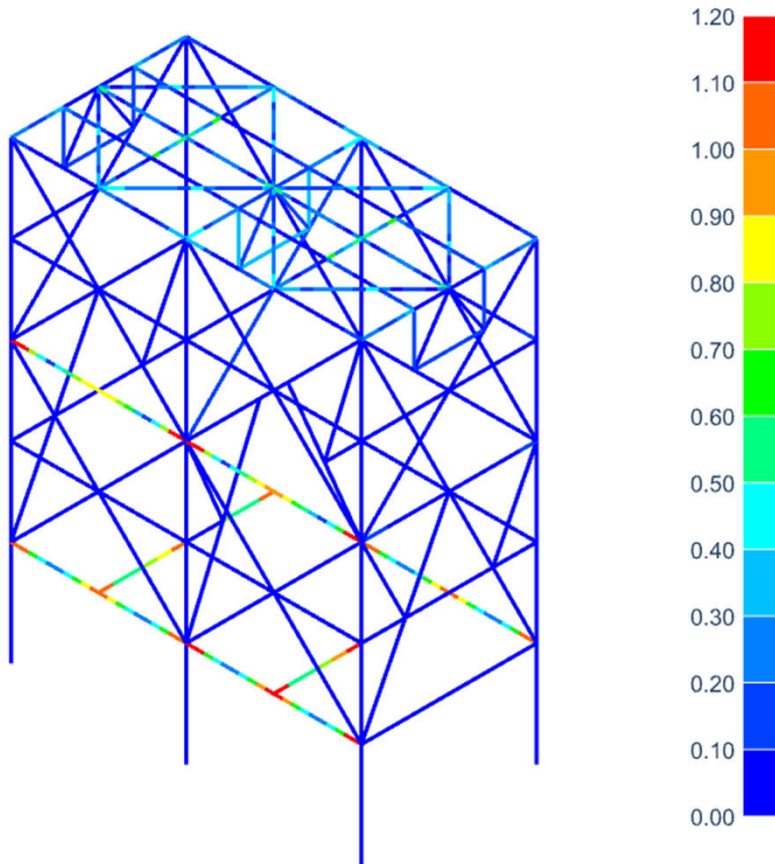




# Display Plot

1

Press  to display plot



Criteria Plot

ID: 5 Title:

Description:

