



Tutorial

API ISO Norsok

Updated on: 01 Sep 2023

Tested with: SDC Verifier 2023 R1

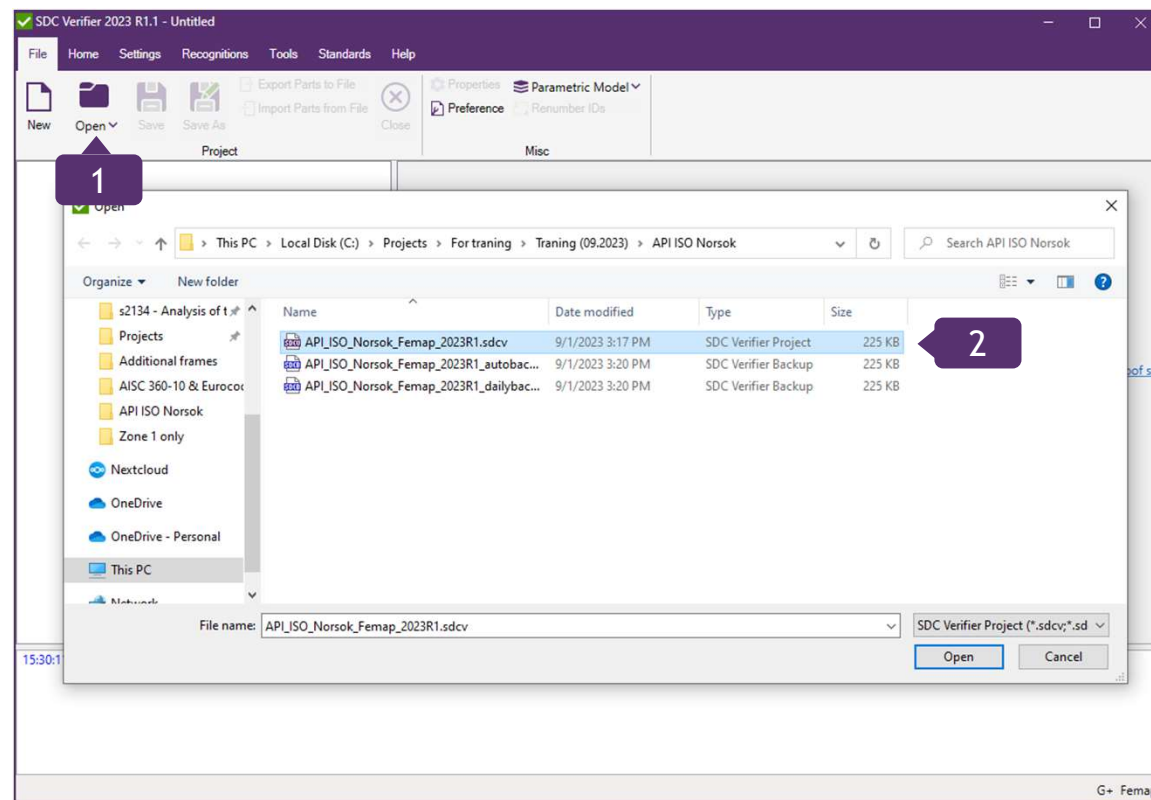
Femap version 2022.2

Preface

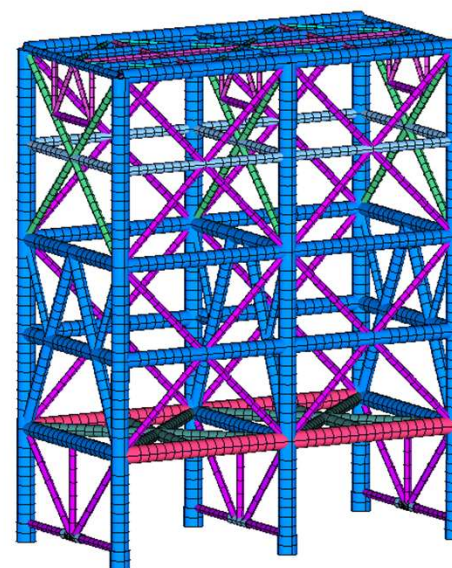
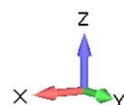
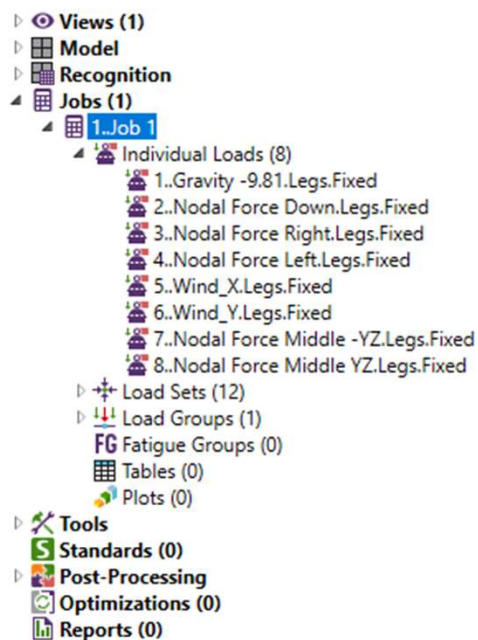
- In this tutorial, API 2A RP/ISO 19902/Norsok N004 Beam Design Checks are reviewed.
- A beam model of a steel frame has been used as a start FEM model.
- Beam member finder was used to recognize beam member length in 3 directions.
- The report was generated with the help of report designer.

Launch SDC Verifier

- 1 Launch *SDC Verifier* 
- 2 Execute *File - Open Project*
- 3 Project: *API ISO Norsok Femap 2023R1.sdcv*



Predefined project




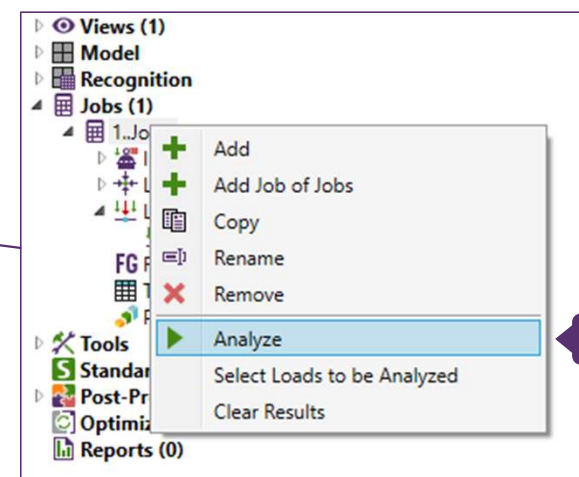
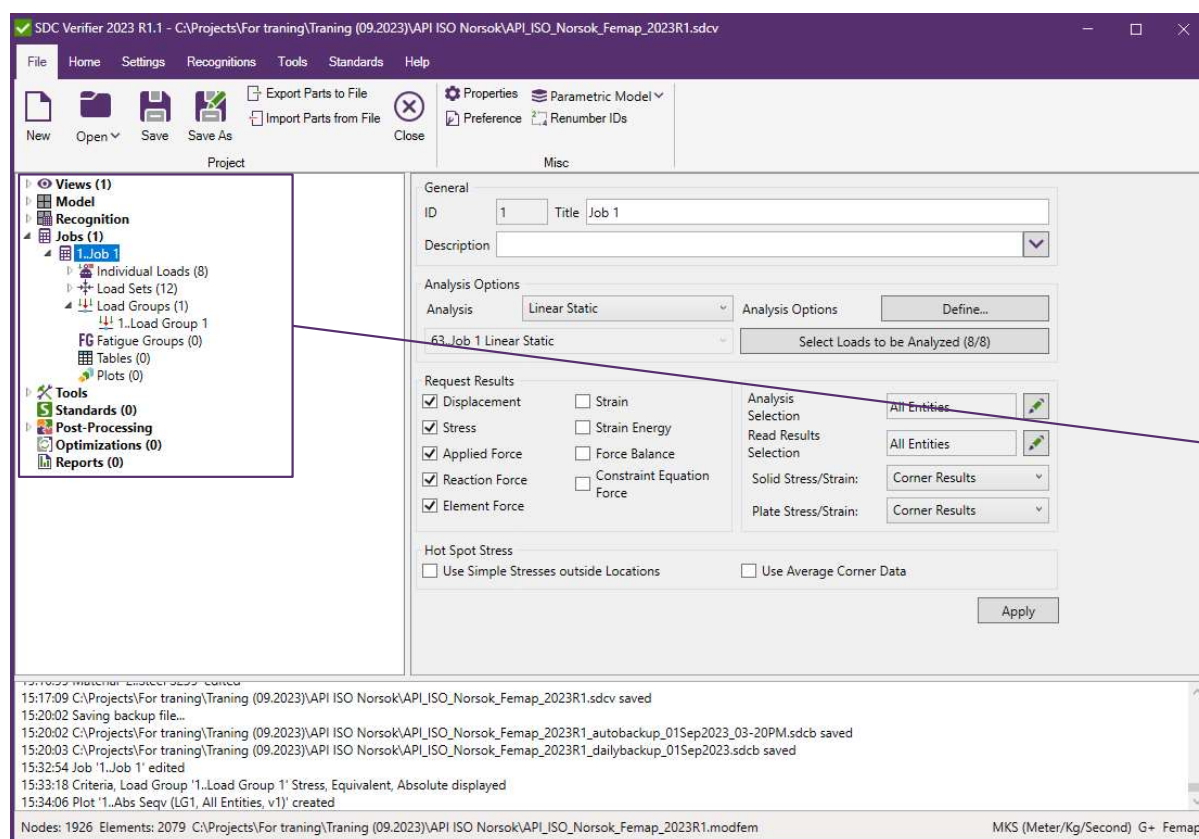
FEMAP [Pa]

This tutorial uses project with predefined boundary condition, load combinations and load group. The model contains only circular tubes elements.

Analyze Job

1

Press  and select Analyze active job: **1..Static Structural**



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:

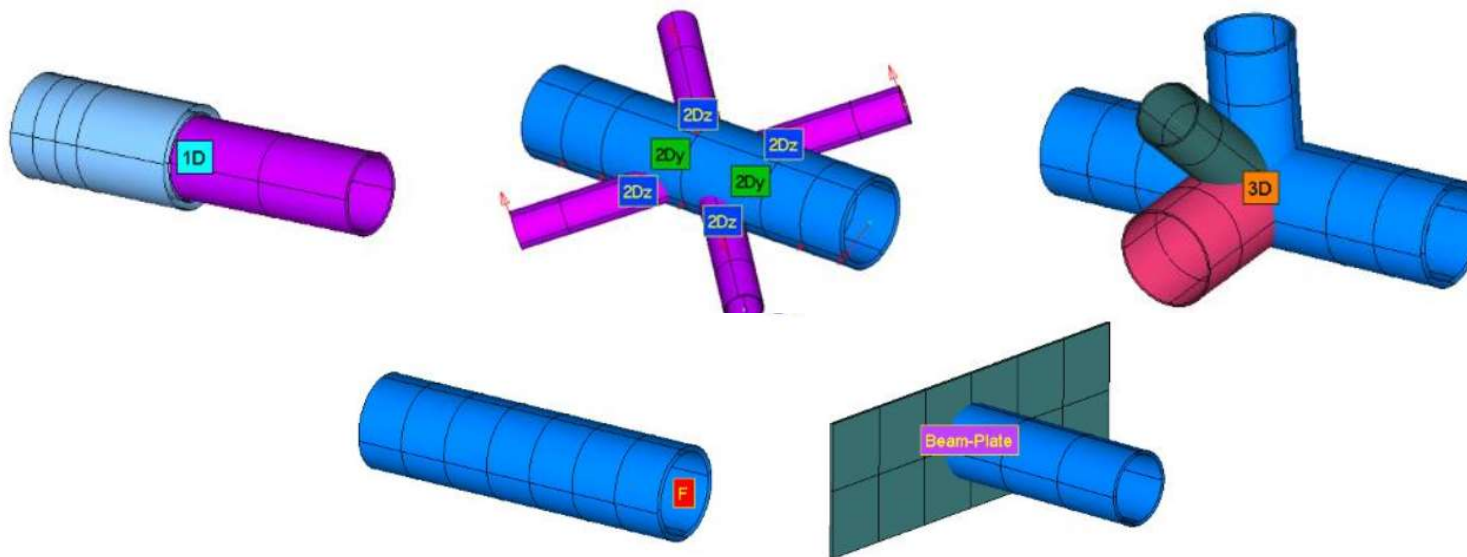
1D Joint - 2 beam members that lie on the curve but with different properties;

