



Tutorial

AISC 360-10 & Eurocode3

20 Jan 2020
version 5.3

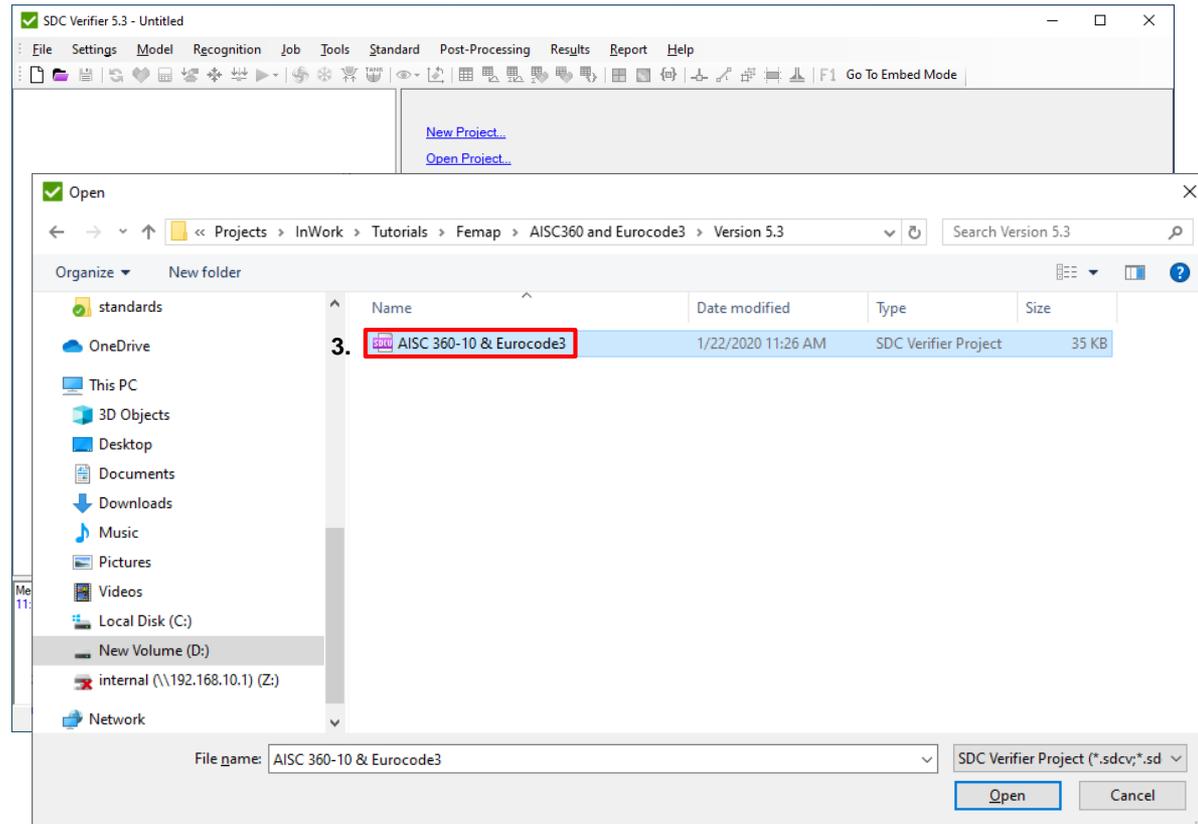
- ▶ In this tutorial, AISC 360-10 & Eurocode3 Member Check are reviewed in details.
- ▶ A beam model structure has been used as a start FEM model.
- ▶ Beam member finder was used to recognize beam member dimensions.
- ▶ Report was automatically generated in SDC Verifier Report Tool to represent beam checks results according AISC 360-10 and Eurocode3 standards.

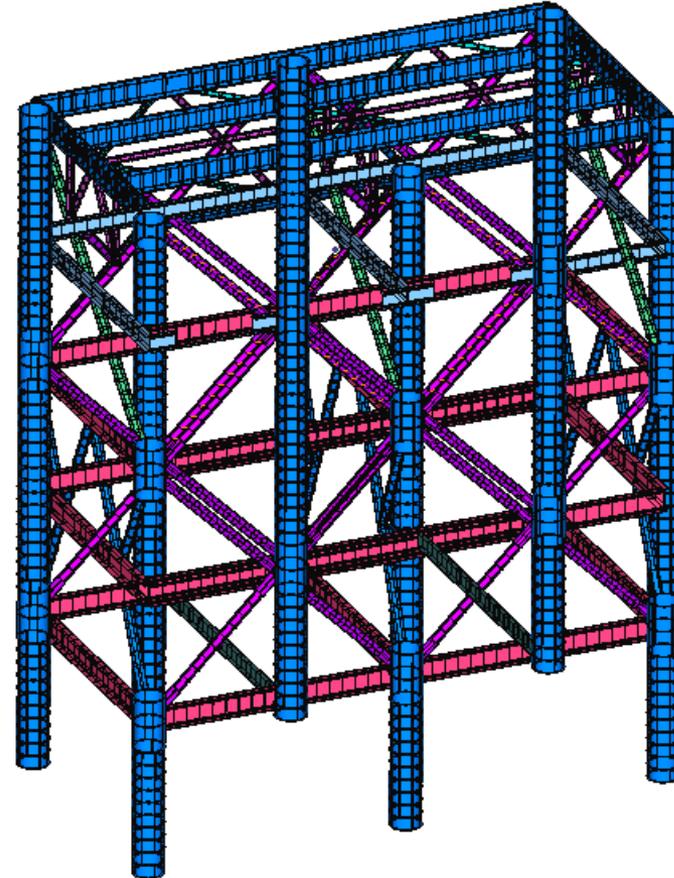
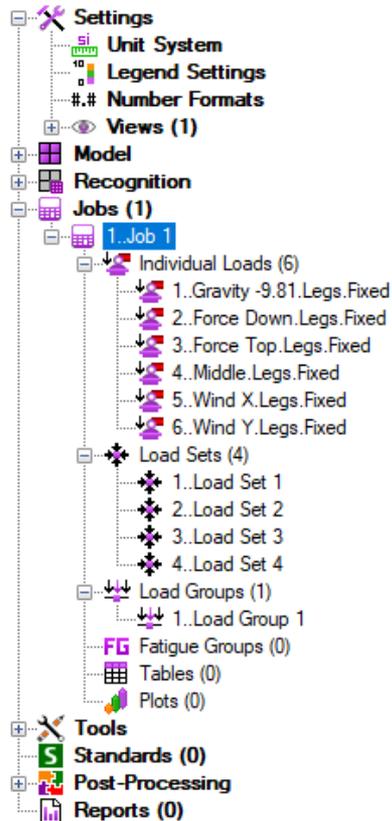
Open Project

1 Launch **SDC Verifier** 

2 Execute *File - Open Project*.

3 Project: **AISC 360-10 & Eurocode3.sdcv**



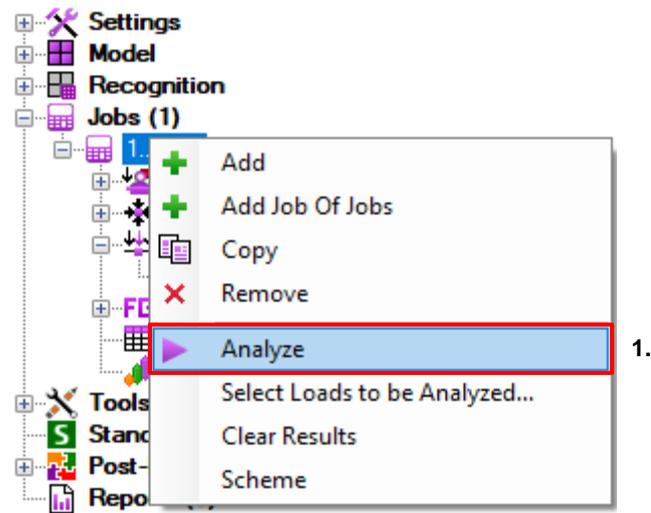


This tutorial uses project with predefined boundary condition, load combinations and load group. The model contains only beam elements of the following types: I-Beam, Circular and Rectangular Tubes