Check: 13..Overall

Load Group: 1..Overall

Options

Parameter: Uf Overall

Direction: All

LG Parameter: Absolute

Point Of Interest: Value Type: AbsMax

View: 2..Isometric

Selection

ALL

+ Component '3..s1.AISC360 select

Elements: 1856

Limits


Type: None

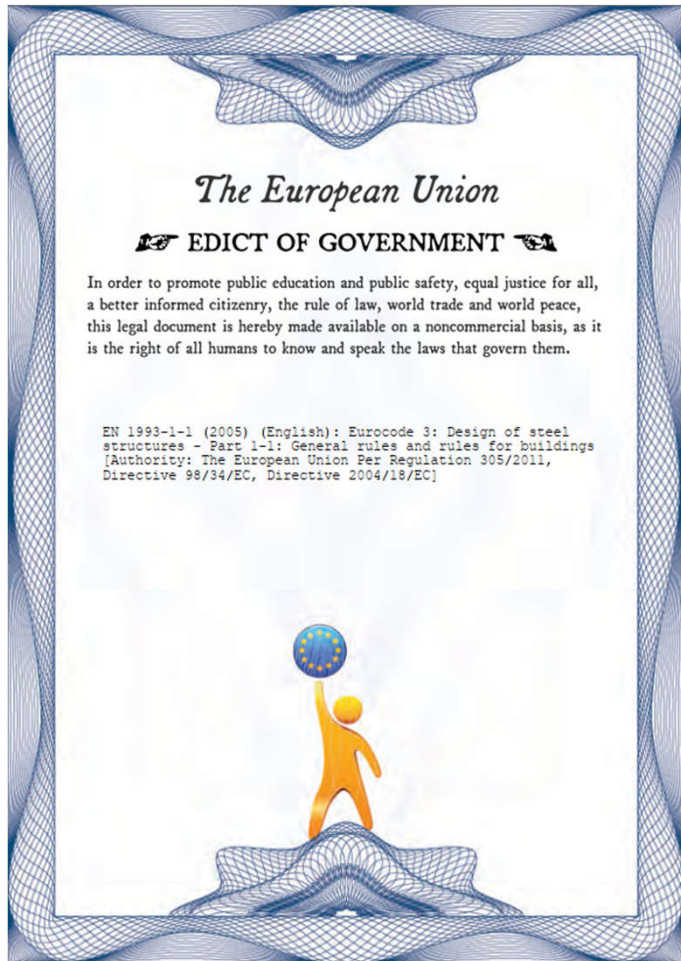
Minimum: 0

Maximum: 0

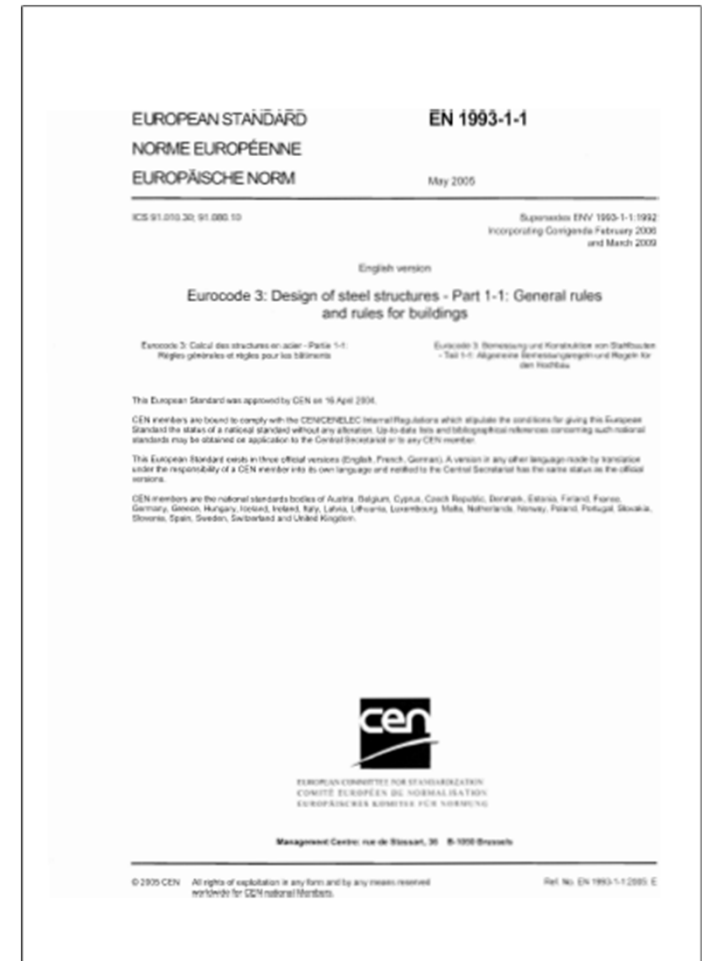
☐ Absolute Value

Set Default Title

I.  OK Cancel



Eurocode 3: Design of steel structures - Part 1-1: General rules and rules for buildings





# Description of Eurocode3 (EN1993-1-1, 2005)

**Gm0** - resistance of cross-sections whatever the class is;  
**Gm1** - resistance of members to instability assessed by member checks;  
**Gm2** - resistance of cross-sections in tension to fracture.  
 **$\lambda_{LT,0}$**  – plateau length of the lateral torsional buckling curves for rolled sections;  
 **$\beta$**  - correction factor for the lateral torsional buckling curves for rolled sections;  
 **$\eta$**  - is used in the shear area calculations.

**Note:** All parameters may be taken from the National Annex

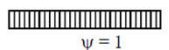




**Fabrication Type:**  
Rolled/Welded;  
**Manufacture Type:** Hot Finished/Cold Formed  
**Fillet** has to be defined in the characteristic (they are missing in the model);  
**Section Net Area** - for fasteners with holes net area has to be defined;  
**Material Type** - the buckling curve (Table 6.2) depends on the material type.

It is possible to choose the calculation method for Lateral Torsional Buckling:  
General Case (chapter 6.3.2.2), For rolled sections or equivalent welded sections (chapter 6.3.2.3) or the worst of two (min reduction factor is used from 2 methods):



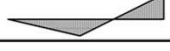
# Description of Eurocode3 (EN1993-1-1, 2005) (Continue)

A correction Factor  $K_c$  can be calculated using the Cm Tool for each member. Also it is possible to set the  $K_c$  equal to 1.

Table 6.6: The Correction Factor:

Moment distribution	$k_c$
 $\psi = 1$	1.0
 $-1 \leq \psi \leq 1$	$\frac{1}{1.33 - 0.33\psi}$
	0.94
	0.90
	0.91

The following cases are NOT recognized and are skipped:

	0.86
	0.77
	0.82

**Eurocode3 Members (EN 1993-1-1, 2005)**

ID: 2 Title: Eurocode3 Members (EN1993-1-1, 2005)

Alias: Standard2

Description:

Factors:

Partial Factor  $G_m0$ : 1.0

Partial Factor  $G_m1$ : 1.0

Partial Factor  $G_m2$ : 1.25

Lambda LT,0: 0.4

Beta: 0.75

Eta: 1.2

Fabrication Type: Defined

Manufacture Method: Defined

Fillet: Defined

Section Net Area: Defined

Material Type:

Correction Factor  $K_c$ :

☒ Calculate according to Table 6.6

☐ Set  $K_c = 1$  for all members

☐ Calculate asymmetric shapes as symmetric

Materials with Yield and Tensile = 0

Selection: 12 Properties

Lengths for Torsional-Flexural and Lateral Torsional Buckling:

☒ LT = max(Ly, Lz)

☐ LT = length in strong axis (Ly or Lz)

☐ Use Torsional Length from Beam Member Finder

Lateral Torsional Buckling Method:

☒ General Case (6.3.2.2)

☐ For rolled sections or equivalent welded sections (6.3.2.3)

☐ Worst of (6.3.2.2) and (6.3.2.3)

Preview Not Supported

OK Cancel

Member Length for Torsional and Torsional-Flexural Buckling Check (LT) by default is max among  $L_y$  and  $L_z$  lengths. For lateral torsional buckling (L LT) is length in strong axis.

It is possible to use Torsional Length from Beam Member Finder. In this case it can be modified manually by user.

**Beam Member Finder**

Length Y Length Z Length Torsional Edit Member (in all directions) Filter Import

Break Joint Options:

Torsion (Lb)

☐ 1D ☐ User


☒ 2DY ☐ Plate 2DY

☒ 2DZ ☐ Plate 2DZ

ID	Title	Elements	Length [m]	Length Factor	Cm Type	Modified
1	Beam Member 1 (T)	47	13			
1.1	Beam Member 1.1 (T)	11	3	1	A	
1.2	Beam Member 1.2 (T)	9	2.5	1	A	
1.3	Beam Member 1.3 (T)	9	2.5	1	A	