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);

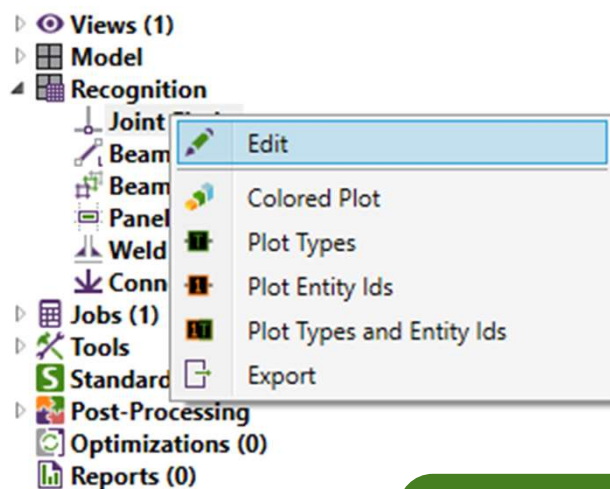
Beam-Plate Joint - beam member connected to plates (perpendicularly); User Defined;



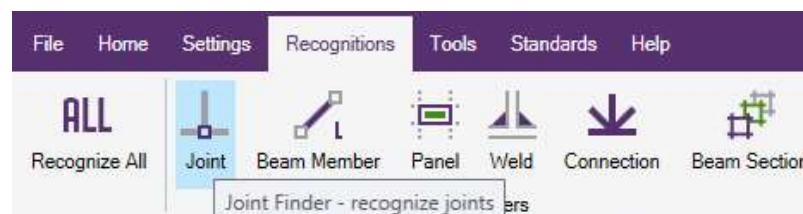
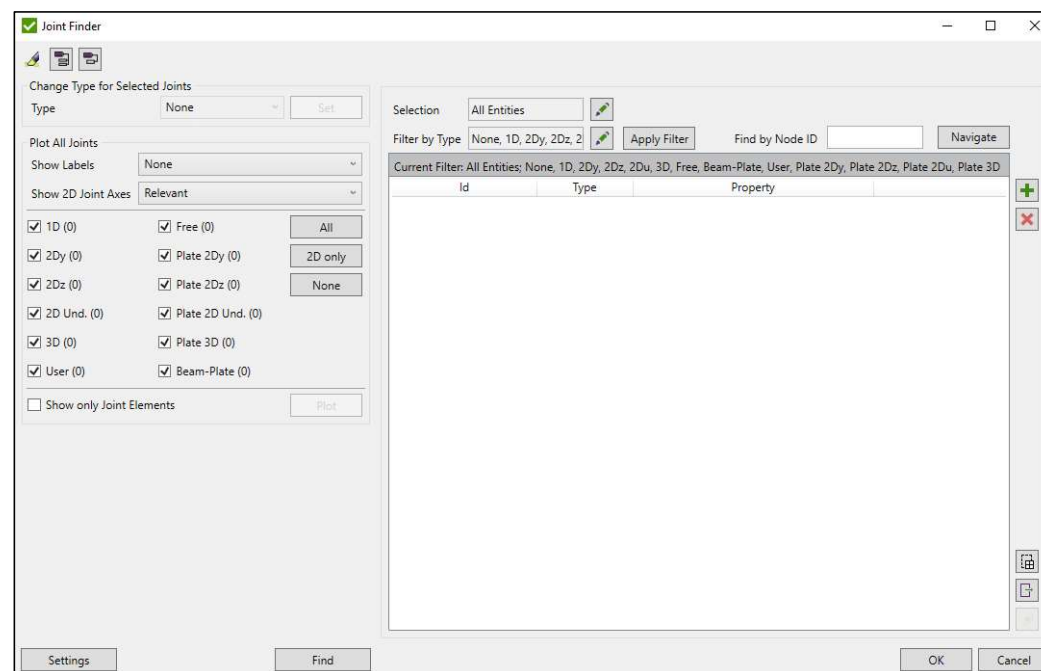
Joint Recognition

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

2 Press **Find**.



It is possible go to
Recognitions on
Ribbon tab and press
Joint:

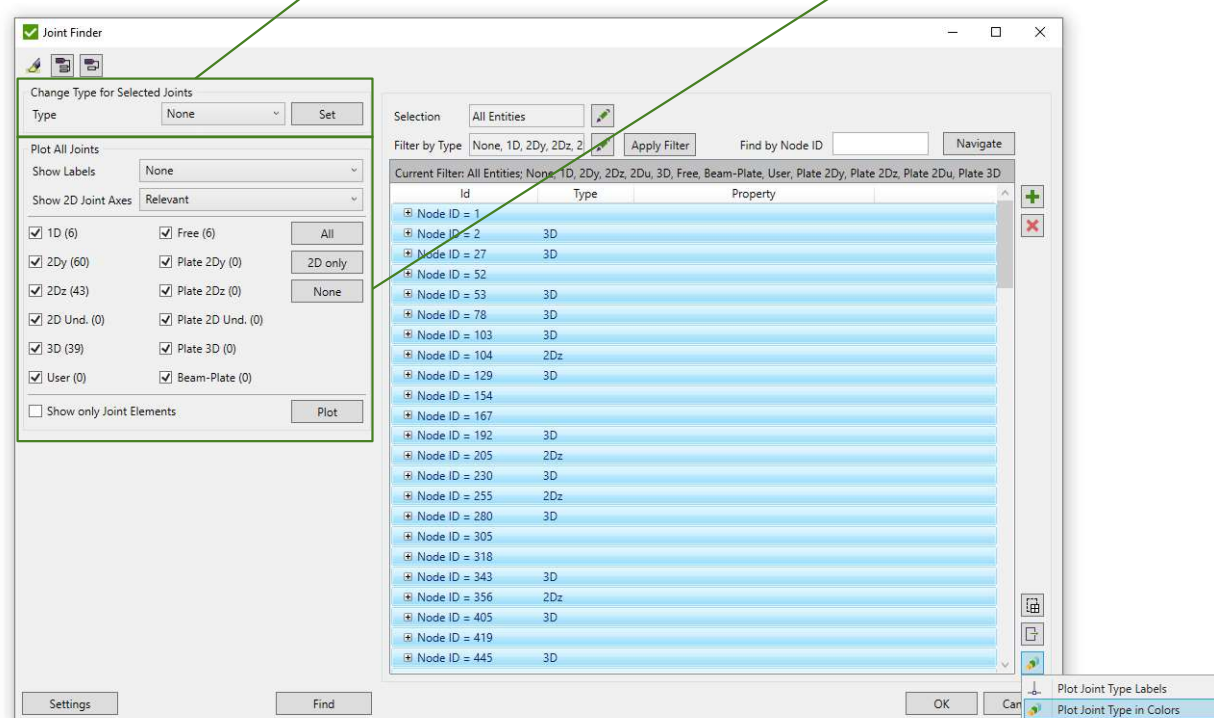
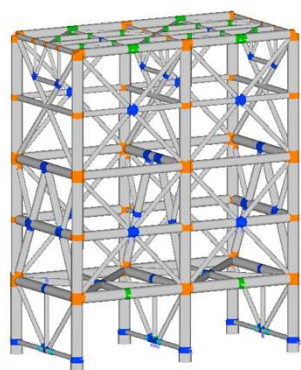


Joints Plot

1 Select All Joints (Ctrl+A).

2 Press  and execute  Plot Joint Type in Colors

3 Press **OK**.

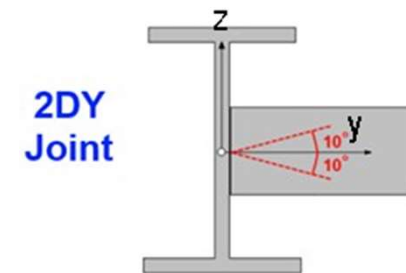
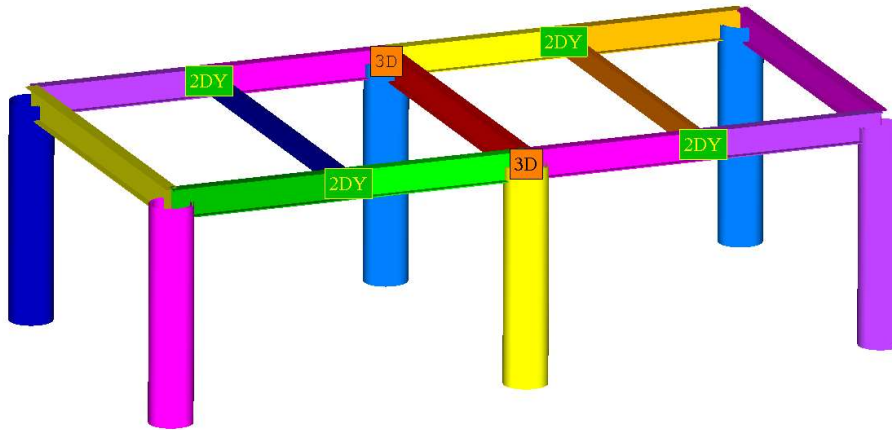


3

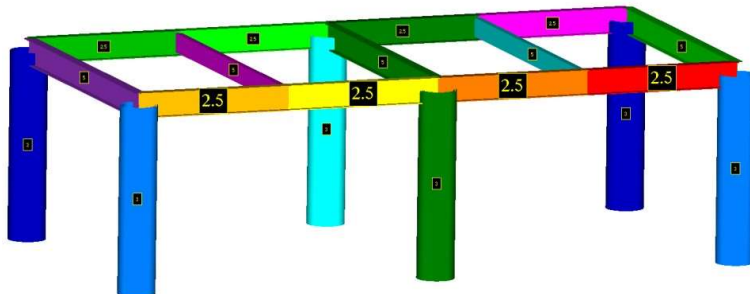
2

Beam Member Lengths in 2 directions

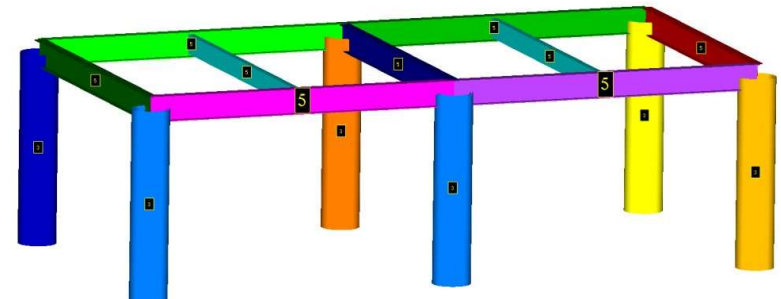
Beam Member Finder recognizes beam members and (buckling) lengths for different directions (Y, Z and Torsional).