Analyze Job

1

Execute ► **Analyze** from *Job1*
context menu



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;

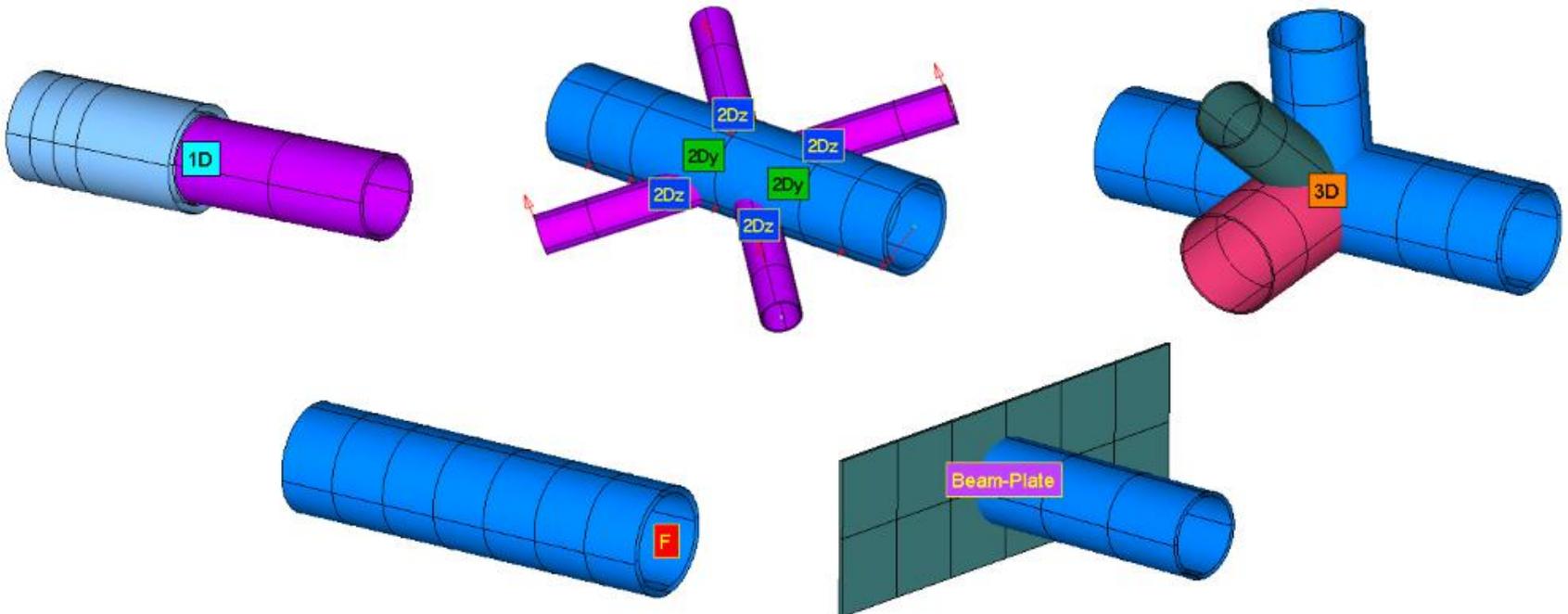
2D Joint – beam members connected in one plane;

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);

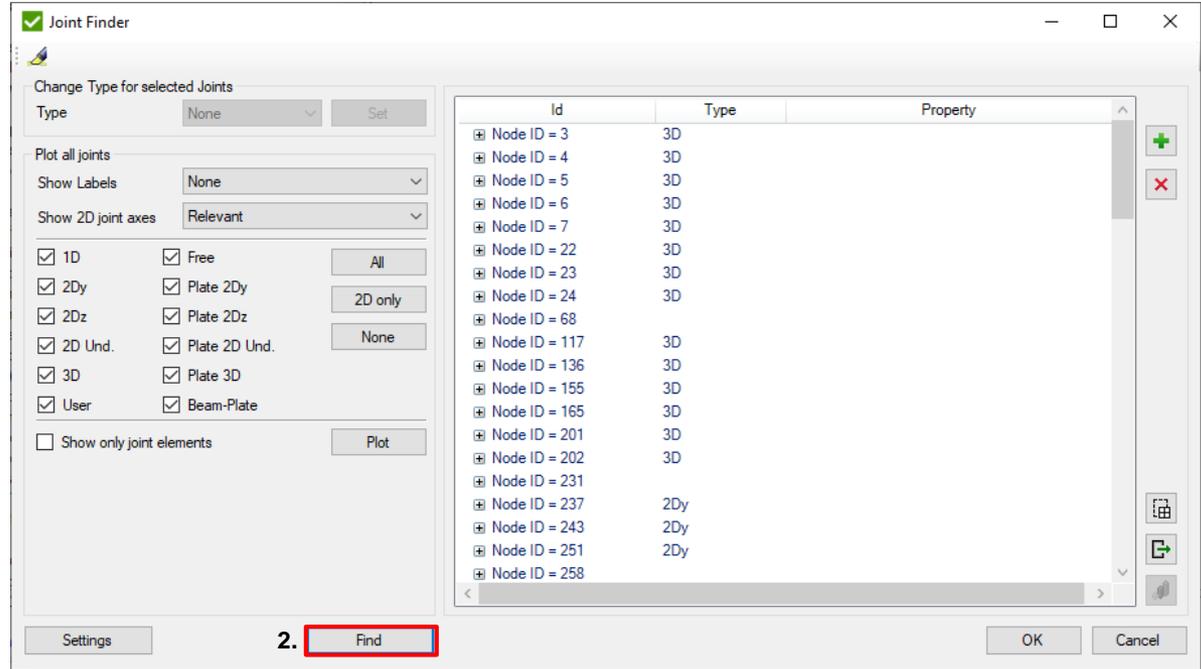
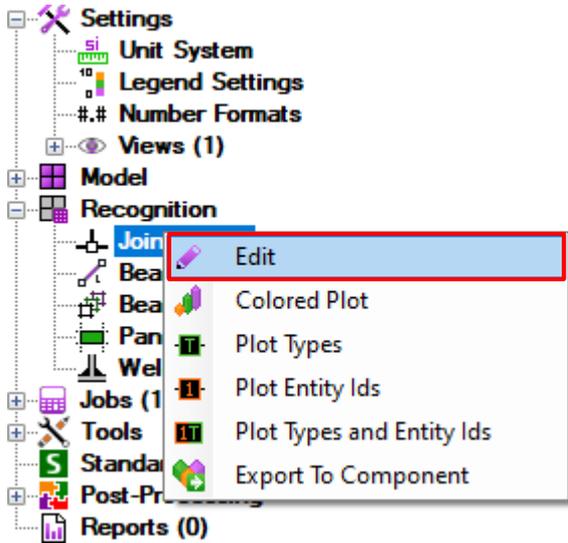
User Defined;



Joint Recognition

1 Execute *Edit* from *Joint Finder* context menu

2 Press *Find*.



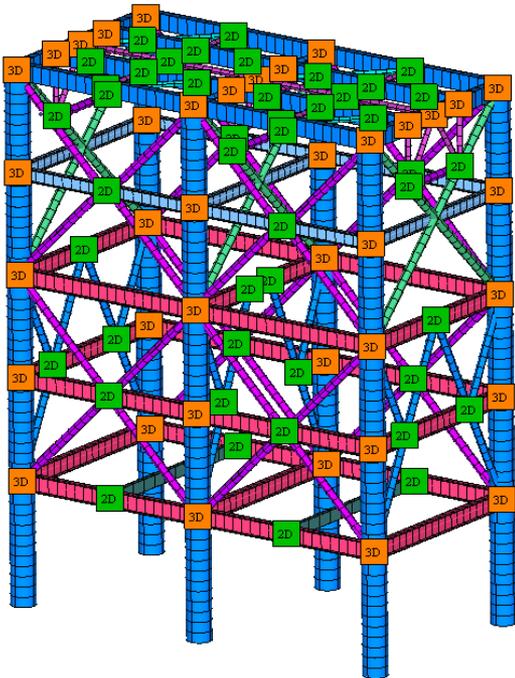
Joints Plot

1 Select All Joints (Ctrl+A).

2 Press

3 Press Plot Joint Type Labels

4 Press OK



Joint Finder

Change Type for selected Joints

Type: None Set

Plot all joints

Show Labels: None

Show 2D joint axes: Relevant

1D Free All
 2Dy Plate 2Dy 2D only
 2Dz Plate 2Dz None
 2D Und. Plate 2D Und. None
 3D Plate 3D
 User Beam-Plate

Show only joint elements Plot

Id	Type	Property
+ Node ID = 3	3D	
+ Node ID = 4	3D	
+ Node ID = 5	3D	
+ Node ID = 6	3D	
+ Node ID = 7	3D	
+ Node ID = 22	3D	
+ Node ID = 23	3D	
+ Node ID = 24	3D	
+ Node ID = 68	3D	
+ Node ID = 117	3D	
+ Node ID = 136	3D	
+ Node ID = 155	3D	
+ Node ID = 165	3D	
+ Node ID = 201	3D	
+ Node ID = 202	3D	
+ Node ID = 231	3D	
+ Node ID = 237	2Dy	
+ Node ID = 243	2Dy	
+ Node ID = 251	2Dy	
+ Node ID = 258	2Dy	

2.