# Eurocode3. Fabrication Type

1 Execute *Standards-Add-Eurocode3-Eurocode3 Members*

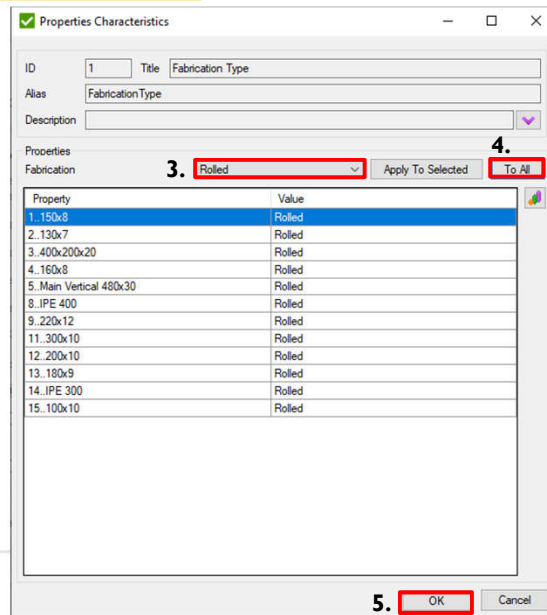
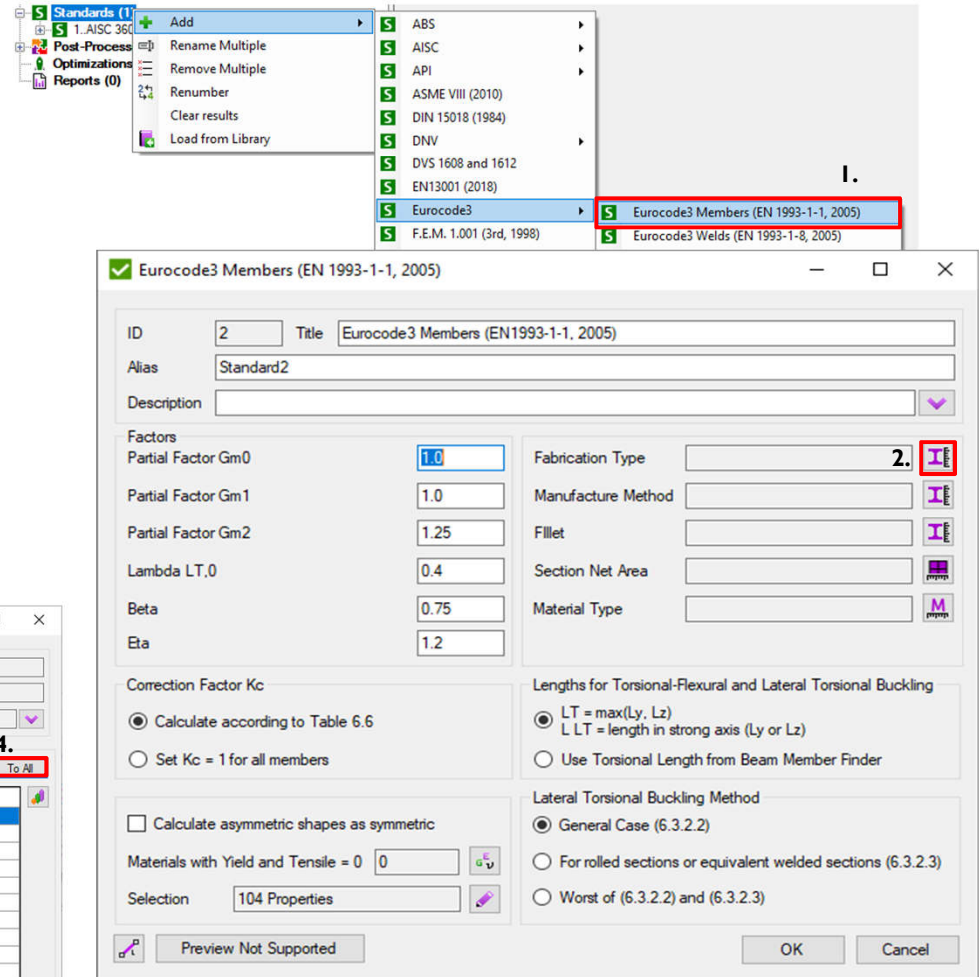
2 Press  to set *Fabrication Type*

3 Execute - **Rolled**

4 Press *To All*

5 Press *Ok*

Go to the next slide to Continue



# Eurocode3. Manufacture Method

1

Press **I** to set *Manufacture Method*

2

Execute – **Hot Finished**

3

Press *To All*

4

Press *Ok*

Go to the next slide to Continue

**Eurocode3 Members (EN 1993-1-1, 2005)**

ID: 2 Title: Eurocode3 Members (EN1993-1-1, 2005)

Alias: Standard2

Description:

Factors: Partial Factor Gm0: 1.0 Partial Factor Gm1: 1.0

Fabrication Type: Defined

Manufacture Method: **Hot Finished**

Net Area:

Type:

**Properties Characteristics**

ID: 2 Title: Manufacture Method

Alias: Hollow

Description:

Properties: Hollow Manufacturing Method: **Hot Finished** Apply To Selected: **To All**

Property	Value
1..150x8	Hot Finished
2..130x7	Hot Finished
3..400x200x20	Hot Finished
4..160x8	Hot Finished
5..Main Vertical 480x30	Hot Finished
6..IPE 400	Hot Finished
7..220x12	Hot Finished
8..300x10	Hot Finished
9..200x10	Hot Finished
10..180x9	Hot Finished
11..IPE 300	Hot Finished
12..100x10	Hot Finished

OK Cancel

1.