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



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



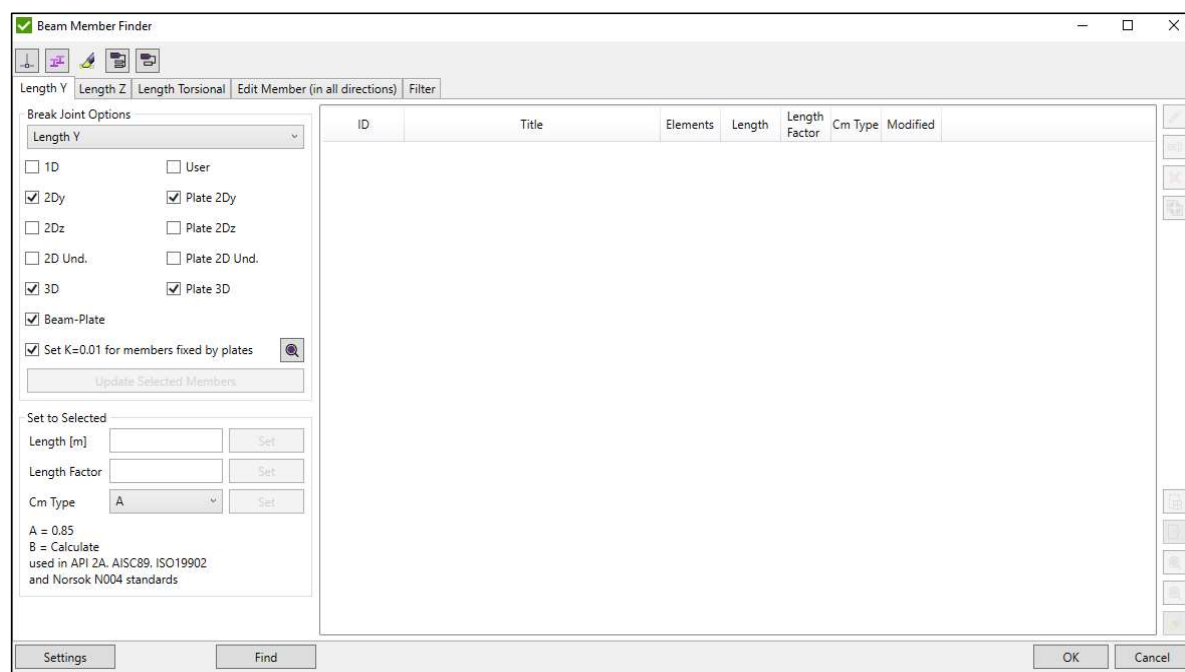
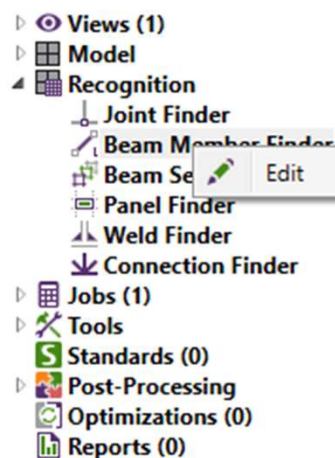
Recognize Length

1

Execute **Edit** from **Beam Member Finder** context menu

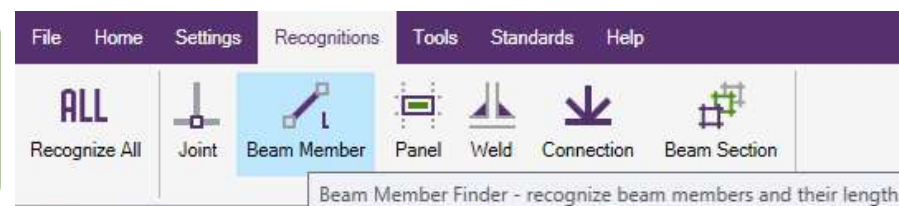
2

Press **Find**.



Default **Break Joint Options** for Tabs:
Length Y: 2DY, 3D, Plate 2DY, Plate 3D
Length Z: 2DZ, 3D, Plate 2DZ, Plate 3D
Length Torsional: 2DY, 2DZ, 2D Und, 3D

It is possible to open it another way - go to **Recognitions** tab in Ribbon and press **Beam Member**:



Beam Member Finder interface

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

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

Press Settings to define
recognition options: selection,
default title

Press Find to automatically recognize
Beam Members and Sub Members for all
3 directions (Y, Z and torsional)

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

The screenshot shows the 'Beam Member Finder' window. It has a toolbar at the top with icons for selection, deletion, and plotting. Below the toolbar are tabs for 'Length Y', 'Length Z', 'Length Torsional', 'Edit Member (in all directions)', and 'Filter'. The 'Length Y' tab is active.

On the left, there are 'Break Joint Options' for 'Length Y' with checkboxes for 1D, 2Dy, 2Dz, 2D Und., 3D, Beam-Plate, and Set K=0.01 for members fixed by plates. There are also checkboxes for 'User', 'Plate 2Dy', 'Plate 2Dz', 'Plate 2D Und.', and 'Plate 3D'. An 'Update Selected Members' button is below these options.

Below the break options is a 'Set to Selected' section with input fields for 'Length [m]' and 'Length Factor', each with a 'Set' button. There is also a 'Cm Type' dropdown menu set to 'A' with a 'Set' button. A note below states: 'A = 0.85, B = Calculate, used in API 2A, AISC89, ISO19902 and Norsok N004 standards'.

At the bottom left are 'Settings' and 'Find' buttons.

The main area is a table with the following columns: ID, Title, Elements, Length, Length Factor, Cm Type, Modified, and Joint - NodeID [Joint Type].

ID	Title	Elements	Length	Length Factor	Cm Type	Modified	Joint - NodeID [Joint Type]
1	Beam Member 1 (Y)	50	5	1	A		1[2Dz]
2	Beam Member 2 (Y)	50	5	1	A		52[2Dz]
3	Beam Member 3 (Y)	100	10				458[2Dy] 405[3D] 507[2Dy]
4	Beam Member 4 (Y)	100	10				556[2Dy] 445[3D] 605[2Dy]
5	Beam Member 5 (Y)	100	10				103[3D] 356[2Dz] 104[2Dz]
6	Beam Member 6 (Y)	51	5	1	A		154[2Dz] 167[2Dz]
7	Beam Member 7 (Y)	100	10				205[2Dz] 230[3D] 255[2Dz]
8	Beam Member 8 (Y)	51	5	1	A		305[2Dz] 318[2Dz]
9	Beam Member 9 (Y)	28	2.795	1	A		
10	Beam Member 10 (Y)	56	5.59				318[2Dy]
11	Beam Member 11 (Y)	56	5.59				305[2Dy]
12	Beam Member 12 (Y)	50	5	1	A		3368[2Dz]
13	Beam Member 13 (Y)	103	10				1176[3D]
14	Beam Member 14 (Y)	50	5	1	A		3518[2Dz]
15	Beam Member 15 (Y)	103	10				
16	Beam Member 16 (Y)	50	5	1	A		
17	Beam Member 17 (Y)	28	2.795	1	A		
18	Beam Member 18 (Y)	56	5.59				
19	Beam Member 19 (Y)	56	5.59				
20	Beam Member 20 (Y)	13	1.25	1	A		
21	Beam Member 21 (Y)	28	2.795	1	A		
22	Beam Member 22 (Y)	56	5.59				

On the right side of the table is a vertical toolbar with icons for plotting. A context menu is open over the 'Plot Length Labels' icon, showing options: 'Plot selected members', 'Plot Length Criteria', 'Plot Members ID Labels', 'Plot Full Members ID Labels', 'Plot Length Labels', 'Plot Cm Type Labels', 'Plot Length Factor Labels', 'Plot Joints for Selected Members', 'Plot Members Y and Z axes', and 'Plot Length Labels in Y and Z axes'.

At the bottom right are 'OK' and 'Cancel' buttons.

Beam Member Finder interface

Break Joint Options define which types of joints will be used to split Beam Member on sub members. There are 3 predefined Break Joint Options (Length Y, Length Z, and Torsional) and custom.

Sub members from table on a plot:

Beam Member Finder

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

Break Joint Options

Length Y

☐ 1D ☐ User

☒ 2Dy ☒ Plate 2Dy

☐ 2Dz ☐ Plate 2Dz

☐ 2D Und. ☐ Plate 2D Und.

☒ 3D ☒ Plate 3D

☒ Beam-Plate

☒ Set K=0.01 for members fixed by plates

Update Selected Members

Set to Selected

Length [m] Set

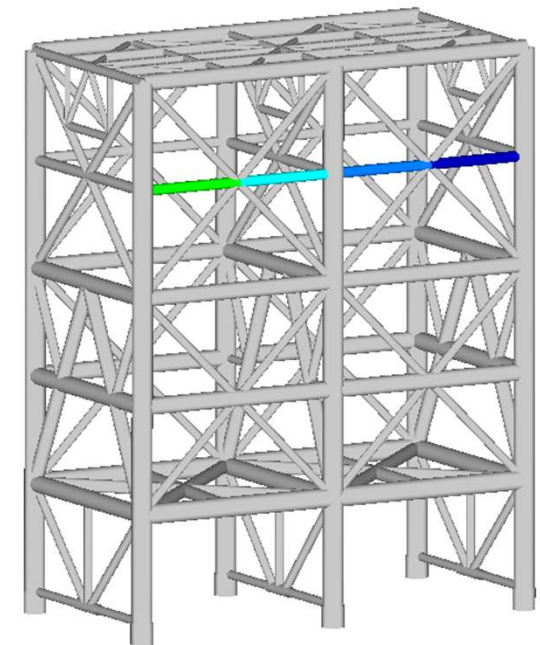
Length Factor Set

Cm Type Set

A = 0.85
B = Calculate
used in API 2A, AISI89, ISO19902
and Norsok N004 standards

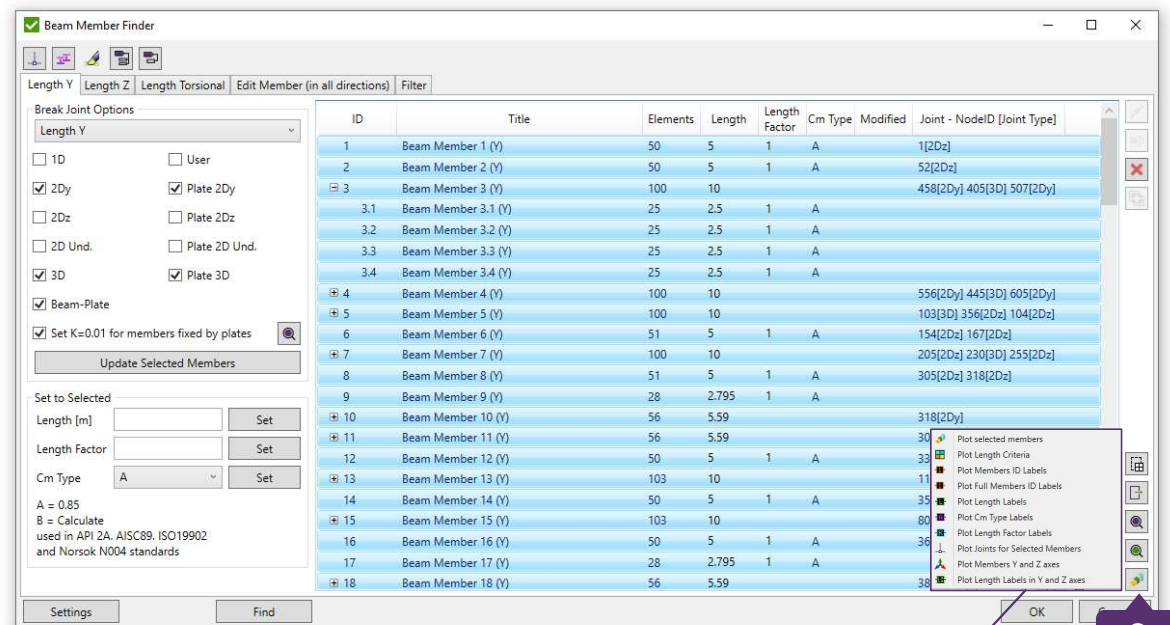
ID	Title	Elements	Length	Length Factor	Cm Type	Modified	Joint - ModelID [Joint Type]
1	Beam Member 1 (Y)	50	5	1	A		1[2Dz]
2	Beam Member 2 (Y)	50	5	1	A		52[2Dz]
3	Beam Member 3 (Y)	100	10				458[2Dy] 405[3D] 507[2Dy]
3.1	Beam Member 3.1 (Y)	25	2.5	1	A		
3.2	Beam Member 3.2 (Y)	25	2.5	1	A		
3.3	Beam Member 3.3 (Y)	25	2.5	1	A		
3.4	Beam Member 3.4 (Y)	25	2.5	1	A		
4	Beam Member 4 (Y)	100	10				556[2Dy] 445[3D] 605[2Dy]
5	Beam Member 5 (Y)	100	10				103[3D] 356[2Dz] 104[2Dz]
6	Beam Member 6 (Y)	51	5	1	A		154[2Dz] 167[2Dz]
7	Beam Member 7 (Y)	100	10				205[2Dz] 230[3D] 255[2Dz]
8	Beam Member 8 (Y)	51	5	1	A		305[2Dz] 318[2Dz]
9	Beam Member 9 (Y)	28	2.795	1	A		
10	Beam Member 10 (Y)	56	5.59				318[2Dy]
11	Beam Member 11 (Y)	56	5.59				305[2Dy]
12	Beam Member 12 (Y)	50	5	1	A		3368[2Dz]
13	Beam Member 13 (Y)	103	10				1176[3D]
14	Beam Member 14 (Y)	50	5	1	A		3518[2Dz]
15	Beam Member 15 (Y)	103	10				804[3D]
16	Beam Member 16 (Y)	50	5	1	A		3668[2Dz]
17	Beam Member 17 (Y)	28	2.795	1	A		
18	Beam Member 18 (Y)	56	5.59				3825[2Dy]











Settings Find OK Cancel



SDC
VERIFIER

-



-  Plot selected members
-  Plot Length Criteria
-  Plot Members ID Labels
-  Plot Full Members ID Labels
-  Plot Length Labels
-  Plot Cm Type Labels
-  Plot Length Factor Labels
-  Plot Joints for Selected Members
-  Plot Members Y and Z axes
-  Plot Length Labels in Y and Z axes

Recommended Practice for Planning, Designing and Constructing Fixed Offshore Platforms — Load and Resistance Factor Design

API RECOMMENDED PRACTICE 2A-LRFD (RP 2A-LRFD)
FIRST EDITION, JULY 1, 1993

American Petroleum Institute
1220 L Street, Northwest
Washington, DC 20005



This "Recommended Practice for Planning, Designing, and Constructing Fixed Offshore Platforms Load - and Resistance Factor Design" (LRFD) contains the design and engineering design principles and good practices that have been the basis of the API RP2A working strength design (WSD) recommended practice, now in its 20th Edition. The LRFD provisions have been developed from the WSD provisions using reliability based calibration.