4. OK Cancel

Plot Joints of specific type:

Plot all joints

Show Labels: None

Show 2D joint axes: Relevant

1D Free All
 2Dy Plate 2Dy 2D only
 2Dz Plate 2Dz None
 2D Und. Plate 2D Und. None
 3D Plate 3D
 User Beam-Plate

Show only joint elements Plot

3. Plot Joint Type Labels

Plot Joint Type in colors

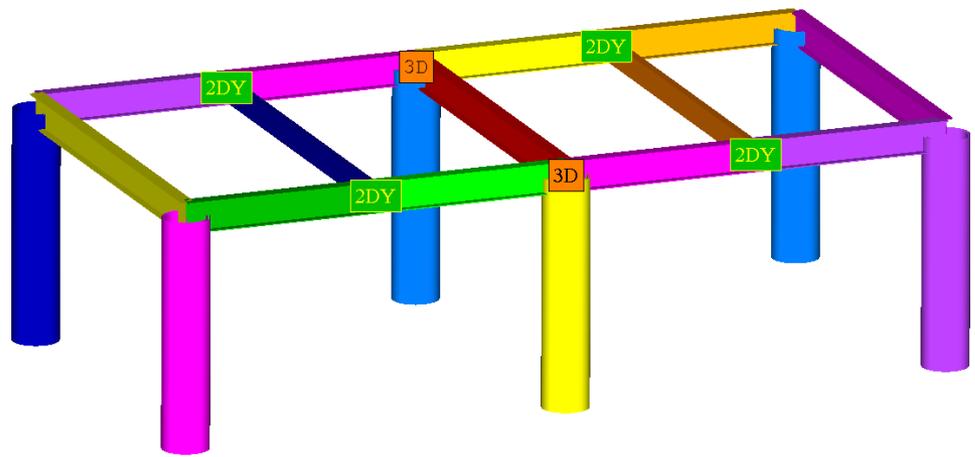
Modify Joint Type:

Change Type for selected Joints

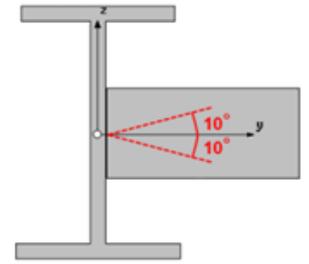
Type: None Set

Beam Member Finder. Members Length

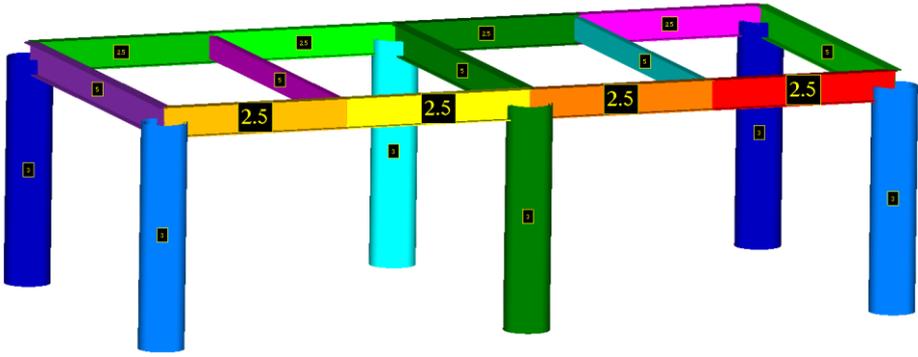
Beam Member Finder recognizes beam members and (buckling) lengths for different directions (Y, Z and Torsional).



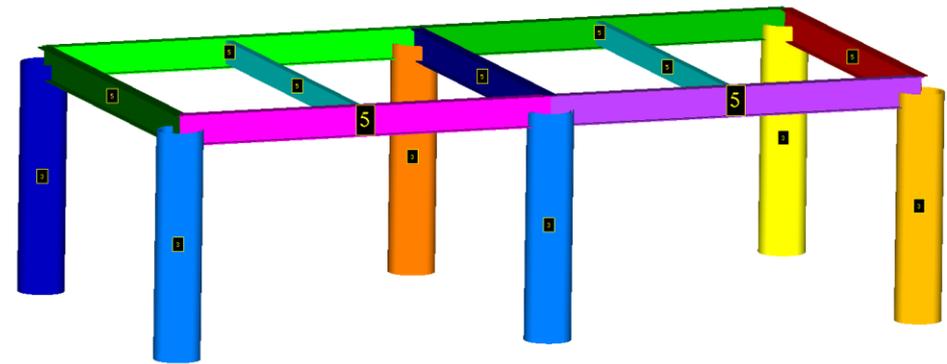
2DY
Joint



Length Y – 4 Beam Members with L = 2.5



Length Z – 2 Beam Members with L = 5



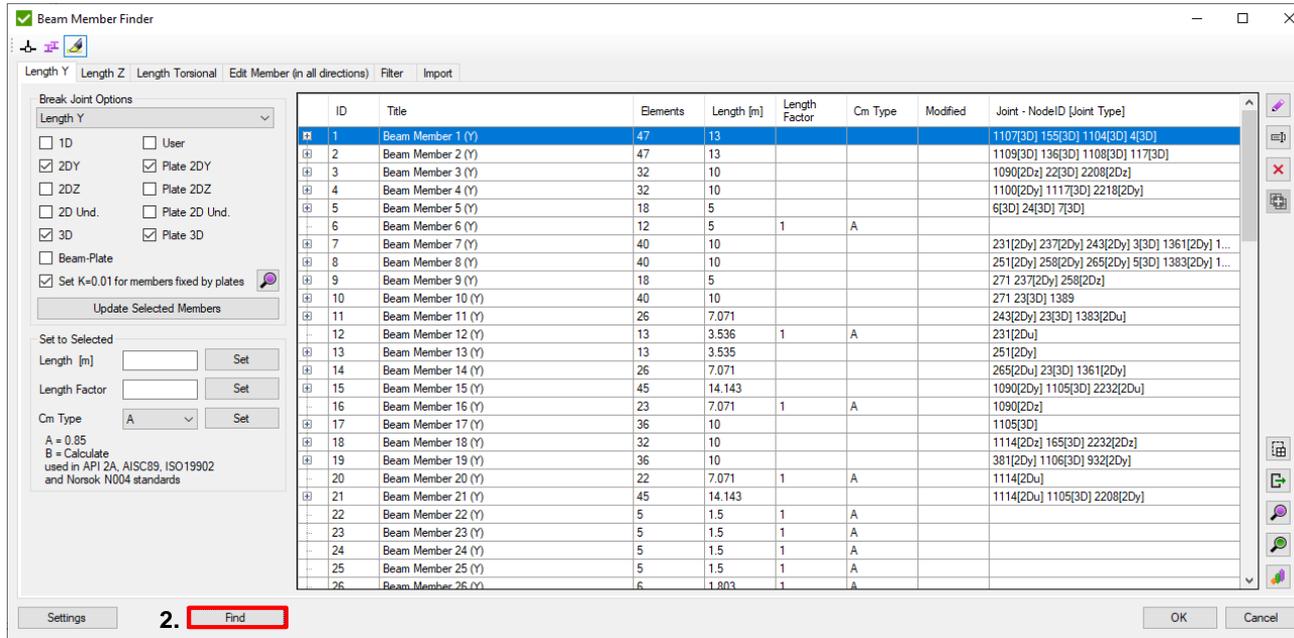
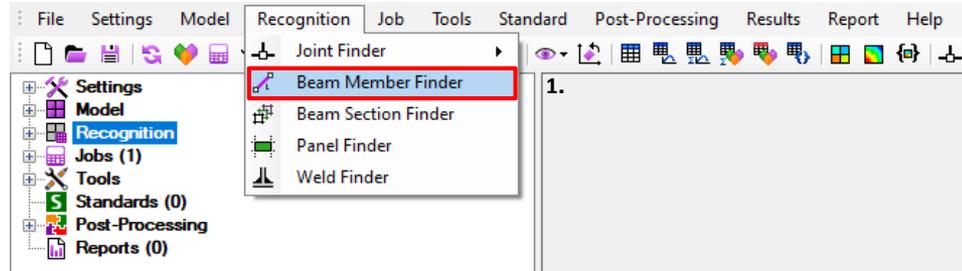
Recognize Length Y