# Eurocode3. Fillet

1 Press  to set *Fillet*

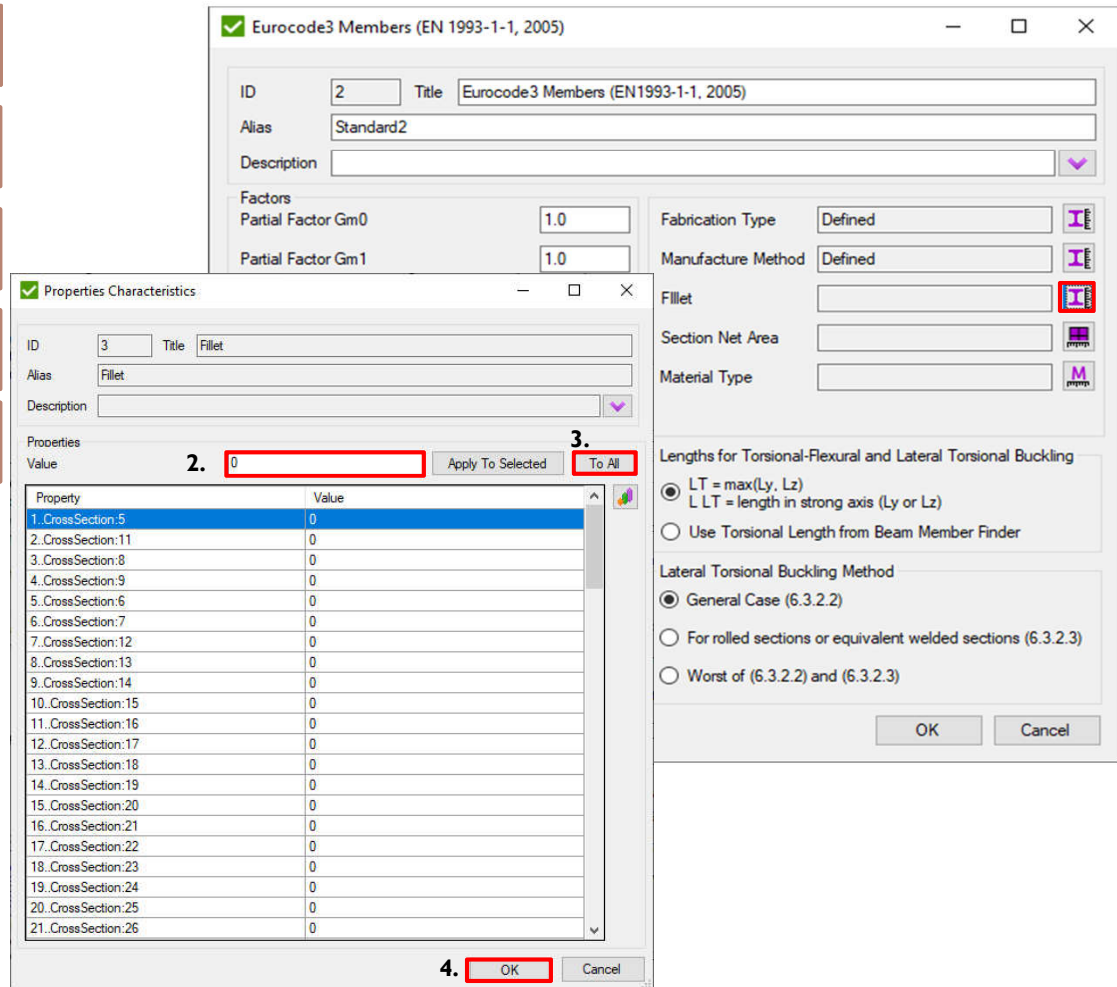
2 Properties Value - **0**

3 Press *To All*

4 Press *Ok*

Repeat Steps 1-4 for *Section Net Area*

Go to the next slide to Continue



**Eurocode3 Members (EN 1993-1-1, 2005)**

ID: 2 Title: Eurocode3 Members (EN1993-1-1, 2005)  
 Alias: Standard2  
 Description:   
 Factors:  
 Partial Factor Gm0: 1.0  
 Partial Factor Gm1: 1.0  
 Fabrication Type: Defined  
 Manufacture Method: Defined  
 Fillet:   
 Section Net Area:   
 Material Type:   
 Lengths for Torsional-Flexural and Lateral Torsional Buckling:  
☒ LT = max(Ly, Lz)  
 L LT = length in strong axis (Ly or Lz)  
☐ Use Torsional Length from Beam Member Finder  
 Lateral Torsional Buckling Method:  
☒ General Case (6.3.2.2)  
☐ For rolled sections or equivalent welded sections (6.3.2.3)  
☐ Worst of (6.3.2.2) and (6.3.2.3)  
 OK Cancel


**Properties Characteristics**

ID: 3 Title: Fillet  
 Alias: Fillet  
 Description:   
 Properties Value: 0  
 Apply To Selected To All  

Property	Value
1..CrossSection:5	0
2..CrossSection:11	0
3..CrossSection:8	0
4..CrossSection:9	0
5..CrossSection:6	0
6..CrossSection:7	0
7..CrossSection:12	0
8..CrossSection:13	0
9..CrossSection:14	0
10..CrossSection:15	0
11..CrossSection:16	0
12..CrossSection:17	0
13..CrossSection:18	0
14..CrossSection:19	0
15..CrossSection:20	0
16..CrossSection:21	0
17..CrossSection:22	0
18..CrossSection:23	0
19..CrossSection:24	0
20..CrossSection:25	0
21..CrossSection:26	0