Issued by
AMERICAN PETROLEUM INSTITUTE
Production Department

FOR INFORMATION CONCERNING TECHNICAL CONTENTS OF
THIS PUBLICATION CONTACT THE API PRODUCTION DEPARTMENT,
1201 MAIN STREET, SUITE 2535, DALLAS, TX 75202-3694 — (214) 749-3841.
SEE BACK SIDE FOR INFORMATION CONCERNING HOW TO OBTAIN
ADDITIONAL COPIES OF THIS PUBLICATION.

Users of this publication should become familiar with its scope
and content. This publication is intended to supplement rather
than replace individual engineering judgment.

OFFICIAL PUBLICATION



REG. U.S. PATENT OFFICE

Copyright © 1993 American Petroleum Institute

Cm - reduction factors

$$\frac{f_c}{\phi_c F_{cn}} + \frac{1}{\phi_b F_{bn}} \left\{ \left[\frac{C_{my} f_{by}}{\left(1 - \frac{f_c}{\phi_c F_{ey}}\right)} \right]^2 + \left[\frac{C_{mz} f_{bz}}{\left(1 - \frac{f_c}{\phi_c F_{ez}}\right)} \right]^2 \right\}^{0.5} \leq 1.0$$

..... (D.3.2-1)

TABLE D.3-1
EFFECTIVE LENGTH AND BENDING
REDUCTION FACTORS FOR
MEMBER STRENGTH CHECKING

Situation	Effective Length Factor K	Reduction Factor $C_m^{(1)}$
Superstructure Legs		
Braced	1.0	(a)
Portal (unbraced)	$K^{(2)}$	(a)
Jacket Legs & Piling		
Grouted Composite Section	1.0	(c)
Ungouted Jacket Legs	1.0	(c)
Ungouted Piling Between Shim Points	1.0	(b)
Jacket Braces		
Face-to-face Length of Main Diagonals	0.8	(b) or (c)
Face of Leg to Centerline of Joint Length of K-Braces ⁽³⁾	0.8	(c)
Longer Segment Length of X-Braces ⁽³⁾	0.9	(c)
Secondary Horizontals	0.7	(c)
Deck Truss Chord members	1.0	(a),(b) or (c)
Deck Truss Web Members		
In-Plane Action	0.8	(b)
Out-of-Plane Action	1.0	(a) or (b)

C_{my} and C_{mz} reduction factors are used in combined axial and bending check. API RP 2A description:

By default C_m Type is equal to A = 0.85 for all members. It is possible to modify C_m Type for selected members:

In SDC Verifier B = minimum from (b) and (c)

- C_{my} and C_{mz} factors for ISO 19902 can be found in the Table 13.5-1 and are used in the formula 13.3-3.
- C_{my} and C_{mz} factors for Norsok N004 Rev3 can be found in the Table 6-2 and are used in the formula 6.27

Notes to Table D.3-1:

(1) Use whichever is more applicable to a specific situation. Values of the reduction factor C_m referred to in the above table are as follows:

(a) 0.85

(b) $0.6 - 0.4 \left(\frac{M_1}{M_2} \right)$, no more than 0.85, or less than 0.40, where M_1/M_2 is the ratio of smaller to larger moments at the ends of that portion of the member unbraced in the plane of bending under consideration. M_1/M_2 is positive when the number is bent in reverse curvature, negative when bent in single curvature.

(c) $1.0 - 0.4 \left(\frac{f_c}{\phi_c F_e} \right)$, or 0.85, whichever is less

Cm Type

A

Set

A = 0.85

B = Calculate

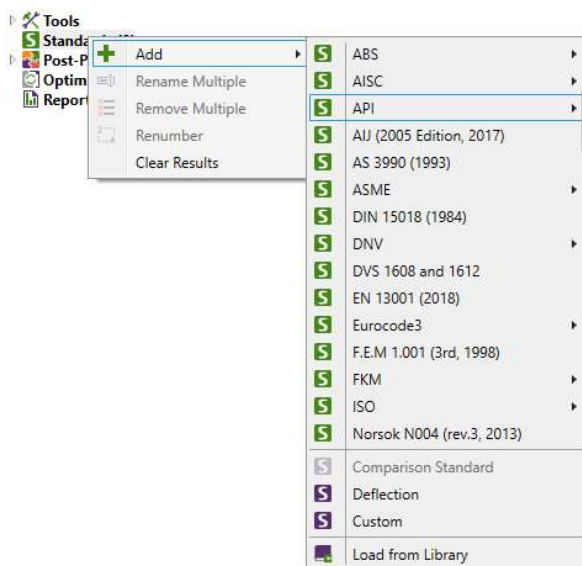
used in API 2A, AISC89, ISO19902 and Norsok N004 standards

Add API RP 2A-LRFD standard

1

Execute **Standards** => **Add** => **API RP 2A-LRFD (1st, Jul 1993)**.

API 2A RP standard covers the design checks only cylindrical types of shapes.



SECTION D
CYLINDRICAL MEMBER DESIGN
 C_x = critical elastic buckling coefficient
The theoretical value of C_x is 0.6. However, a reduced value of $C_x = 0.3$ is recommended for use in Equation D.2.2-3 to account for the effect of initial geometric imperfections within API Spec 2B tolerance limits, Reference D2.
 ϕ_t = resistance factor for axial tensile strength, 0.95
 ϕ_c = resistance factor for axial compressive strength, 0.85
 ϕ_b = resistance factor for bending strength, 0.95.
 ϕ_v = resistance factor for beam shear strength, 0.95

API RP 2A-LRFD (1st, 1993)

ID: 1 Title: API RP 2A-LRFD (1st, 1993)

Alias: Standard1

Description:

Safety Factors

Critical Elastic Buckling Coefficient (C_x): 0.3

Resistance Factor for Tension (F_t): 0.95

Resistance Factor For Compression (F_c): 0.85

Resistance Factor For Bending (F_b): 0.95

Resistance Factor For Shear (F_v): 0.95

Selection

+ 2 Shapes


Elements: 2077

☐ Use AISC 360-10 for non-tubular shapes

Materials with Yield = 0

OK Cancel

Define Material Characteristics

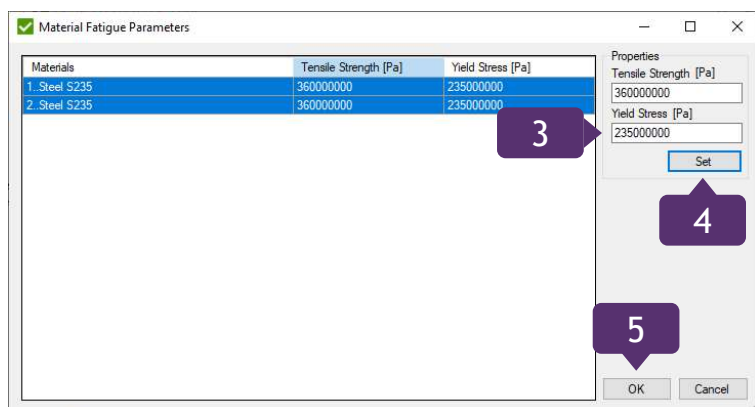
1 Press  to set the material yield stress and tensile strength

2 Tensile Strength: **360e+6**

3 Yield Stress: **240e+6**

4 Press **Set**

5 Press **OK**



Material Fatigue Parameters

Materials	Tensile Strength [Pa]	Yield Stress [Pa]
1. Steel S235	360000000	235000000
2. Steel S235	360000000	235000000

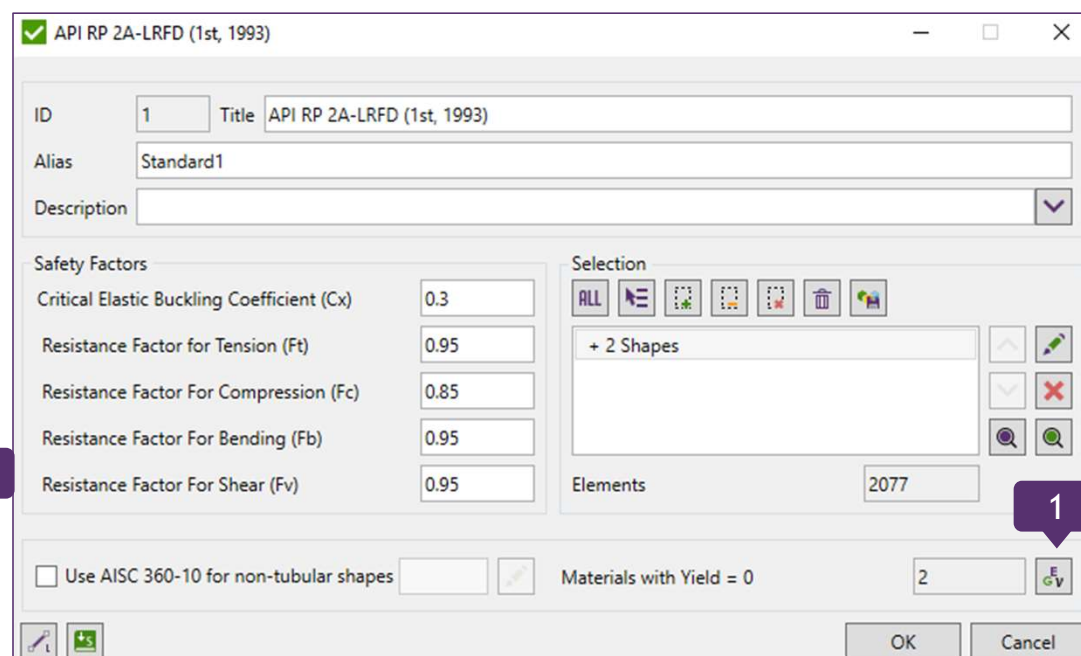
Properties

Tensile Strength [Pa] 360000000

Yield Stress [Pa] 235000000

Set

OK Cancel



API RP 2A-LRFD (1st, 1993)

ID 1 Title API RP 2A-LRFD (1st, 1993)

Alias Standard1

Description

Safety Factors

Critical Elastic Buckling Coefficient (Cx) 0.3

Resistance Factor for Tension (Ft) 0.95

Resistance Factor For Compression (Fc) 0.85

Resistance Factor For Bending (Fb) 0.95

Resistance Factor For Shear (Fv) 0.95

Selection

+ 2 Shapes

Elements 2077

Use AISC 360-10 for non-tubular shapes ☐

Materials with Yield = 0 2


OK Cancel

Extreme table for bending check

1

Execute **Table** from **Bending Stress Check** context menu

2

Press  to select load

3

Load Type: Load Group

4

Load: 1..Load Group 1

5

Press **OK**

6

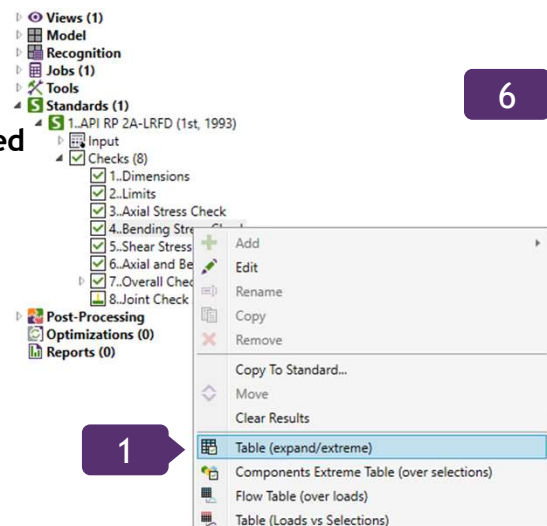
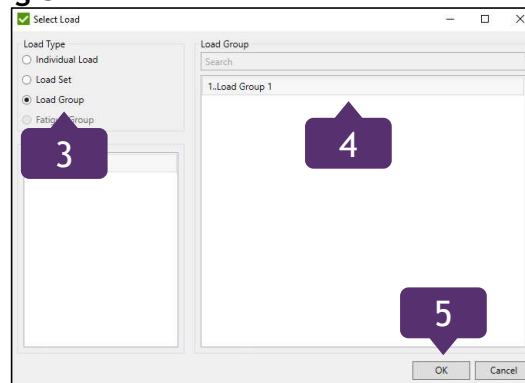
Extreme Options: **Detailed**

7

Press **Fill Table**

8

Press **OK**



Overall Check contains results from all checks. With the help of one table/plot it is possible to verify if the model passes the checks (< 1). Overall Utilization Factor = worst Uf among all checks.