1

Execute Recognition – Beam Member Finder

2

Press Find



Beam Member Finder Explanation

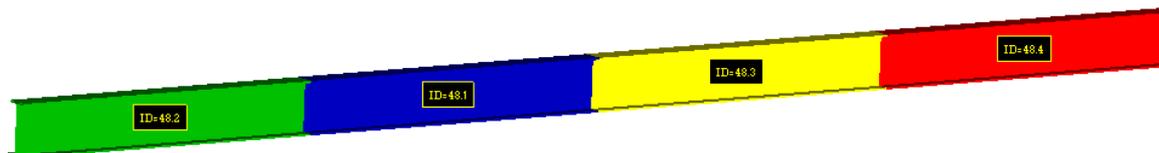
Break Options
define what joints are used to split beam members

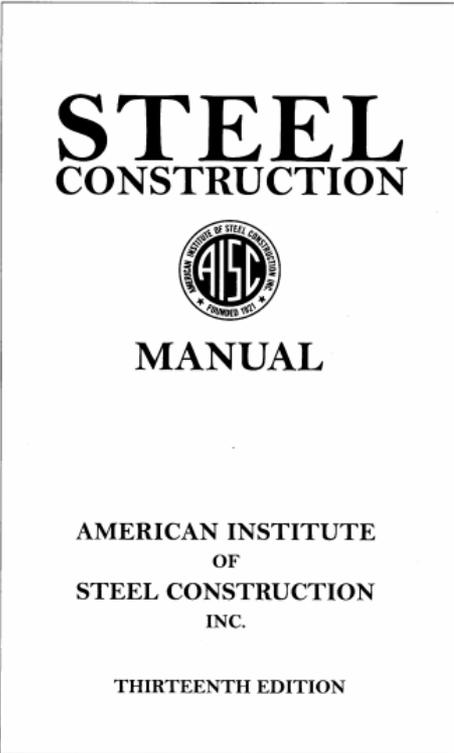
Change Length/Factor
for selected beam members

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

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

ID	Title	Elements	Length [m]	Length Factor	Cm Type	Modified	Joint - NodeID [Joint Type]
48	Beam Member 48 (Y)	36	10				1111[3D] 520[2Dy] 68[2Dy]
48.1	Beam Member 48.1 (Y)	9	2.5	1	A		
48.2	Beam Member 48.2 (Y)	9	2.5	1	A		
48.3	Beam Member 48.3 (Y)	9	2.5	1	A		
48.4	Beam Member 48.4 (Y)	9	2.5	1	A		





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

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		Resistance Factors	
	LRFD		ASD
Tension (F _t)	0.9	Tension (F _t)	0.6
Tensile Rupture (F _{tr})	0.75	Tensile Rupture (F _{tr})	0.5
Compression (F _c)	0.9	Compression (F _c)	0.6
Shear (F _v)	0.9	Shear (F _v)	0.6
Bending (F _b)	0.9	Bending (F _b)	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;

ϕ = resistance factor, specified in Chapters B through K;

ϕR_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;

Ω = safety factor, specified in Chapters B through K;

R_n / Ω = 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:

$$P_n = F_y A_g \tag{D2-1}$$

$\phi_t = 0.90$ (LRFD) $\Omega_t = 1.67$ (ASD)

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

1 Execute *Standards-Add-AISC-AISC 360-10 Members (14th, 2010)*.

2 Resistance Factors: **LRFD**

3 Press to set *Section Build Type*

4 Execute - **Rolled**

5 Press *To All*

6 Press *Ok*

Go to the next slide to Continue

The screenshot shows a software interface with several windows and menus. The 'Tools' menu is open, showing 'Add' selected. A sub-menu is open for 'Add', showing 'AISC 360-10 Members (14th, 2010)' selected. The 'Properties Characteristics' window is open, showing the 'Build Type' set to 'Rolled' and 'Apply To Selected' set to 'To All'. The 'Resistance Factors' window is also open, showing 'LRFD' selected. The 'Section Build Type' icon is highlighted. The 'OK' button is highlighted in the 'Properties Characteristics' window.

1. AISC 360-10 Members (14th, 2010)

2. LRFD

3. Section Build Type icon

4. Rolled

5. To All

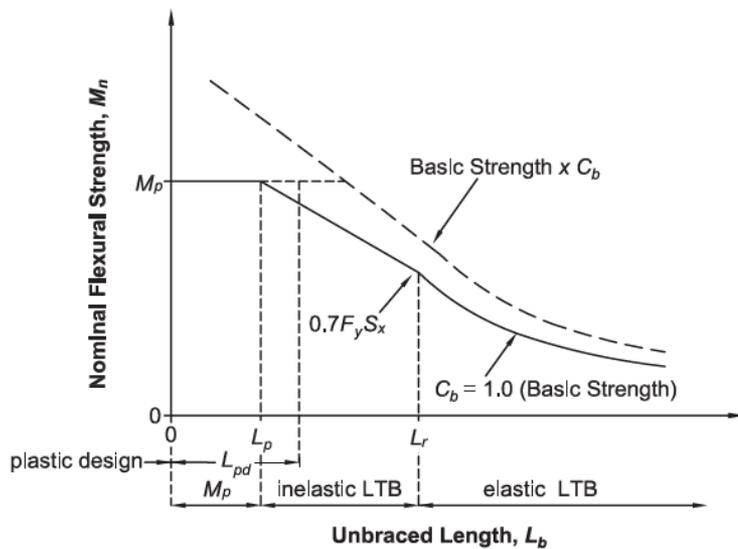
6. OK

Property	Value
1. 150x8	Rolled
2. 130x7	Rolled
3. 400x200x20	Rolled
4. 160x8	Rolled
5. Main Vertical 480x30	Rolled
6. 382x19	Rolled
7. 400x19	Rolled
8. IPE 400	Rolled
9. 220x12	Rolled
11. 300x10	Rolled
12. 200x10	Rolled
13. 180x9	Rolled
14. IPE 300	Rolled
15. 100x10	Rolled

Section Build Type:
Rolled/Build Up

1 Select – Calculate C_b

2 Press *Ok*



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

1.

The screenshot shows the 'AISC 360-10 Members (14th, 2010)' settings window. The 'Settings' section includes:

- Resistance Factors: LRFD
- Section Build Type: Defined
- Calculate C_b (based on moment diagram, Chapter F1)** (selected)
- User defined C_b : Defined
- Stiffener Distance (Chapter G2.1): Defined
- Net Area (Chapter D2.2): Defined
- Shear Lag Factor (Table D3.1): Defined
- Use API 2A RP for tubular shapes:

 The 'Second order effects (APPENDIX 8)' section includes:

- Take into account second-order effects (B1 multiplier):
- Use $C_m = 1$ (conservative):
- Calculate C_m : case a = $0.6 - 0.4 * M_1 / M_2$, case b = 1.0:
- Not subject to transverse loading (case a) when Shear Force < 0.1 Percent of Axial Force

 The 'Torsion' section includes:

- 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

 The 'OK' button is highlighted with a red box.