 OK Cancel

# Eurocode3. Material Type

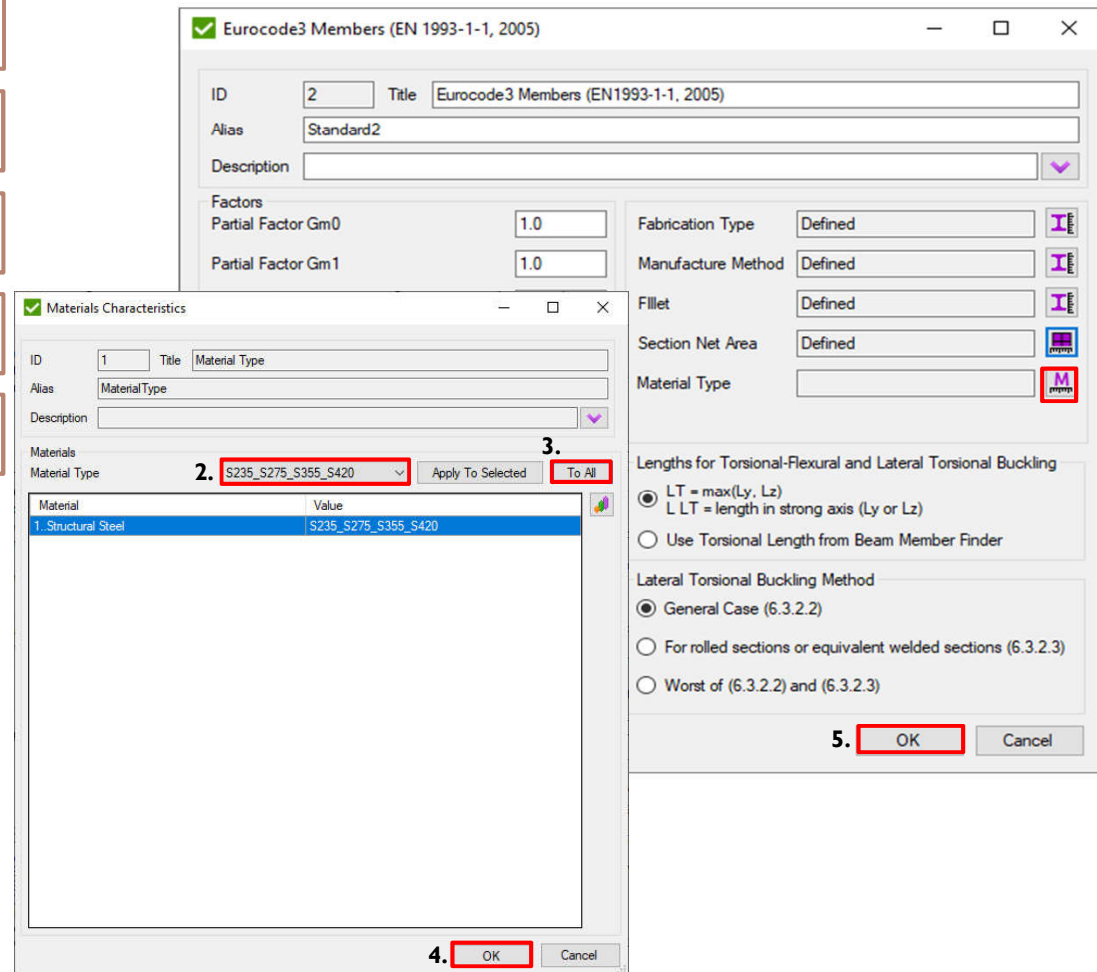
1 Press  to set *Material Type*

2 Execute – *S235\_S275\_S355\_S420*

3 Press *To All*

4 Press *Ok*

5 Press *Ok*



**Eurocode3 Members (EN 1993-1-1, 2005)**

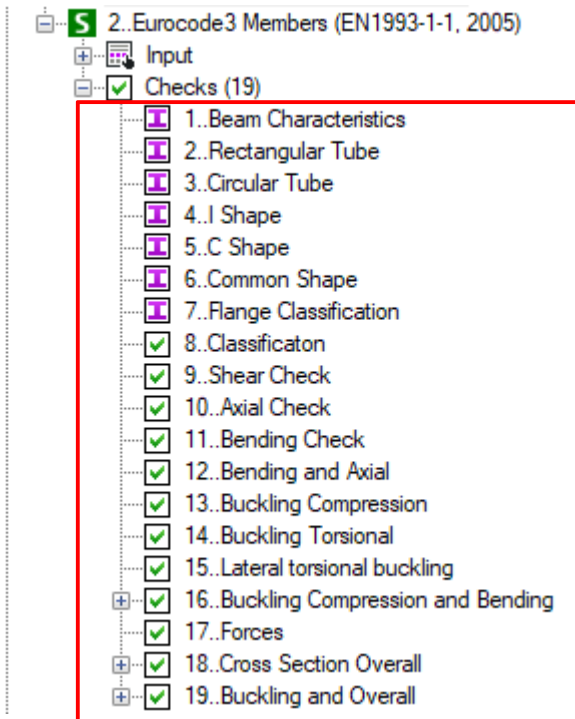
ID: 2 Title: Eurocode3 Members (EN1993-1-1, 2005)  
Alias: Standard2  
Description:   
Factors:  
Partial Factor Gm0: 1.0  
Partial Factor Gm1: 1.0  
Fabrication Type: Defined  
Manufacture Method: Defined  
Fillet: Defined  
Section Net Area: Defined  
Material Type:   
Lengths for Torsional-Flexural and Lateral Torsional Buckling:  
☒ LT = max(Ly, Lz)  
L LT = length in strong axis (Ly or Lz)  
☐ Use Torsional Length from Beam Member Finder  
Lateral Torsional Buckling Method:  
☒ General Case (6.3.2.2)  
☐ For rolled sections or equivalent welded sections (6.3.2.3)  
☐ Worst of (6.3.2.2) and (6.3.2.3)  
OK Cancel

**Materials Characteristics**

ID: 1 Title: Material Type  
Alias: Material Type  
Description:   
Materials:  
Material Type: S235\_S275\_S355\_S420  
Apply To Selected To All  
Material Value  
1. Structural Steel S235\_S275\_S355\_S420  
OK Cancel

1.