ID	Title	Extreme	Bending Moment [N]	Bending Strength [N]	Bending Moment Resistance [N]	Utilization Factor
1		Maximum	0.00	308388256.00	22125.36	0.00
2		Element ID	2960	455	5211	2960
3		Load	IL4	IL6	IL6	IL4
4		Maximum	1394314.88	330288032.00	1279478.13	1.09
5		Element ID	6390	3037	6375	6390
6		Load	IL5	IL6	IL6	IL5
7		Absolute	1394314.88	330288032.00	1279478.13	1.09
8		Element ID	6390	3037	6375	6390
9		Load	IL5	IL6	IL6	IL5

Criteria Plot for Bending Stress Check

1

Execute **Criteria Plot** from **Bending Stress Check** context menu

2

Press  to select load

3

Load Type: Load Group

4

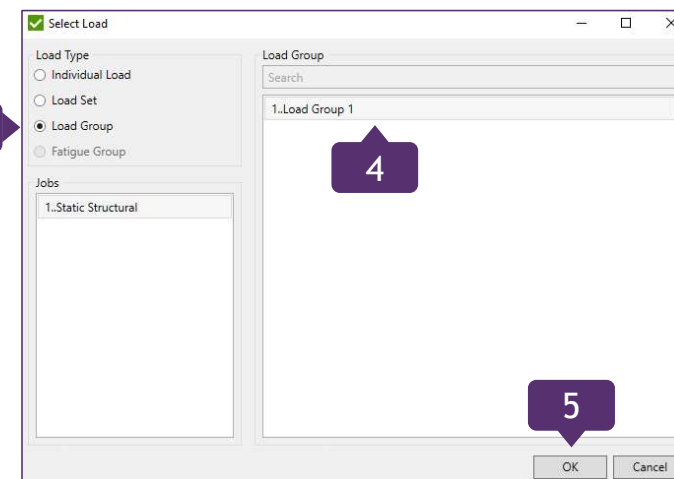
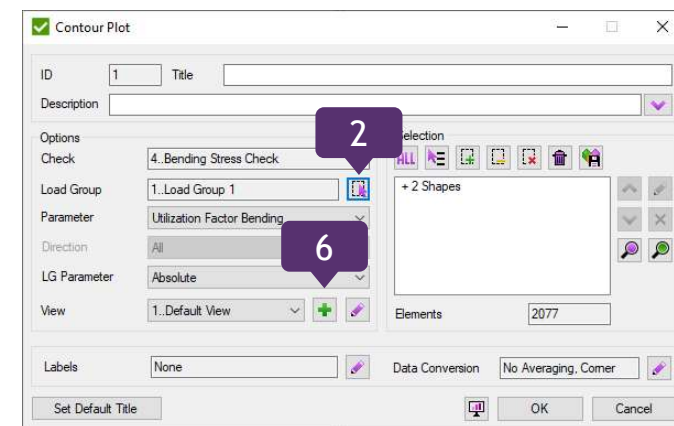
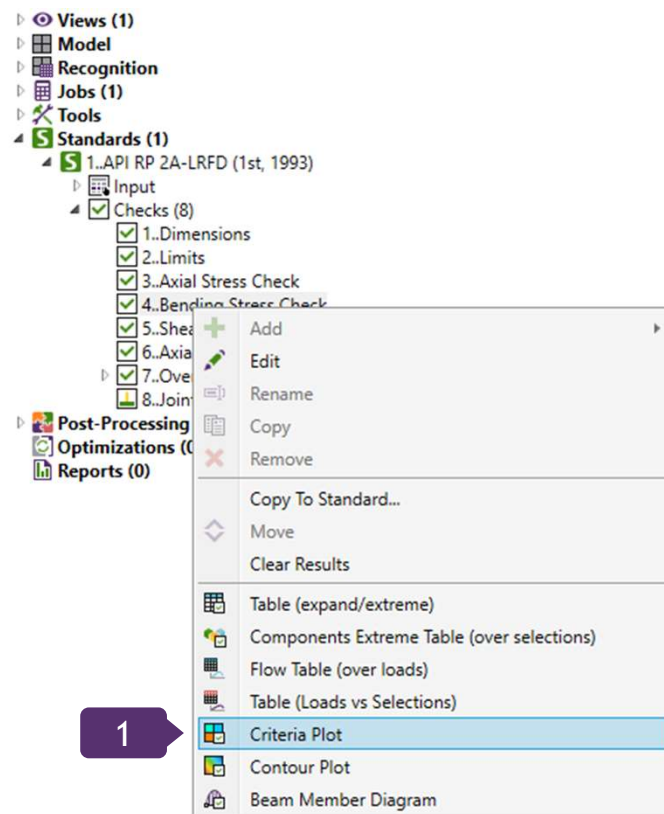
Load: 1..Load Group 1

5

Press **OK**

6

Press to add view 



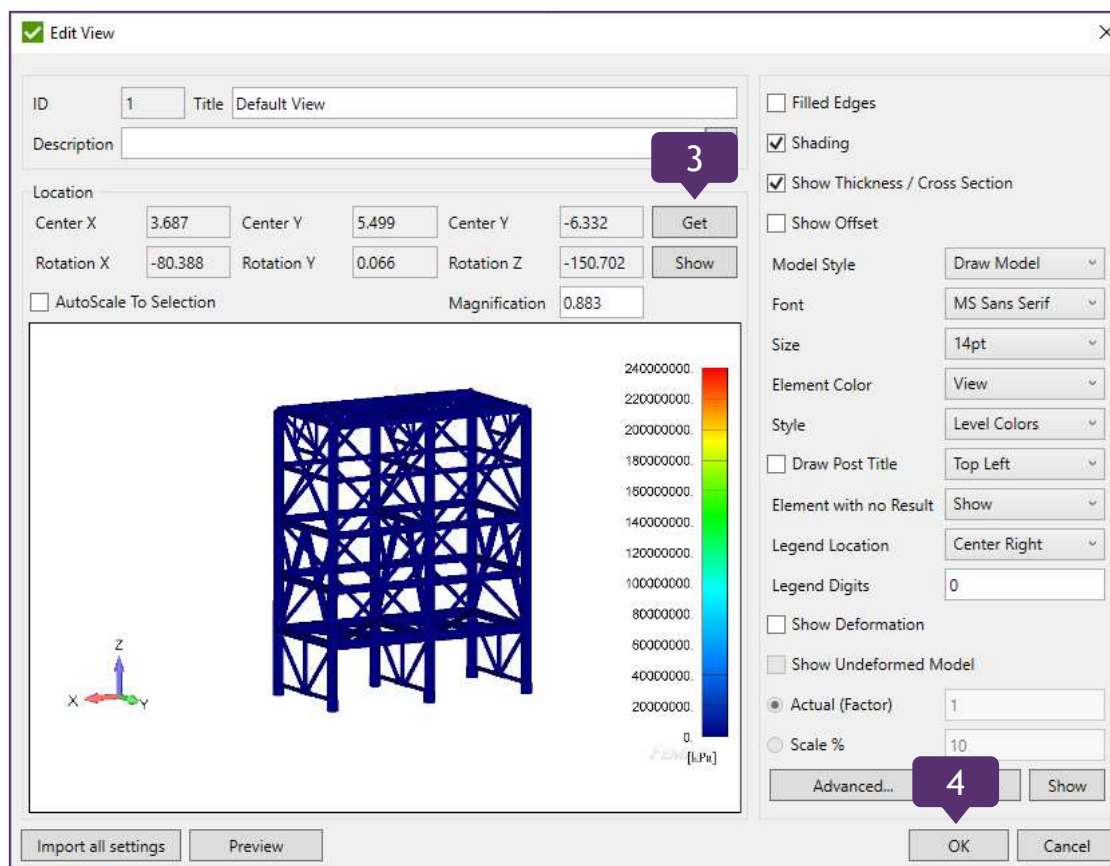
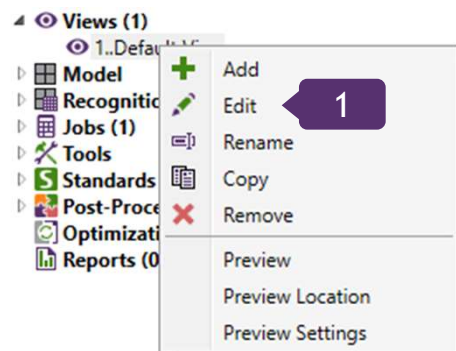
Plot. Create View

1 Press **Default view / Edit**

2 Orient model in Femap as shown on the picture

3 Press **Get**

4 Press **OK**




Criteria plot for overall check

1

Execute  from **Overall Check** context menu

2

Press  to select load

3

Load Type: Load Group

4

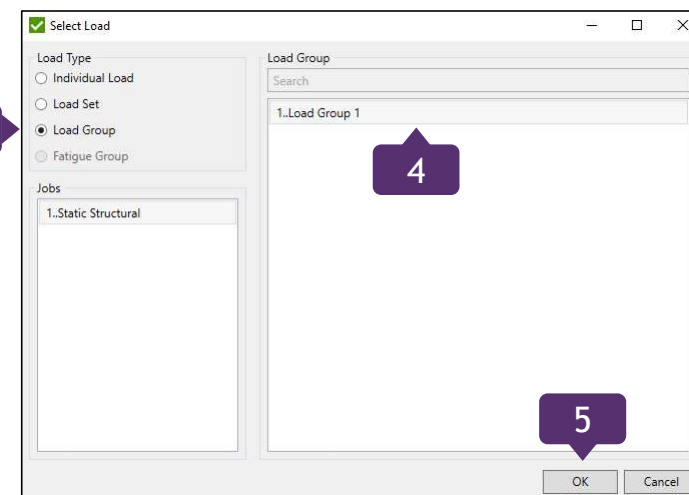
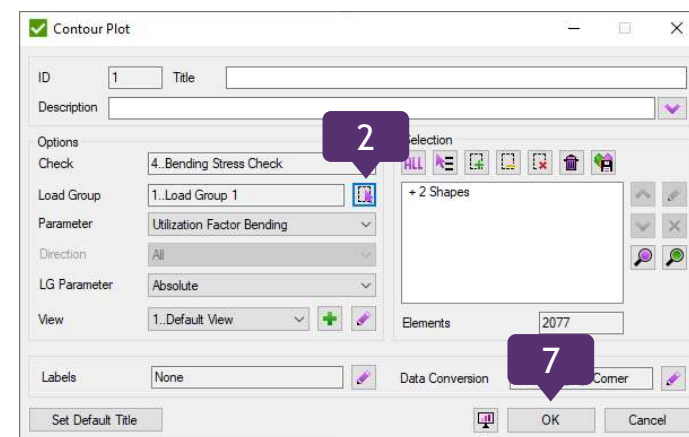
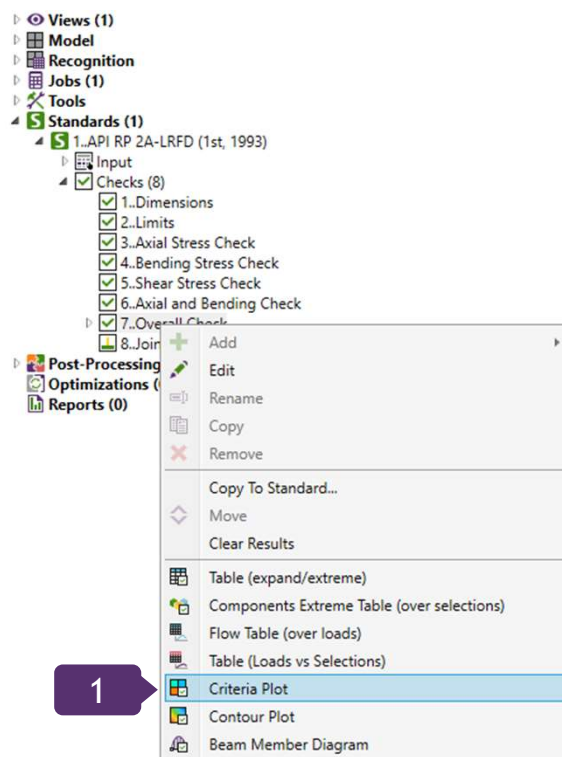
Load: 1..Load Group 1