2.

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.

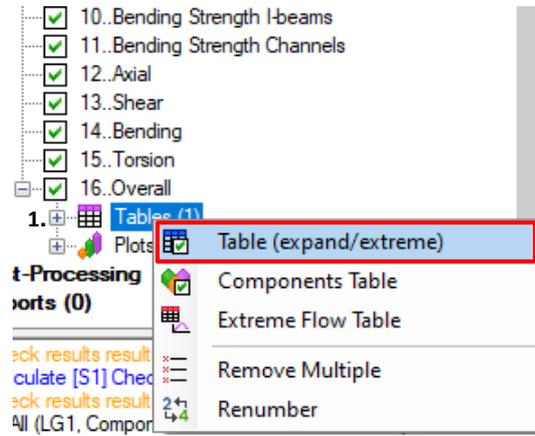
Id	Title (Alias)	Value	Description
1	CalculateCb	1	Set 1 to calculate Cb based on formula (F1-1). Set 0 to use r
2	SecondOrderEffect	0	Set 1 to take into account second order analysis effect (App
3	PercentOfAxial	0.1	if shear force is lower than percent of axial force than memb
4	CalculateCm	1	Cm will 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 sectio
15	UFTorsionCode	1234	Code is used for Torsional Utilization Factor when it is high
16	rolled	1	
17	built_up	2	
18	nonslender	3	
19	slender	4	
20	NotSupported	12345678	
21	compact	5	
22	noncompact	6	

- 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 on element ID = 64 doesn't pass the check $1.01 > 1$.



Custom Check Table

ID: 2 Title: []

Description: []

Options

Check: 16..Overall

Load Group: 1..Load Group 1

Table Type: Extreme (worst result on selection)

Table Structure: Direction over Parameters

Direction: All

Extreme Options

Detailed (extreme locations - element and load (for Load Groups))

Short (only extremes)

Selection

+ Component 7..s1.AISC360 selection

Elements: 1856

Set Default Title

Extreme	Uf Axial	Uf Bending Major	Uf Bending Minor	Uf Shear	Uf Axial and Bending	Uf Overall
Minimum						
Value	0.00	0.00	0.00	0.00	0.00	0.00
Element ID	59	1134	1577	1626	304	1908
Load	LS2	LS1	LS3	LS1	LS1	LS2
Maximum						
Value	0.44	1.00	0.57	0.21	1.01	1.01
Element ID	955	64	174	146	64	64
Load	LS4	LS4	LS1	LS1	LS2	LS2
Absolute						
Value	0.44	1.00	0.57	0.21	1.01	1.01
Element ID	955	64	174	146	64	64
Load	LS4	LS4	LS1	LS1	LS2	LS2

3. Detailed (extreme locations - element and load (for Load Groups))

4. Fill Table

5. OK Cancel

Utilization Factor Plot

1 Select *Plots*

3 Press  to preview Plot

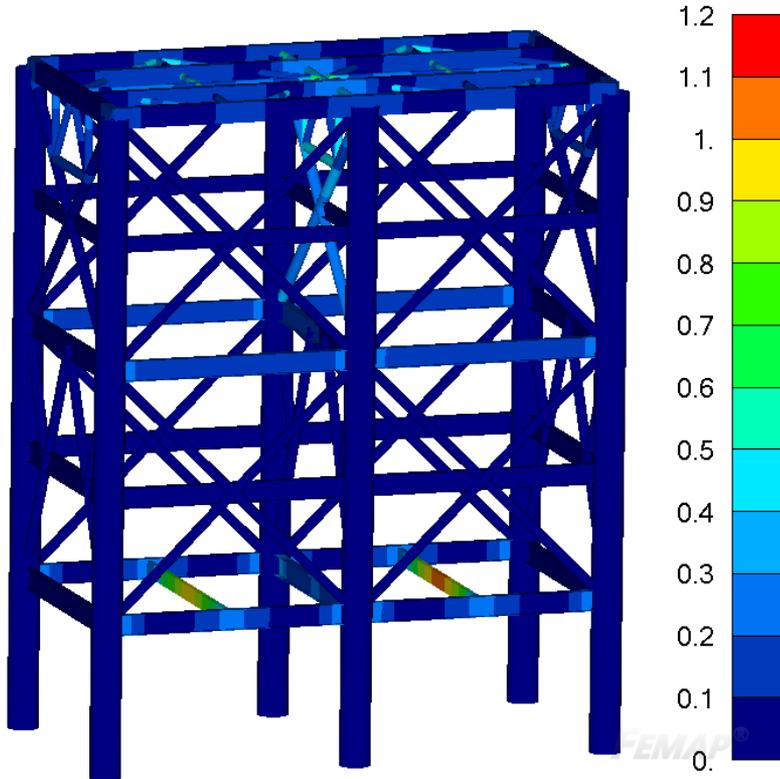
2 Execute *Criteria Plot* in context menu

4 Press *Ok*

- 11..Bending Strength Channels
- 12..Axial
- 13..Shear
- 14..Bending
- 15..Torsion
- 16..Overall

Tables (2)

1.  Plot
- Criteria Plot**
 - Contour Plot
 - Remove Multiple
 - Renumber
- 2.



SDC Verifier uses legend from 0 to 1.2 for Utilization factor. Elements in orange and red do not pass the check

Criteria Plot

ID: 2 Title: Abs Uf Overall (LG1, Component '7..s1.AISC360 selection', v1, Total)

Description:

Options

Check: 16..Overall

Load Group: 1..Load Group 1

Parameter: Uf Overall

Direction: All

LG Parameter: Absolute

Point Of Interest: Total Type: AbsMax

View: 1..Default View

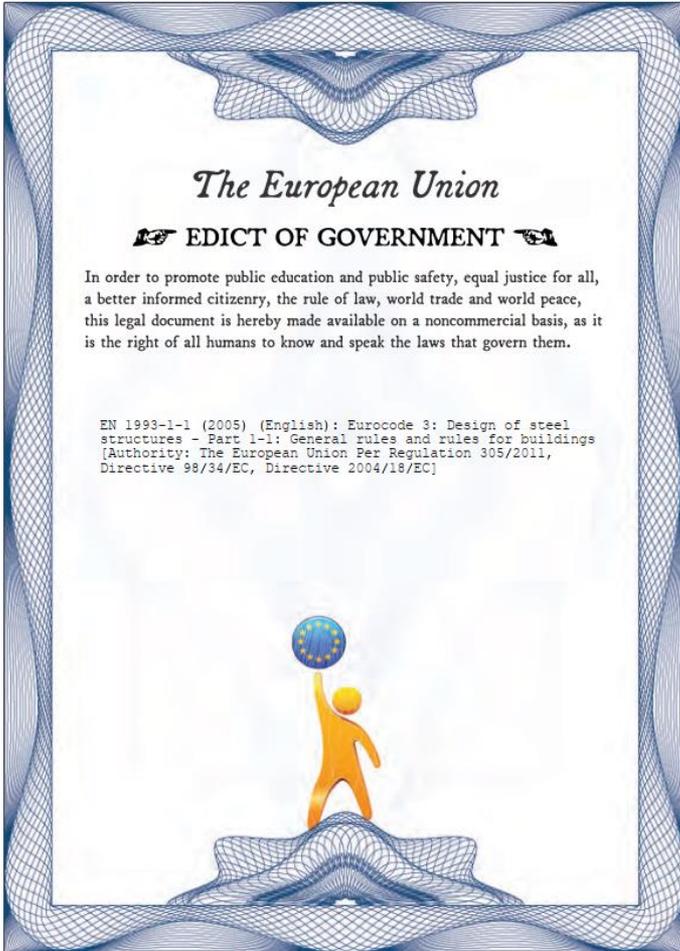
Selection

+ Component '7..s1.AISC360 selection'

Elements: 1856

Labels: None Limits: None

3.  **OK** 4. 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;
 β - correction factor for the lateral torsional buckling curves for rolled sections;
 η - is used in the shear area calculations.