# Standard is created



Standard contains 19 checks:

- 1 - Beam member characteristics;
- 2-7 - calculation dimensions and factors for 5 different shapes;
- 8 – cross section resistance;
- 9 – shear strength check;
- 10 – tension and compression strength check;
- 11 – bending strength check;
- 12 – bending, tension and compression strength check;
- 13-15 – buckling strength checks ;
- 16 – additional buckling compression and bending check;
- 17 – forces;
- 18 - cross section overall strength check;
- 19 – buckling and overall strength check.



# Preview Table Results

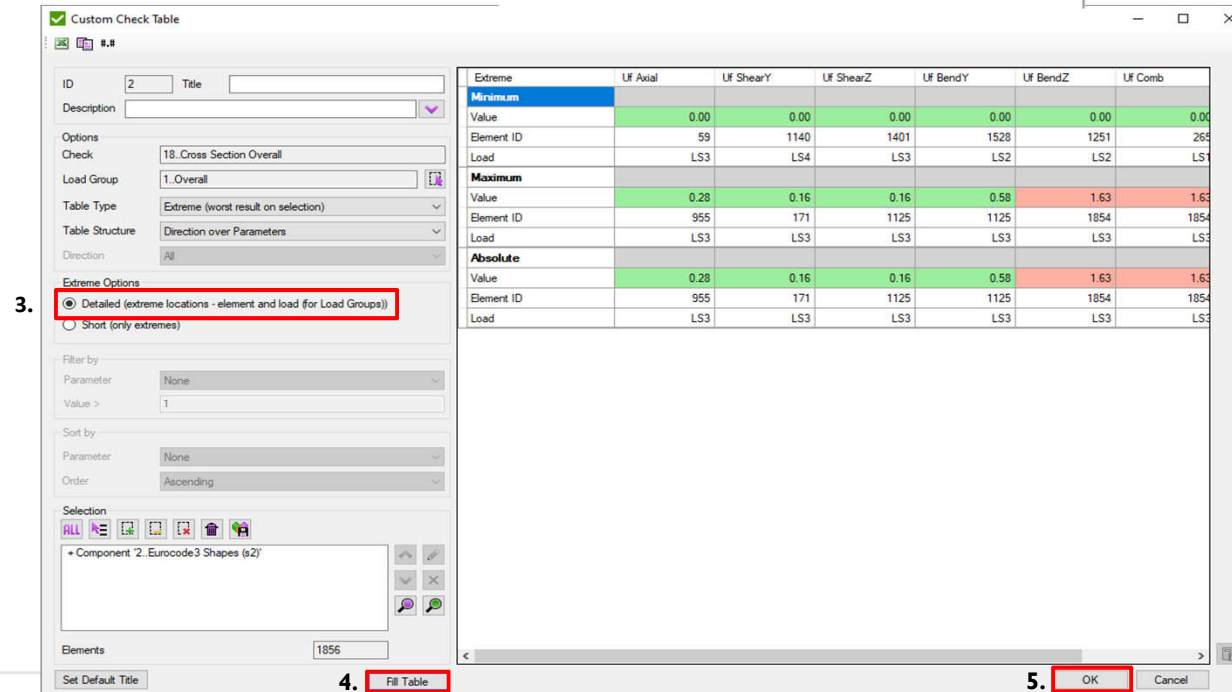
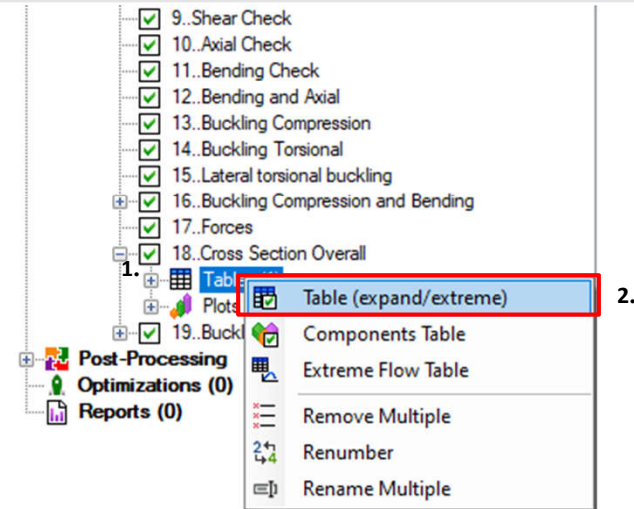
1 Select Tables

2 Execute Table (expand/extreme) in context menu

3 Select Extreme Options - Detailed

4 Press Fill Table

5 Press Ok





# Utilization Factor Plot

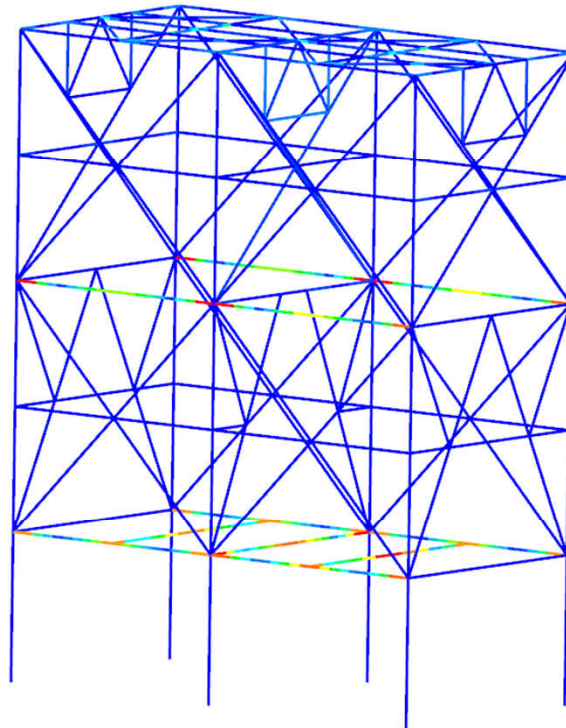
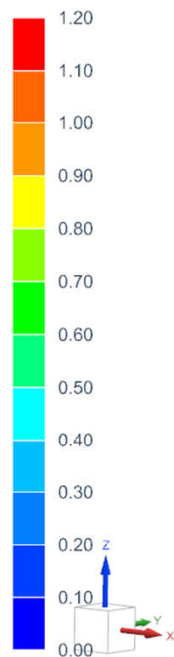
1 Select Plots