5

Press **OK**

6

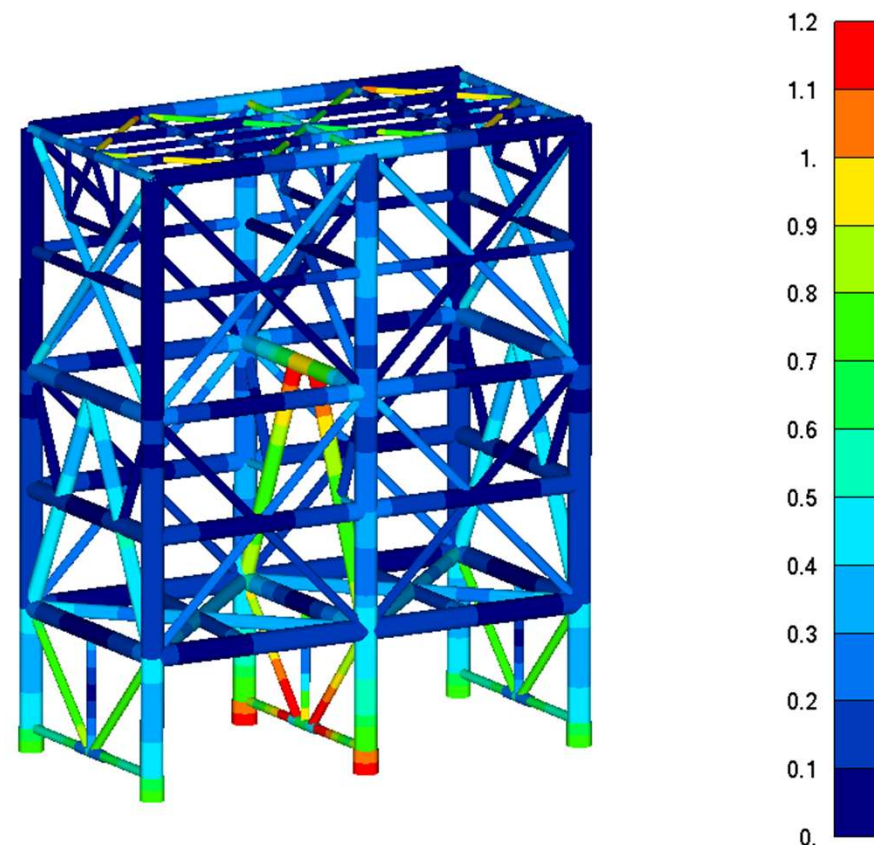
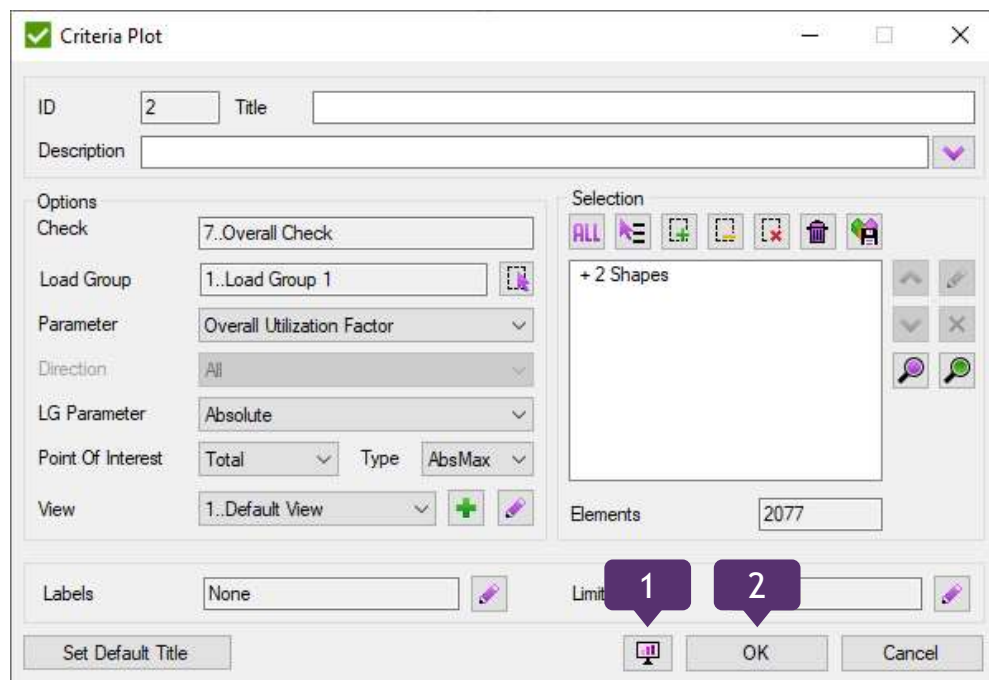
Press **OK**



Display Plot

1 Press  to display plot

2 Press **OK**



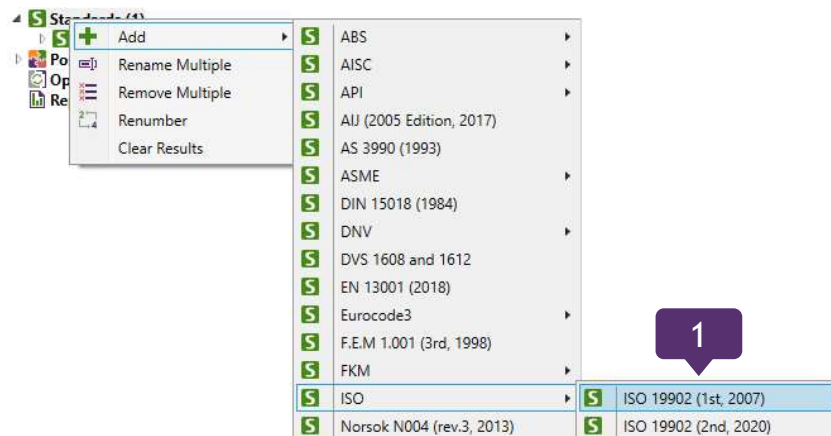
Add ISO 19902 standard

1

Execute **Standards => Add => ISO 19902 (1st, Dec 2007)**

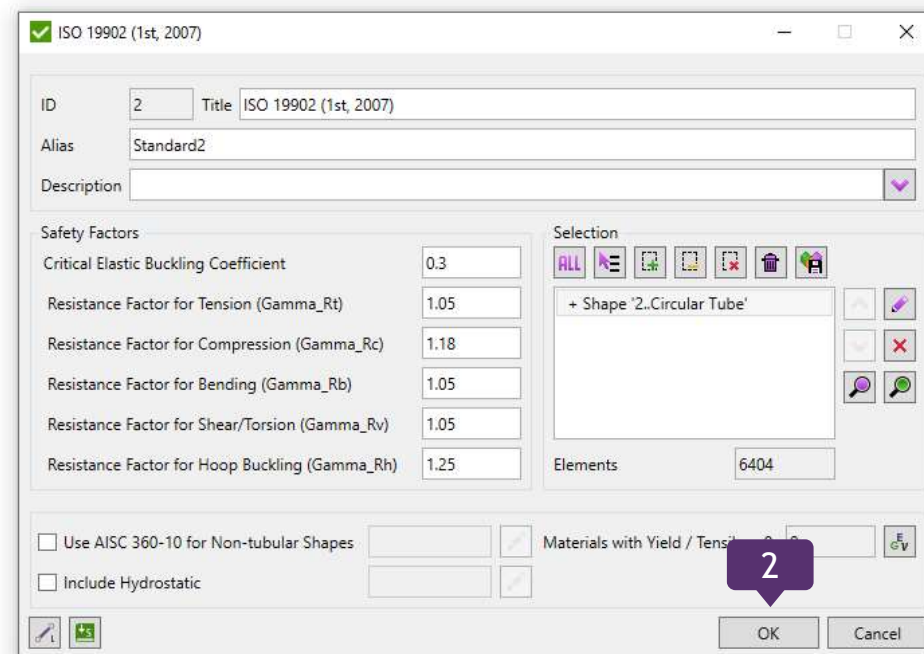
2

Press **OK**



1

ISO 19902 procedure is similar to API 2A RP. In overall check it is possible to verify if the structure passes all checks : Overall Utilization Factor = worst U_f among all checks < 1 .
Add extreme table and criteria plot for '1..Load Group 1' the same as for API standard.



2

C_x is the elastic critical buckling coefficient, see below;

The theoretical value of C_x for an ideal tubular is 0.6. However, a reduced value of $C_x = 0.3$ should be used in Equation (13.2-10) to account for the effect of initial geometric imperfections within the tolerance limits given in Clause 21. A reduced value of $C_x = 0.3$ is implicit in the value of f_{xe} used in Equations (13.2-8) and (13.2-9).

$\gamma_{R,t}$ is the partial resistance factor for axial tensile strength, $\gamma_{R,t} = 1.05$.

$\gamma_{R,c}$ is the partial resistance factor for axial compressive strength, $\gamma_{R,c} = 1.18$.

$\gamma_{R,b}$ is the partial resistance factor for bending strength, $\gamma_{R,b} = 1.05$;

$\gamma_{R,v}$ is the partial resistance factor for shear strength, $\gamma_{R,v} = 1.05$;

$\gamma_{R,h}$ is the partial resistance factor for hoop buckling strength, $\gamma_{R,h} = 1.25$.

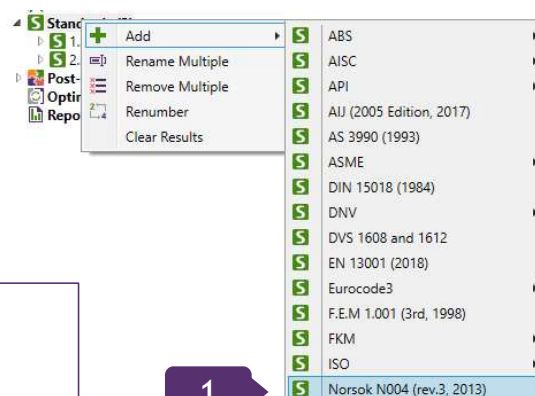
Add Norsok N004 standard

1

Execute **Standards** => **Add** => **Norsok N004 (rev.3, Feb 2013)**.

2

Press **OK**



1

Norsok N004 procedure is similar to API 2A RP. In overall check it is possible to verify if the structure passes all checks : Overall Utilization Factor = worst Uf among all checks < 1.

C_e = critical elastic buckling coefficient = 0.3

$\gamma_{R,t}$ = material factor for tension = 1.15

$\gamma_{R,v}$ = material factor for shear = 1.15

γ_M = see section 6.3.7

$\gamma_M = 1.15$ for $\bar{\lambda}_s < 0.5$ (6.22)

$\gamma_M = 0.85 + 0.60\bar{\lambda}_s$ for $0.5 \leq \bar{\lambda}_s \leq 1.0$

$\gamma_M = 1.45$ for $\bar{\lambda}_s > 1.0$

where

$$\bar{\lambda}_s = \frac{|\sigma_{c,sd}|}{f_{cl}} \cdot \lambda_c + \left(\frac{\sigma_{p,sd}}{f_h} \right)^2 \cdot \lambda_h \quad (6.23)$$

where f_{cl} is calculated from Equation (6.6) or Equation (6.7) whichever is appropriate and f_h from Equation (6.17), Equation (6.18), or Equation (6.19) whichever is appropriate.