Note: All parameters may be taken from the National Annex

Options

Partial Factor Gm0	1
Partial Factor Gm1	1
Partial Factor Gm2	1.25
Lambda LT,0	0.4
Beta	0.75
Eta	1.2

Correction Factor Kc

Calculate according to Table 6.6

Set Kc = 1 for all members

Materials with Yield and Tensile = 0 0

Selection 14 Properties

Fabrication Type Defined

Manufacture Method Defined

Fillet Defined

Section Net Area Defined

Material Type Defined

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)

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 C_m 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

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.

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

The screenshot shows a software interface with several windows. At the top, a 'Standards (1)' window has a context menu open with 'Add' selected. Below it, a list of standards is shown, with 'Eurocode3 Members (EN 1993-1-1, 2005)' highlighted. A 'Eurocode3 Members (EN 1993-1-1, 2005)' dialog box is open, showing 'ID' 2 and 'Title' 'Eurocode3 Members (EN1993-1-1, 2005)'. Below this, a 'Properties Characteristics' dialog box is open, showing 'Fabrication' set to 'Rolled' and 'Apply To Selected' set to 'To All'. A table of properties is visible, with 'Rolled' as the value for all listed items. To the right, a 'Fabrication Type' dialog box is open, showing 'Fabrication Type' set to 'Rolled' and 'Lateral Torsional Buckling Method' set to 'General Case (6.3.2.2)'. The 'OK' button in the 'Properties Characteristics' dialog is highlighted.

Property	Value
1..150x8	Rolled
2..130x7	Rolled
3..400x200x20	Rolled
4..160x8	Rolled
5..Main Vertical 480x30	Rolled
6..382x19	Rolled
7..400x19	Rolled
8..IPE 400	Rolled
9..220x12	Rolled
11..300x10	Rolled
12..200x10	Rolled
13..180x9	Rolled
14..IPE 300	Rolled
15..100x10	Rolled

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

The image shows two overlapping software dialog boxes. The background dialog is titled "Eurocode3 Members (EN 1993-1-1, 2005)". It has fields for ID (2), Title (Eurocode3 Members (EN1993-1-1, 2005)), and Description. Under "Options", there are input fields for Partial Factor Gm0 (1.0), Gm1 (1.0), Gm2 (1.25), and Lambda LT,0 (0.4). On the right, there are dropdown menus for Fabrication Type (Defined), Manufacture Method, Fillet, Section Net Area, and Material Type. Below these are radio button options for "Lengths for Torsional-Flexural and Lateral Torsional Buckling" and "Lateral Torsional Buckling Method". The foreground dialog is titled "Properties Characteristics". It has fields for ID (2), Title (Manufacture Method), Alias (Hollow), and Description. Under "Properties", there is a dropdown for "Hollow Manufacturing Method" set to "Hot Finished", and an "Apply To Selected" dropdown set to "To All". Below these is a table with 15 rows, each with a "Property" and a "Value".

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..382x19	Hot Finished
7..400x19	Hot Finished
8..IPE 400	Hot Finished
9..220x12	Hot Finished
11..300x10	Hot Finished
12..200x10	Hot Finished
13..180x9	Hot Finished
14..IPE 300	Hot Finished
15..100x10	Hot Finished

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*

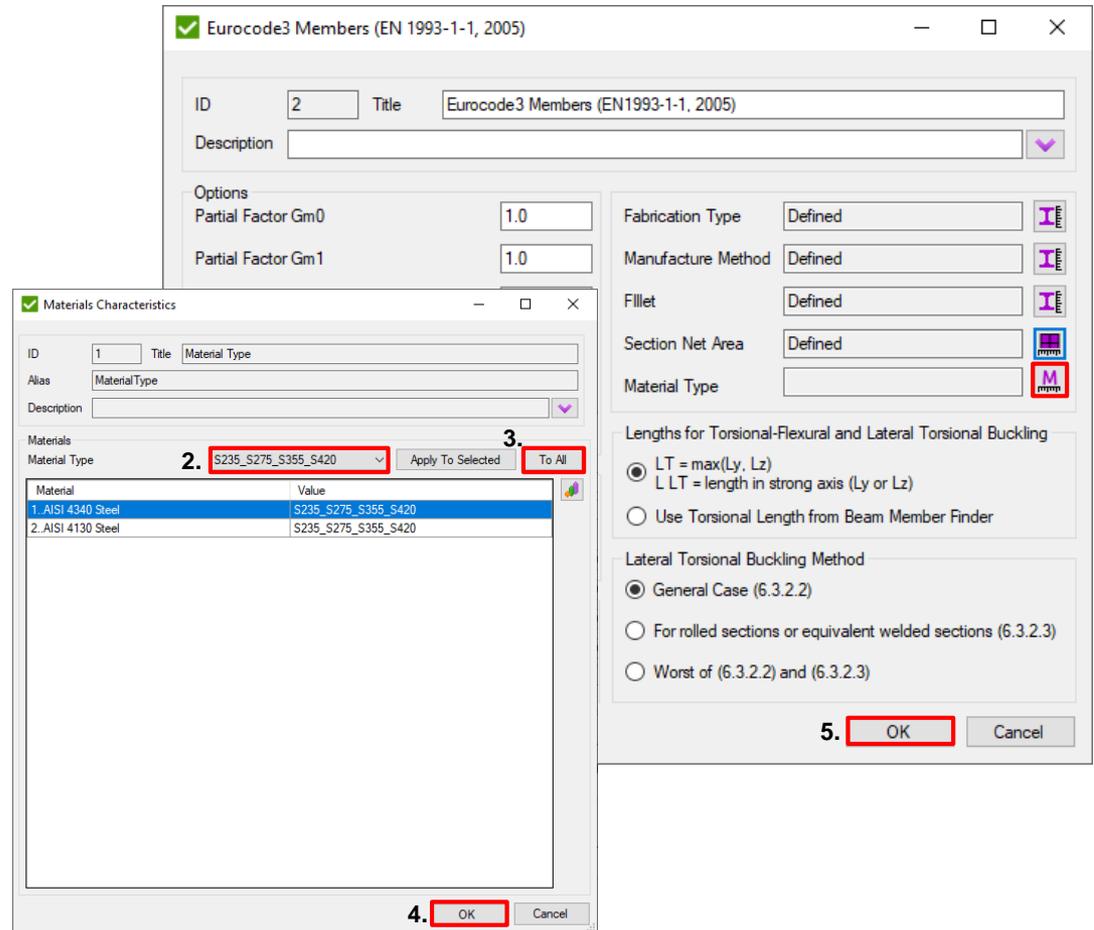
Go to the next slide to Continue

The image shows two overlapping dialog boxes from a software application. The top dialog is titled "Eurocode3 Members (EN 1993-1-1, 2005)". It has fields for ID (2), Title (Eurocode3 Members (EN1993-1-1, 2005)), and Description. Below these are "Options" for Partial Factor Gm0 (1.0), Gm1 (1.0), and Gm2 (1.25). On the right side, there are buttons for "Fillet" (highlighted with a red box and labeled "1."), "Section Net Area", and "Material Type". The bottom dialog is titled "Properties Characteristics". It has fields for ID (3), Title (Fillet), Alias (Fillet), and Description. Below these are "Properties" with a "Value" field set to "0" (highlighted with a red box and labeled "2."). There are "Apply To Selected" and "To All" buttons (the latter is highlighted with a red box and labeled "3."). At the bottom, there is an "OK" button (highlighted with a red box and labeled "4.") and a "Cancel" button. A table lists various properties and their values:

Property	Value
1..150x8	0
2..130x7	0
3..400x200x20	0
4..160x8	0
5..Main Vertical 480x30	0
6..382x19	0
7..400x19	0
8..IPE 400	0
9..220x12	0
11..300x10	0
12..200x10	0
13..180x9	0
14..IPE 300	0
15..100x10	0