3 Press  to preview Plot

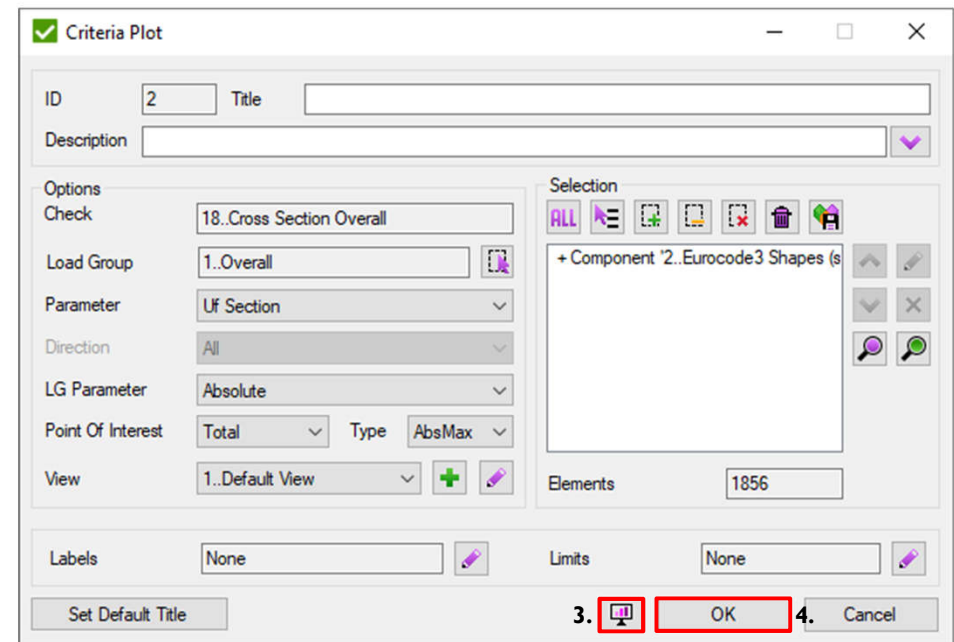
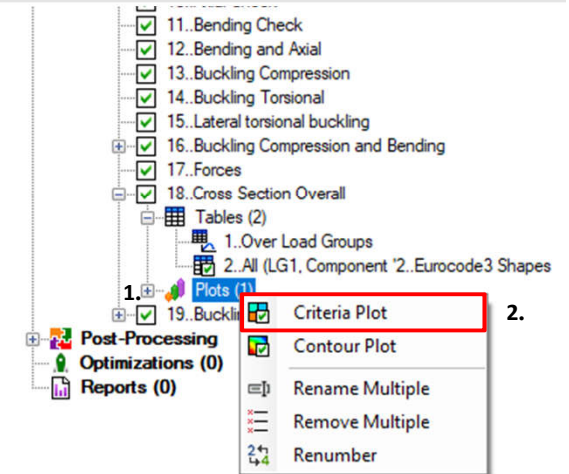
2 Execute *Criteria Plot* in context menu

4 Press *Ok*

aisc360\_s : Job 1 Linear Result  
SdcData, Static Step 1  
Members - Elemental, Scalar  
Formula Used : SdcExpression  
Min : 0.00, Max : 1.63, Units = Unitless



[Unitless]