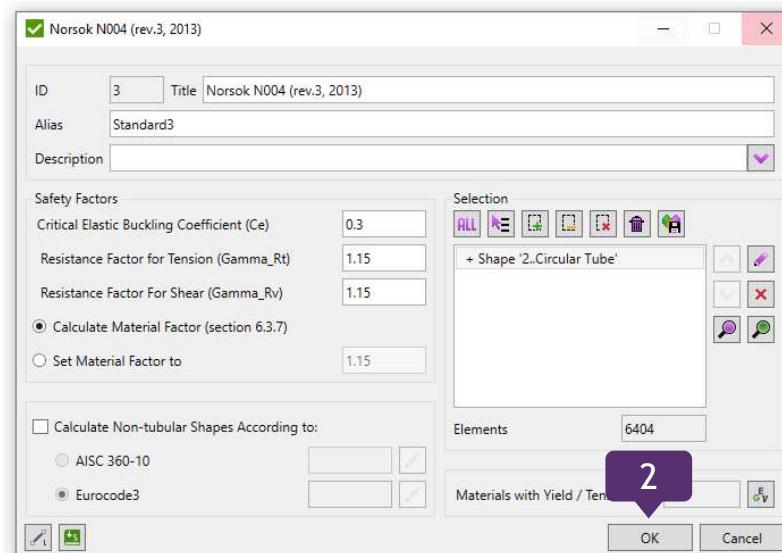
$$\lambda_c = \sqrt{\frac{f_y}{f_{cle}}}, \text{ and } \lambda_h = \sqrt{\frac{f_y}{f_{he}}} \quad (6.24)$$

f_{cle} and f_{he} is obtained from Equation (6.8), and Equation (6.20) respectively.

$\sigma_{p,sd}$ is obtained from Equation (6.16) and

$$\sigma_{c,sd} = \frac{N_{sd}}{A} + \frac{\sqrt{M_{y,sd}^2 + M_{z,sd}^2}}{W} \quad (6.25)$$

N_{sd} is negative if in tension.



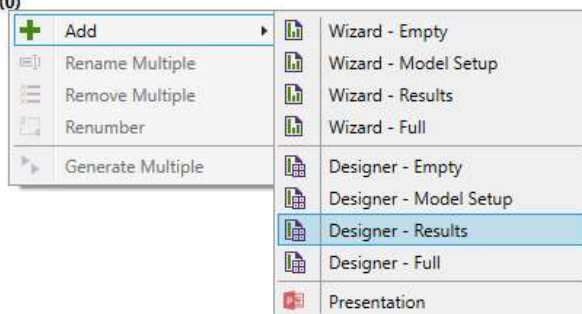
2

Report - Tables

1 Execute **Reports** => **Add** => **Designer Results**

2 **Results** => **Check Tables**. Select **Overall Check** and press **Add Check Tables**

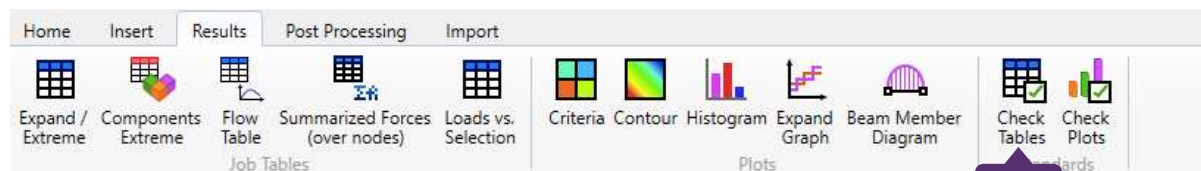
Post-Processing
Optimizations (0)
Reports (0)



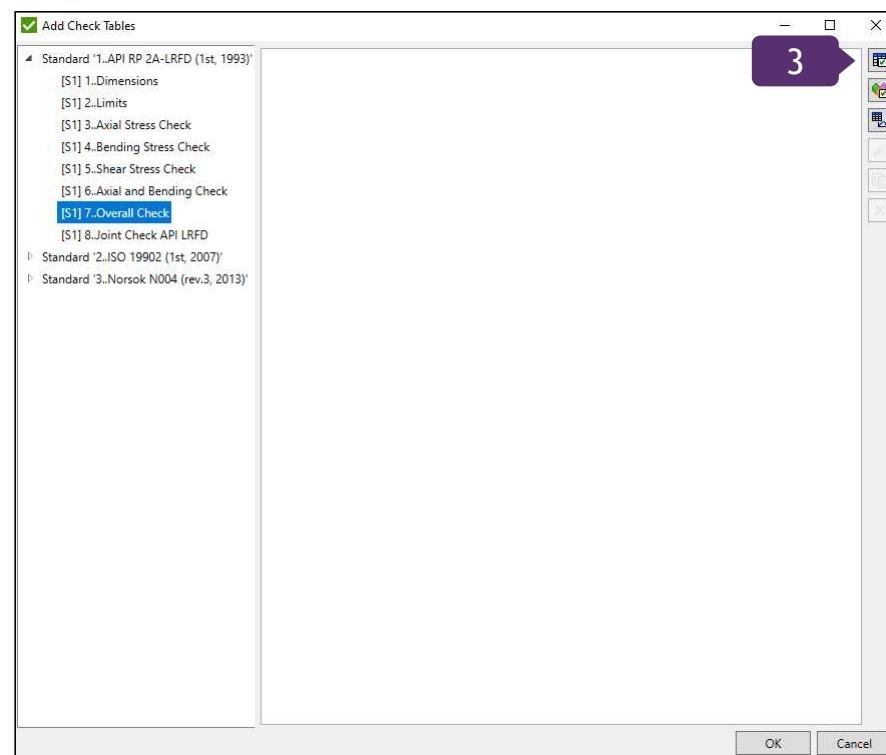
1

There are 4 templates of the reports:

- **Empty** - only first page and preface items are included;
- **Model Setup** - description of the model data (materials, properties, components, boundary conditions) is included;
- **Results** - for each load extreme displacement tables, stress and displacement plots are included. Predefined tables: sum of reaction forces, stresses/displacements summary tables;
- **Full** - Model Setup + Results + all tables created in Job.



2



3

Report - Tables

- 1 Select **Load Group 1**
- 2 Apply **All Entities**
- 3 Select **Detailed**
- 4 Press **Ok**
- 5 Repeat 1-4 step for Standard **ISO 19902** and **Norsok N004**

✓ Add Check Tables

- Standard '1..API RP 2A-LRFD (1st, 1993)'
- Standard '2..ISO 19902 (1st, 2007)'
- Standard '3..Norsok N004 (rev.3, 2013)'

The screenshot shows the 'Custom Check Table' dialog box. It has several sections: 'Loads' with a 'Count' dropdown set to 'LG1..Load Group 1' (callout 1); 'Options' with 'Table Type' set to 'Extreme (worst result on selection)' and 'Table Structure' set to 'Direction over Parameters'; 'Extreme Options' with 'Detailed (extreme locations - element and and load(for Load Groups))' selected (callout 3); 'Filter by' with 'Parameter' set to 'None' and 'Value >' set to '1'; 'Sort by' with 'Parameter' set to 'None' and 'Order' set to 'Descending'; and 'Directions' with 'All' selected. On the right, there is a 'Selections (1) (Elements)' section with a list of 'All Entities' (callout 2) and a toolbar with icons for adding, removing, and searching. At the bottom right, there are 'OK' and 'Cancel' buttons (callout 4).