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*

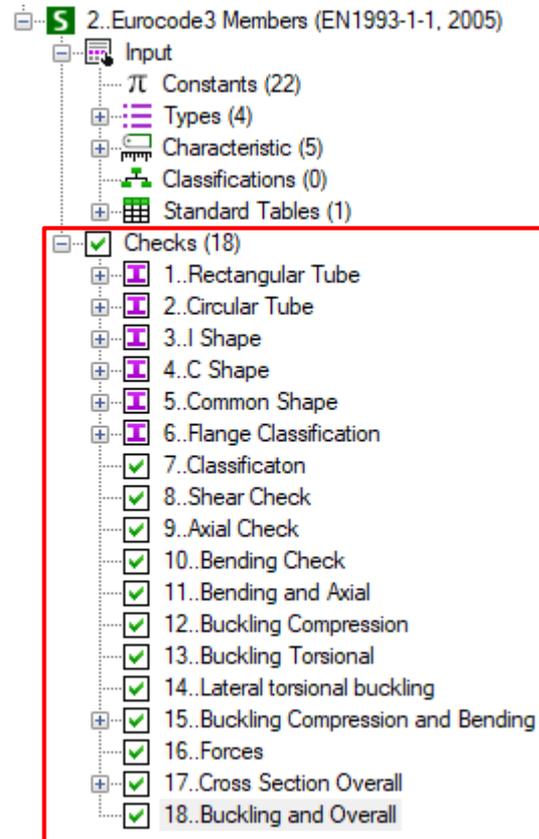


The screenshot shows two overlapping dialog boxes. The top dialog is titled "Eurocode3 Members (EN 1993-1-1, 2005)" and has fields for ID (2), Title (Eurocode3 Members (EN1993-1-1, 2005)), and Description. It also has options for Partial Factor Gm0 (1.0) and Partial Factor Gm1 (1.0). The bottom dialog is titled "Materials Characteristics" and has fields for ID (1), Title (Material Type), Alias (MaterialType), and Description. It features a "Materials" section with a dropdown menu set to "S235_S275_S355_S420" and buttons for "Apply To Selected" and "To All". A table below lists materials: "1. AISI 4340 Steel" and "2. AISI 4130 Steel", both with the value "S235_S275_S355_S420". The dialog also has options for "Lengths for Torsional-Flexural and Lateral Torsional Buckling" and "Lateral Torsional Buckling Method".

Material	Value
1. AISI 4340 Steel	S235_S275_S355_S420
2. AISI 4130 Steel	S235_S275_S355_S420

1.

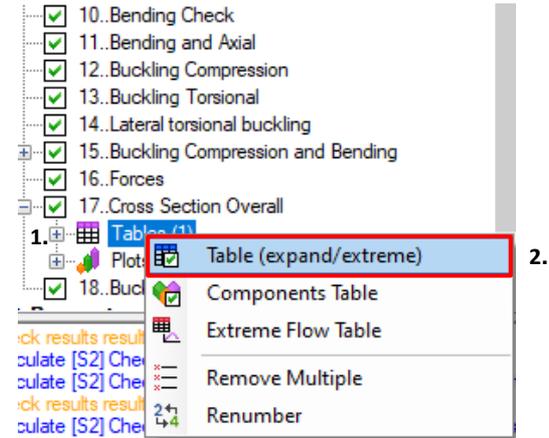
Standard is created



Standard contains 18 checks:
1-6 - calculation dimensions and factors for 5 different shapes;
7 – cross section resistance;
8 – shear strength check;
9 – tension and compression strength check;
10 – bending strength check;
11 – bending, tension and compression strength check;
12-14 – buckling strength checks ;
15 – additional buckling compression and bending check;
16 – forces;
17 - cross section overall strength check;
18 – 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



3. **Detailed (extreme locations - element and load for Load Groups)**

4. **Fill Table**

5. **OK**

Extreme	Uf Axial	Uf ShearY	Uf ShearZ	Uf BendY	Uf BendZ	Uf Comb	Uf Section
Minimum							
Value	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Element ID	2497	1400	64	1577	1134	1614	1908
Load	LS4	LS4	LS1	LS3	LS1	LS1	LS2
Maximum							
Value	0.38	0.16	0.16	0.90	0.56	0.84	0.90
Element ID	955	171	1854	64	1140	64	64
Load	LS4	LS1	LS2	LS4	LS1	LS2	LS4
Absolute							
Value	0.38	0.16	0.16	0.90	0.56	0.84	0.90
Element ID	955	171	1854	64	1140	64	64
Load	LS4	LS1	LS2	LS4	LS1	LS2	LS4

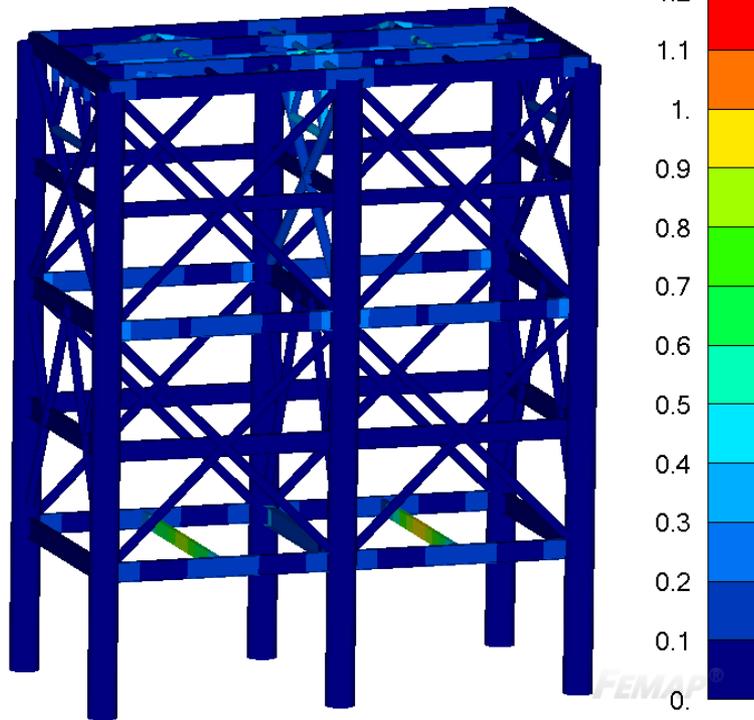
Utilization Factor Plot

1 Select Plots

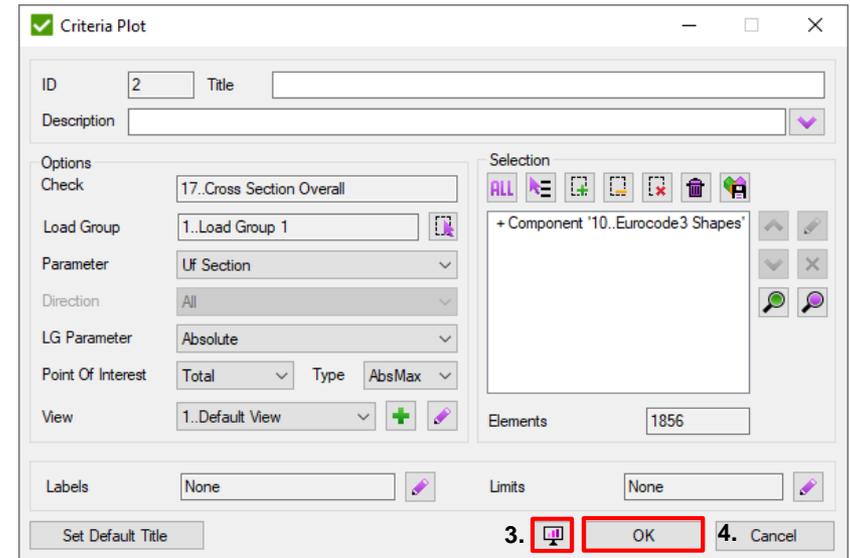
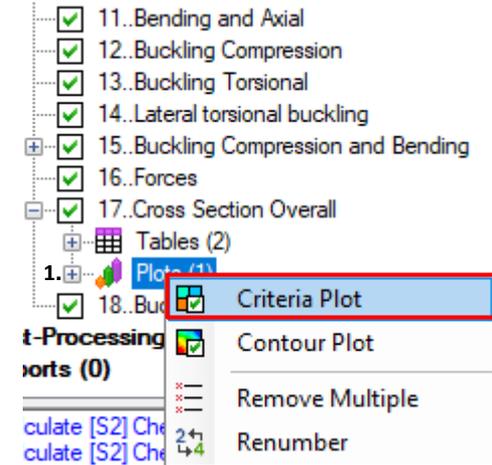
2 Execute *Criteria Plot* in context menu