# Create Predefined Report


1

Execute *Reports - Add - Designer-Results.*

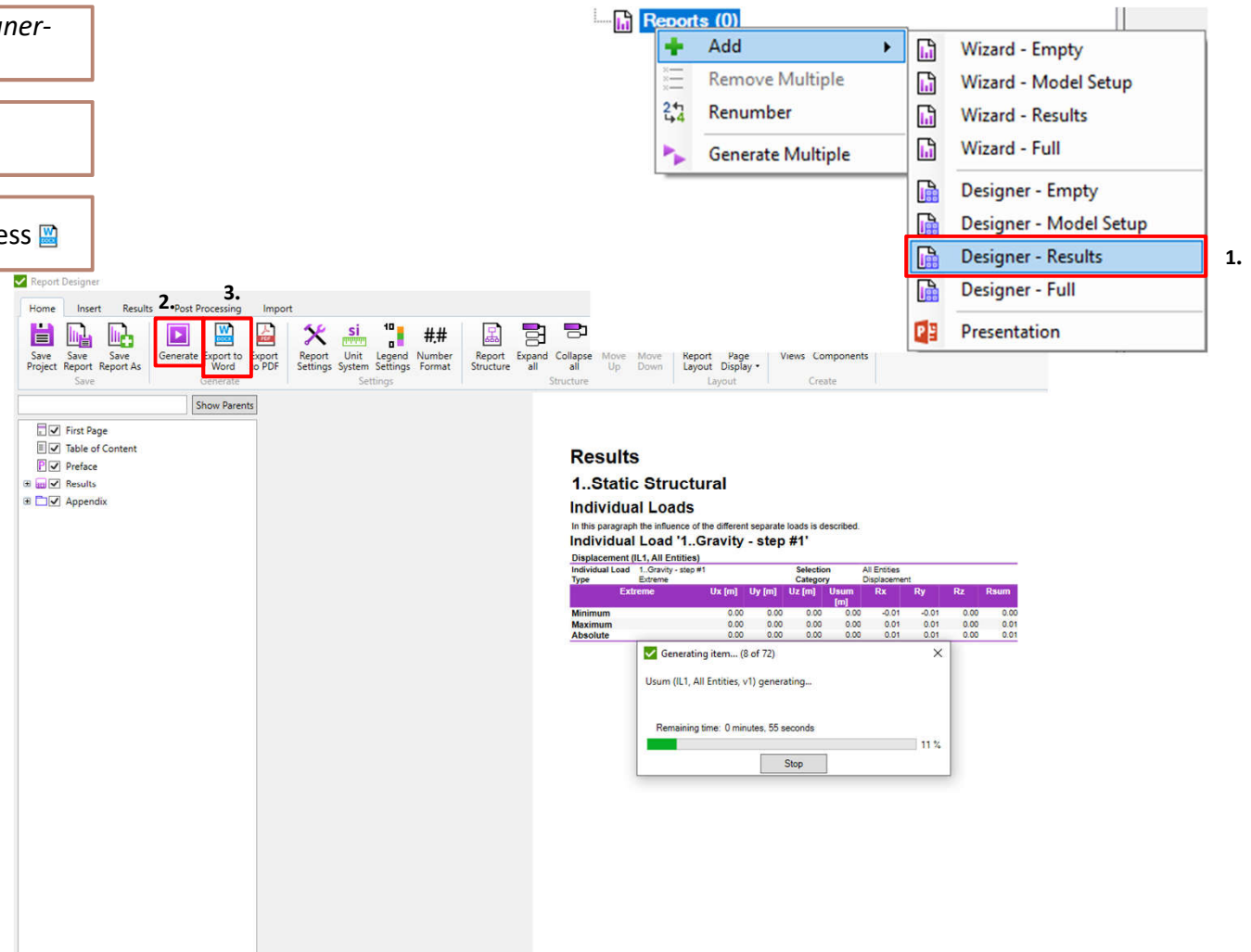
2

Press  to generate report

3

When report is generated press 

Results report includes an overview of the displacements and stresses for all loads and standards with all predefined tables and plots



The screenshot shows the SDC Verifier software interface. On the left, the 'Report Designer' window is open, displaying a list of report sections: First Page, Table of Content, Preface, Results, and Appendix. The 'Results' section is selected. In the center, the 'Generate' button (a purple square with a white play icon) is highlighted with a red box. To the right, the 'Reports (0)' menu is open, showing a list of report types. The 'Designer - Results' option is highlighted with a red box and labeled with a '1.'. Below the main interface, a 'Results' window is shown, displaying the '1..Static Structural' results. It includes a table of displacements for 'Individual Load \*1..Gravity - step #1'.

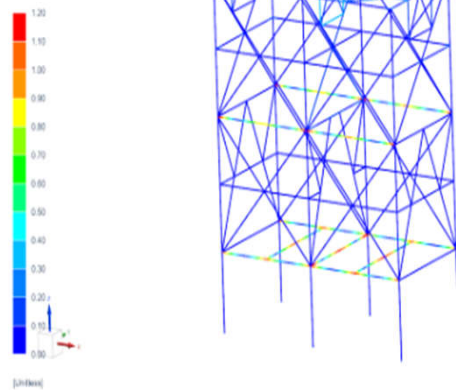
Individual Load	1..Gravity - step #1	Selection Category	All Entries Displacement
Displacement (IL1, All Entities)			
Extreme	Ux (m)	Uy (m)	Uz (m)
Minimum	0.00	0.00	0.00
Maximum	0.00	0.00	0.00
Absolute	0.00	0.00	0.00

A progress dialog box is also visible, indicating 'Generating item... (8 of 72)' with a progress bar at 11%.

# Generated Report

## 1..Abs Uf Overall (LG1, Component '1..AISC360 selection (s1)', v1)

aisc360\_s - Job 1 Linear Result  
StdData, State Step 1  
Member - Element Result, Unaveraged, Scalar  
Formula Used - StdExpression  
Min: 0.00, Max: 1.62, Units = Unitless

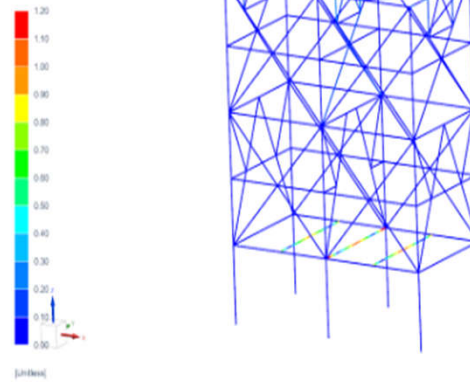


Check	[S1] 16..Overall	Load Group	LG1..Overall
Parameter	Absolute Uf Overall	Selection	Component '1..AISC360 selection (s1)'
View	1..Default View	Data Conversion	No Averaging

AISC 360 - 10

## 1..Abs Uf Combined (LG1, Component '2..Eurocode3 Shapes (s2)', v1)

aisc360\_s - Job 1 Linear Result  
StdData, State Step 1  
Member - Element Result, Unaveraged, Scalar  
Formula Used - StdExpression  
Min: 0.00, Max: 1.67, Units = Unitless



Check	[S2] 16..Buckling Compression and Bending Load Group	Load Group	LG1..Overall
Parameter	Absolute Uf Combined	Selection	Component '2..Eurocode3 Shapes (s2)'
View	1..Default View	Data Conversion	No Averaging

Eurocode3