Report - Plots

1

Execute **Results** => **Check Plots**

2

Select Standard **API RP 2A-LRFD** and press **Add Criteria Plot**

3

Select **Load Group 1**

4

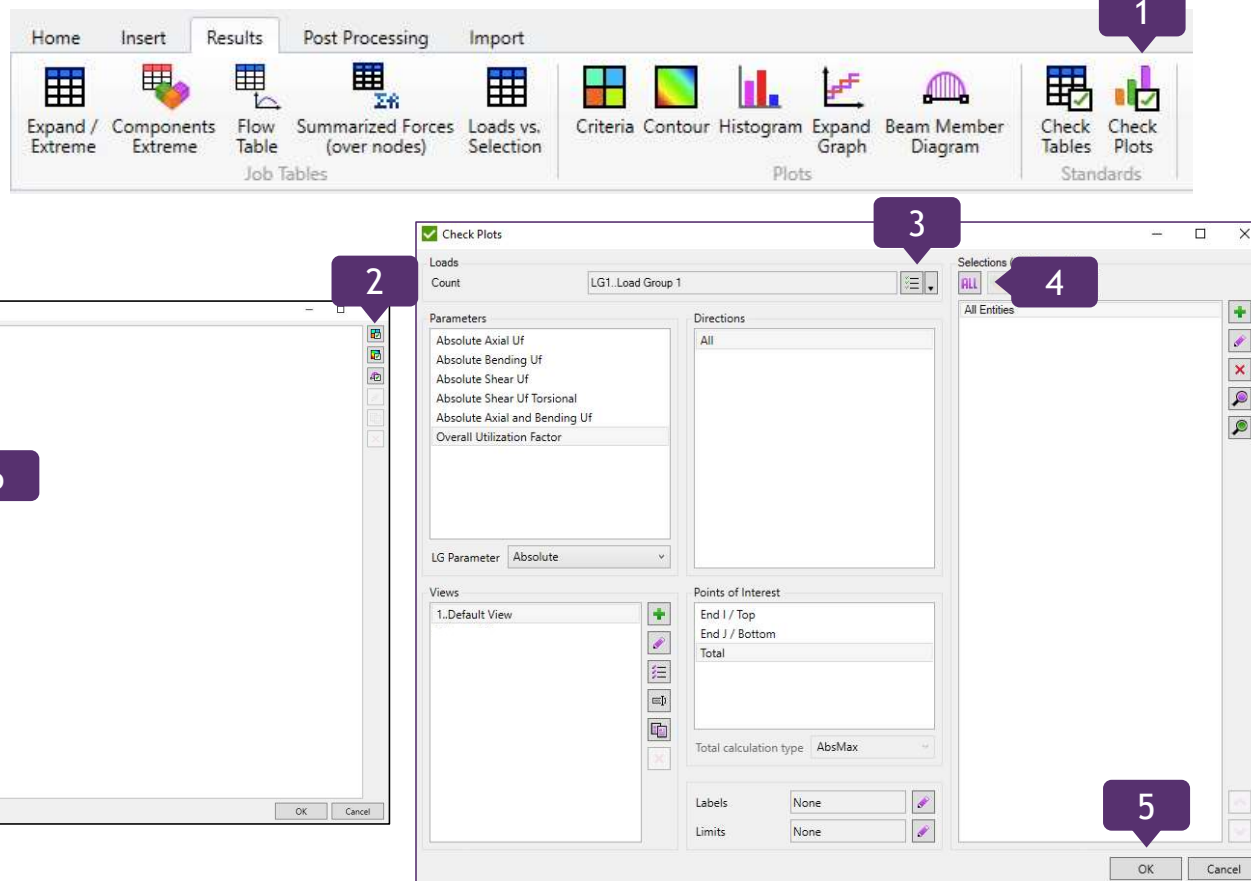
Select **All Entities**

5

Press **OK**

6

Repeat 1-5 step for Standards **ISO 19902** and **Norsok N004**



Report - Plots

1

Select plot in **API RP 2A-LRFD** => **Abs UF Utilization Factor**

2

Select **Break Page Before** and press **No**

3

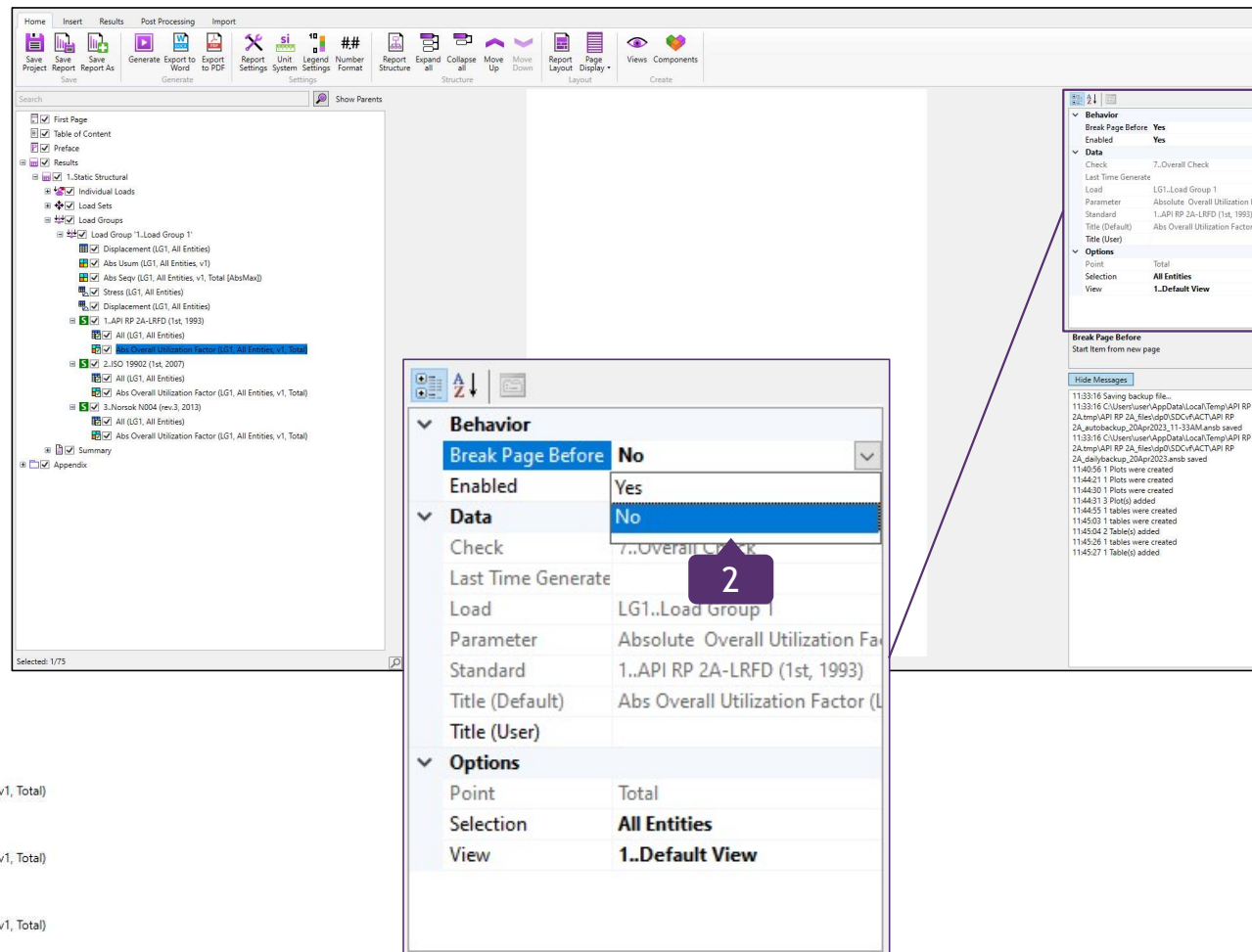
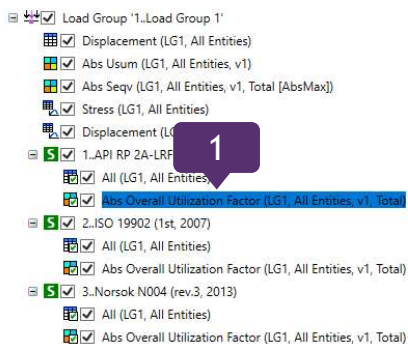
Select plot in **API RP 2A-LRFD** => **Abs UF Utilization Factor**

4


Select **Break Page Before** and press **No**

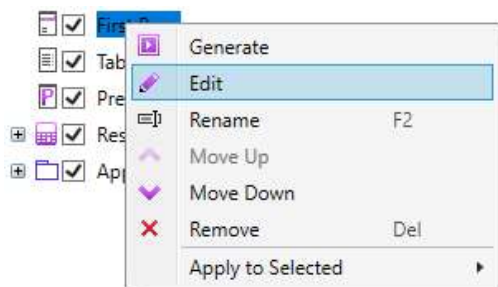
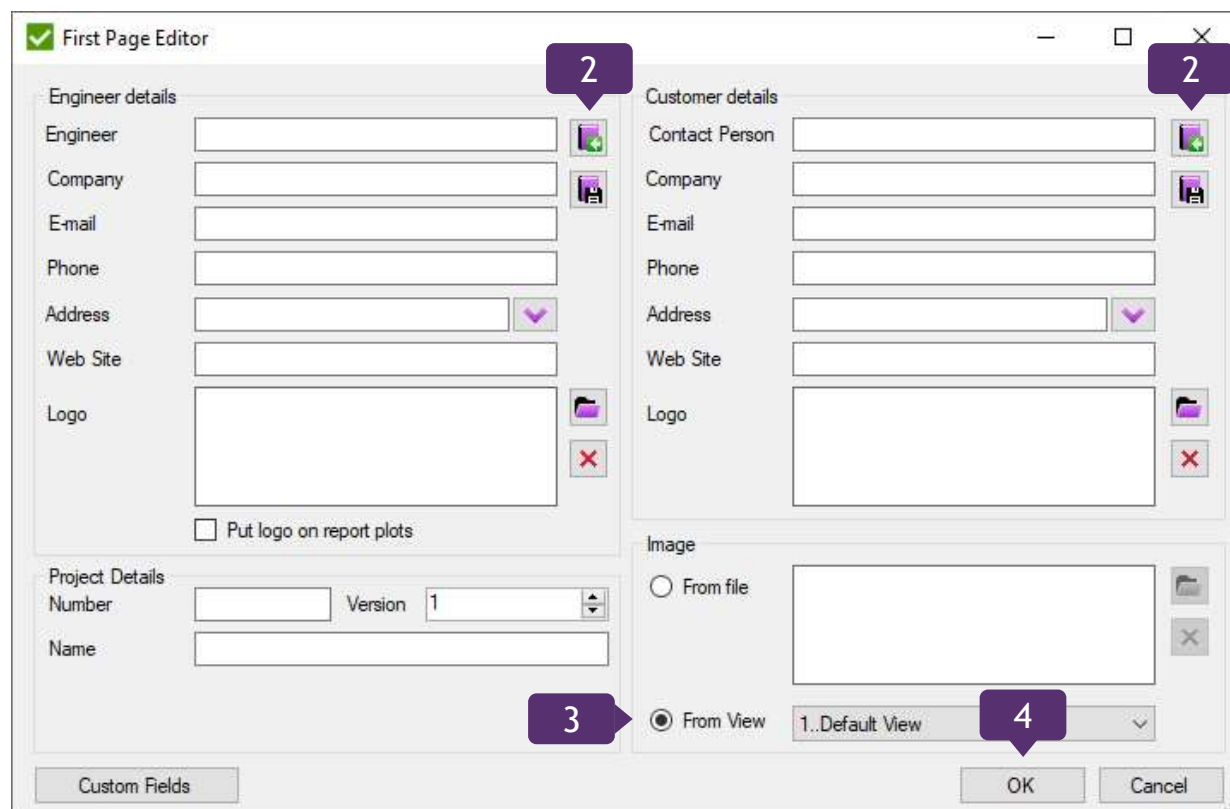
5

Repeat 1-4 step for Standards **ISO 19902** and **Norsok N004**



Report. First Page

- 1 Right click on *First Page* => *Edit*
- 2 Press  to load engineer and customer info from library
- 3 Select Image From View
- 4 Press **OK**.

The 'First Page Editor' dialog box is shown with the following sections and callouts:

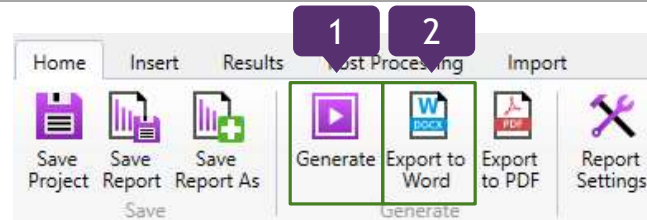
- Engineer details:** Fields for Engineer, Company, E-mail, Phone, Address, Web Site, and Logo. Callout 2 points to the Engineer field.
- Customer details:** Fields for Contact Person, Company, E-mail, Phone, Address, Web Site, and Logo. Callout 2 points to the Contact Person field.
- Project Details:** Fields for Number and Name. Callout 3 points to the Name field.
- Image:** Radio buttons for 'From file' and 'From View'. The 'From View' option is selected, and a dropdown shows '1..Default View'. Callout 4 points to this dropdown.
- Buttons:** 'OK' and 'Cancel' buttons at the bottom right.

Report exported to Microsoft Word

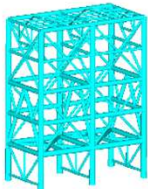


1 Press to generate complete report

2 Press to export to Word



Report 1



Prepared by:
SDC Verifier
+31 15 30-10-310
sdcsverifier.com
Zijlvest 25
2011 VB Haarlem
The Netherlands

Prepared for:
company
+31 15 555-55-55
company.com
Zijlvest 25
2011 VB Haarlem
The Netherlands

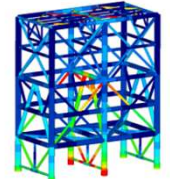
Engineer: Support
Customer: customer
Project Number:
Version: 1
Date: 01/09/2023

1..API RP 2A-LRFD (1st, 1993)

Unit System
Current Unit System = MKS (Meter/Kg/Second). It is used in calculations for the following standards: API RP 2A, ISO 19902, Norsok N004, DIN 15016, FEM 1.001 and Eurocode3.

All (LG1, All Entities)							
Standard	1..API RP 2A-LRFD (1st, 1993)	Check Selection	[S1] 7..Overall Check All Entities				
Load Group	LG1: Load Group 1		Extreme	Absolute Axial UF	Absolute Bending UF	Absolute Shear UF	Absolute Shear Torsional UF
Minimum							
Value	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Element ID	4821	2564	2779	2695	4944	4971	
Load	IL4	IL4	IL4	IL4	IL4	IL4	
Maximum							
Value	1.24	1.00	1.05	0.10	1.83	1.83	
Element ID	2661	6390	3405	480	6385	6385	
Load	IL5	IL5	IL5	IL5	IL6	IL6	
Absolute							
Value	1.24	1.00	1.05	0.10	1.83	1.83	
Element ID	2661	6390	3405	480	6385	6385	
Load	IL5	IL5	IL5	IL5	IL6	IL6	

Abs Overall Utilization Factor (LG1, All Entities, v2)



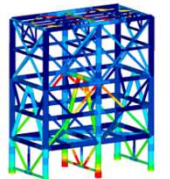
Check Parameter	[S1] 7..Overall Check Absolute Overall Utilization Factor 2..isometric	Load Group Selection Data Conversion	LG1..Load Group 1 All Entities No Averaging
View			

2..ISO 19902 (1st, 2007)

Unit System
Current Unit System = MKS (Meter/Kg/Second). It is used in calculations for the following standards: API RP 2A, ISO 19902, Norsok N004, DIN 15016, FEM 1.001 and Eurocode3.

All (LG1, All Entities)							
Standard	2..ISO 19902 (1st, 2007)	Check Selection	[S2] 9..Overall Check All Entities				
Load Group	LG1: Load Group 1		Extreme	Axial Um	Bending Um	Shear Um	Shear Torsional Um
Minimum							
Value	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Element ID	4821	2564	2779	2695	4824	4834	
Load	IL4	IL4	IL4	IL4	IL4	IL4	
Maximum							
Value	1.24	0.99	1.04	0.10	1.75	1.75	
Element ID	2661	6390	3405	480	6385	6385	
Load	IL5	IL5	IL5	IL5	IL6	IL6	
Absolute							
Value	1.24	0.99	1.04	0.10	1.75	1.75	
Element ID	2661	6390	3405	480	6385	6385	
Load	IL5	IL5	IL5	IL5	IL6	IL6	

Abs Overall Utilization Factor (LG1, All Entities, v2)



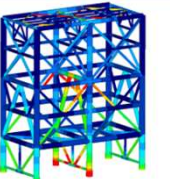
Check Parameter	[S2] 9..Overall Check Absolute Overall Utilization Factor 2..isometric	Load Group Selection Data Conversion	LG1..Load Group 1 All Entities No Averaging
View			

3..Norsok N004 (rev.3, 2013)

Unit System
Current Unit System = MKS (Meter/Kg/Second). It is used in calculations for the following standards: API RP 2A, ISO 19902, Norsok N004, DIN 15016, FEM 1.001 and Eurocode3.

All (LG1, All Entities)							
Standard	3..Norsok N004 (rev.3, 2013)	Check Selection	[S3] 8..Overall Check All Entities				
Load Group	LG1: Load Group 1		Extreme	Absolute Axial UF	Absolute Bending UF	Absolute Shear UF	Absolute Shear Torsional UF
Minimum							
Value	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Element ID	4821	2564	2779	2695	4944	4971	
Load	IL4	IL4	IL4	IL4	IL4	IL4	
Maximum							
Value	1.24	1.09	1.14	0.11	1.83	1.83	
Element ID	2661	6390	3405	480	6385	6385	
Load	IL5	IL5	IL5	IL5	IL6	IL6	
Absolute							
Value	1.24	1.09	1.14	0.11	1.83	1.83	
Element ID	2661	6390	3405	480	6385	6385	
Load	IL5	IL5	IL5	IL5	IL6	IL6	

Abs Overall Utilization Factor (LG1, All Entities, v2)



Check Parameter	[S3] 8..Overall Check Absolute Overall Utilization Factor 2..isometric	Load Group Selection Data Conversion	LG1..Load Group 1 All Entities No Averaging
View			