3 Press  to preview Plot

4 Press *Ok*



SDC Verifier uses legend from 0 to 1.2 for Utilization factor. Elements in orange and red do not pass the check



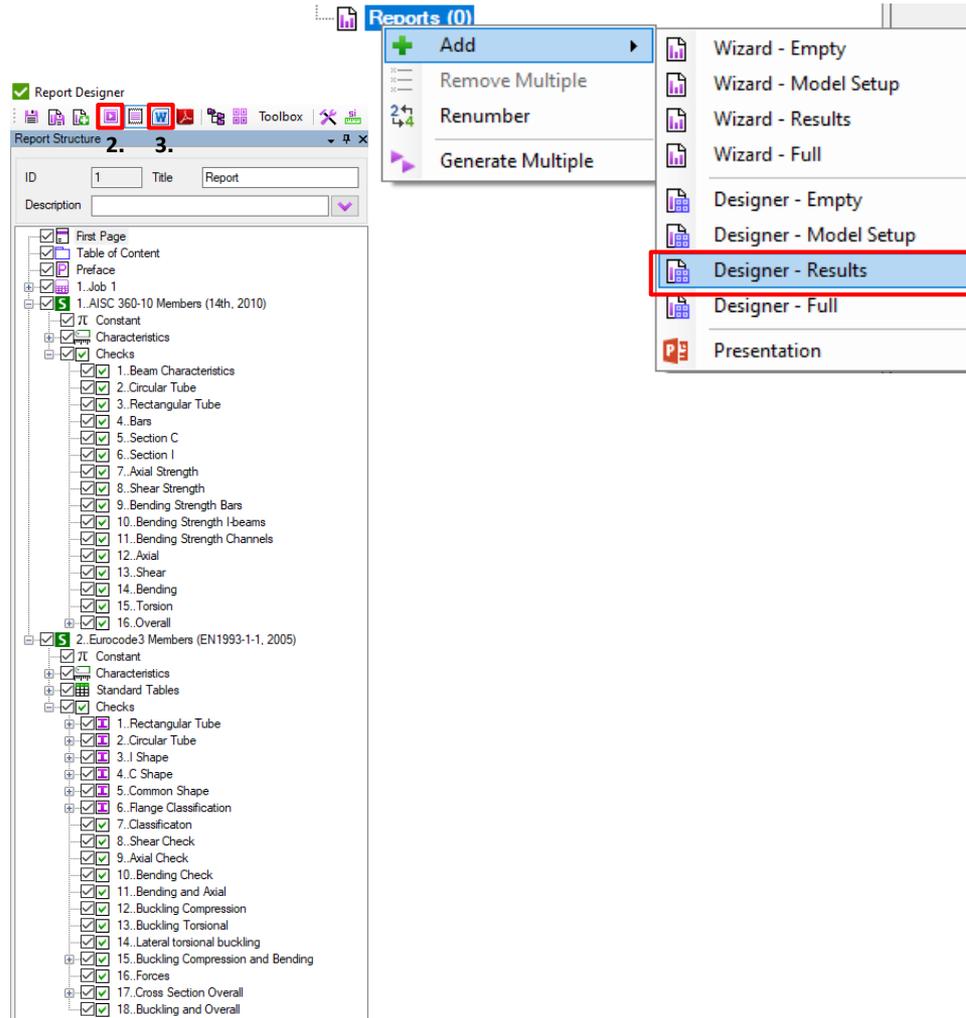
Create Predefined Report

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 'Report Designer' application window. The 'Reports (0)' menu is open, displaying a list of report types. The 'Designer - Results' option is highlighted with a red box. The 'Report Structure' pane on the left shows a tree view of report sections, including '1. AISC 360-10 Members (14th, 2010)' and '2. Eurocode3 Members (EN1993-1-1, 2005)'. The 'Add' menu item is also highlighted with a blue box.

1.

16..Overall

Property	Value
Category	Elemental Custom Check
Selection	Component '7..s1.AISC360 selection'
Parameters	8

1..Over Load Groups

Check Selection	[S1] 16..Overall 16 Shapes	Load Group	LG1..Load Group 1			
Load	Uf Axial	Uf Bending Major	Uf Bending Minor	Uf Shear	Uf Axial and Bending	Uf Overall
Load Group '1..Load Group 1'	0.44	1.00	0.57	0.21	1.01	1.01

2..All (LG1, Component '7..s1.AISC360 selection')

Standard	1..AISC 360-10 Members (14th, 2010)	Check Selection	[S1] 16..Overall Component '7..s1.AISC360 selection'			
Load Group	LG1..Load Group 1					
Extreme	Uf Axial	Uf Bending Major	Uf Bending Minor	Uf Shear	Uf Axial and Bending	Uf Overall
Minimum	0.00	0.00	0.00	0.00	0.00	0.00
Value	59	1134	1577	1626	304	1908
Element ID	LS2	LS1	LS3	LS1	LS1	LS2
Load						
Maximum	0.44	1.00	0.57	0.21	1.01	1.01
Value	955	64	174	146	64	64
Element ID	LS4	LS4	LS1	LS1	LS2	LS2
Load						
Absolute	0.44	1.00	0.57	0.21	1.01	1.01
Value	955	64	174	146	64	64
Element ID	LS4	LS4	LS1	LS1	LS2	LS2
Load						

2..Abs Uf Overall (LG1, Component '7..s1.AISC360 selection', v1, Total)

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AISC 360 - 10

Check	[S1] 16..Overall	Point	Total
www.sdcoverifier.com	Prepared by SDC Verifier		Prepared for company
		Company	

17..Cross Section Overall

Property	Value
Category	Elemental Custom Check
Selection	Component '10..Eurocode3 Shapes'
Parameters	7

1..Over Load Groups

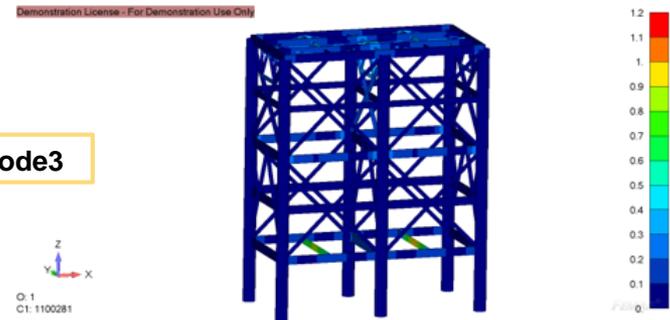
Check Selection	[S2] 17..Cross Section Overall 14 Properties	Load Group	LG1..Load Group 1				
Load	Uf Axial	Uf ShearY	Uf ShearZ	Uf BendY	Uf BendZ	Uf Comb	Uf Section
Load Group '1..Load Group 1'	0.38	0.16	0.16	0.90	0.56	0.84	0.90

2..All (LG1, Component '10..Eurocode3 Shapes')

Standard	2..Eurocode3 Members (EN1993-1-1, 2005)	Check Selection	[S2] 17..Cross Section Overall				
Load Group	LG1..Load Group 1						
Extreme	Uf Axial	Uf ShearY	Uf ShearZ	Uf BendY	Uf BendZ	Uf Comb	Uf Section
Minimum	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Value	2497	1400	64	1577	1134	1614	1908
Element ID	LS4	LS4	LS1	LS3	LS1	LS1	LS2
Load							
Maximum	0.38	0.16	0.16	0.90	0.56	0.84	0.90
Value	955	171	1854	64	1140	64	64
Element ID	LS4	LS1	LS2	LS4	LS1	LS2	LS4
Load							
Absolute	0.38	0.16	0.16	0.90	0.56	0.84	0.90
Value	955	171	1854	64	1140	64	64
Element ID	LS4	LS1	LS2	LS4	LS1	LS2	LS4
Load							

2..Abs Uf Section (LG1, Component '10..Eurocode3 Shapes', v1, Total)

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Eurocode3

Check	[S2] 17..Cross Section Overall	Point	Total
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		Company	