



Tutorial

Plate Buckling DNV 2010


14 Dec 2020
version 2020.0.2

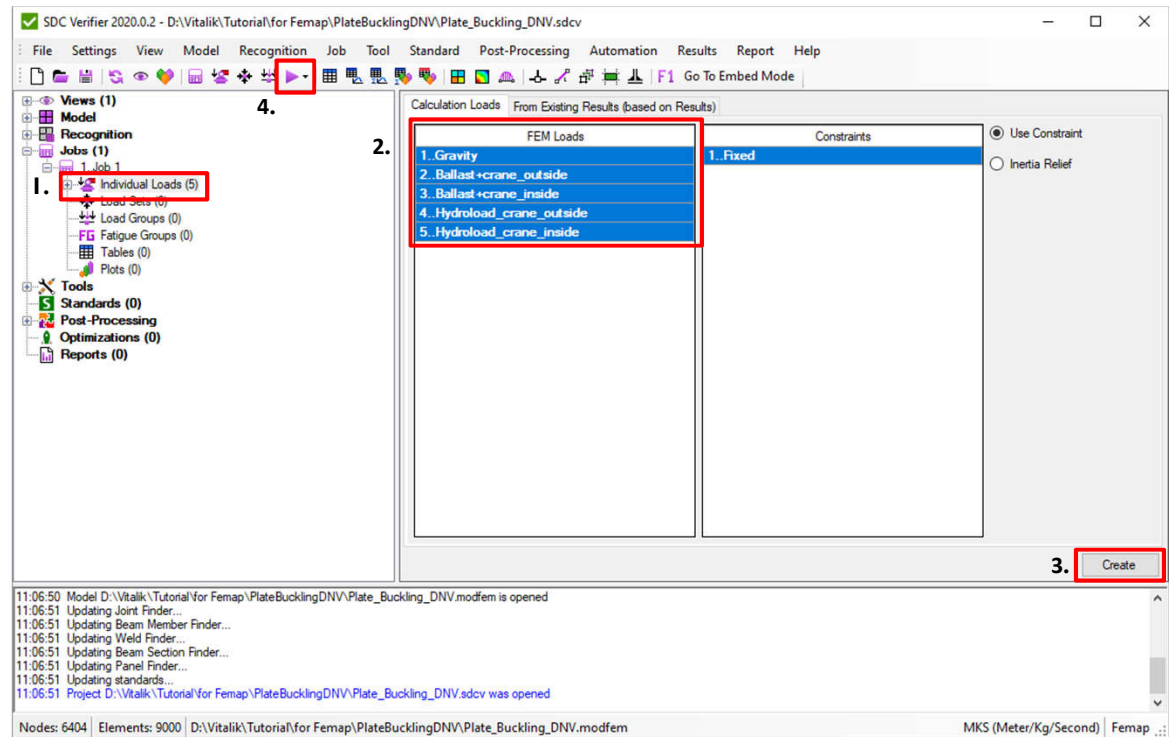
- ▶ In this tutorial an DNV 2010 Plate Buckling Check is reviewed in details.
- ▶ A part of plate model of the ship has been used as a start FEM model.
- ▶ Individual Loads, Load Sets and Load Group (Envelope) are created.
- ▶ Recognition of plates using Panel Finder.
- ▶ Plate Buckling tables and plots.
- ▶ Reporting: preparing and generating final report.

- 



Individual Loads

- 1 Click on **Individual Loads**
- 2 Choose 5 *FEM Loads*:
- 3 Press *Create*
- 4 Press  on toolbar to analyze job




Load Sets

1

Right click on *Load Sets* => **Create/Edit multiple**

2

Fill in "4" into *Count* and press  to add four Load Sets.

3

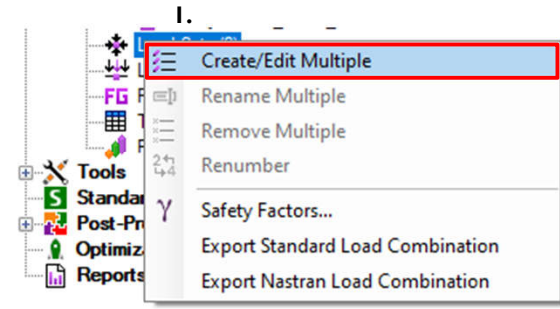
Select highlighted cells in table like shown on the picture and press *Set* to define Factors of Load Sets.

4

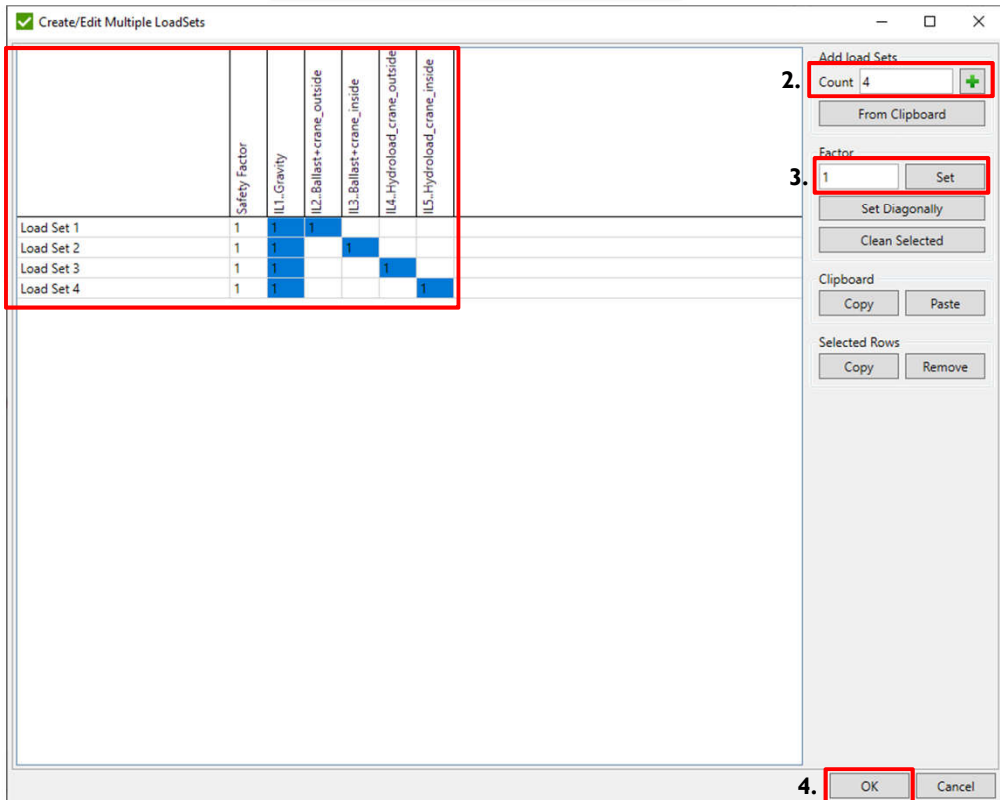
Press *OK*.

Note: Load Sets are created with default titles "Load Set #". It is possible to rename them.
Alternatively titles and factors can be pasted from Clipboard using *Paste* button.


1.




3.



2.


Count 4 

Factor 1 

4. OK

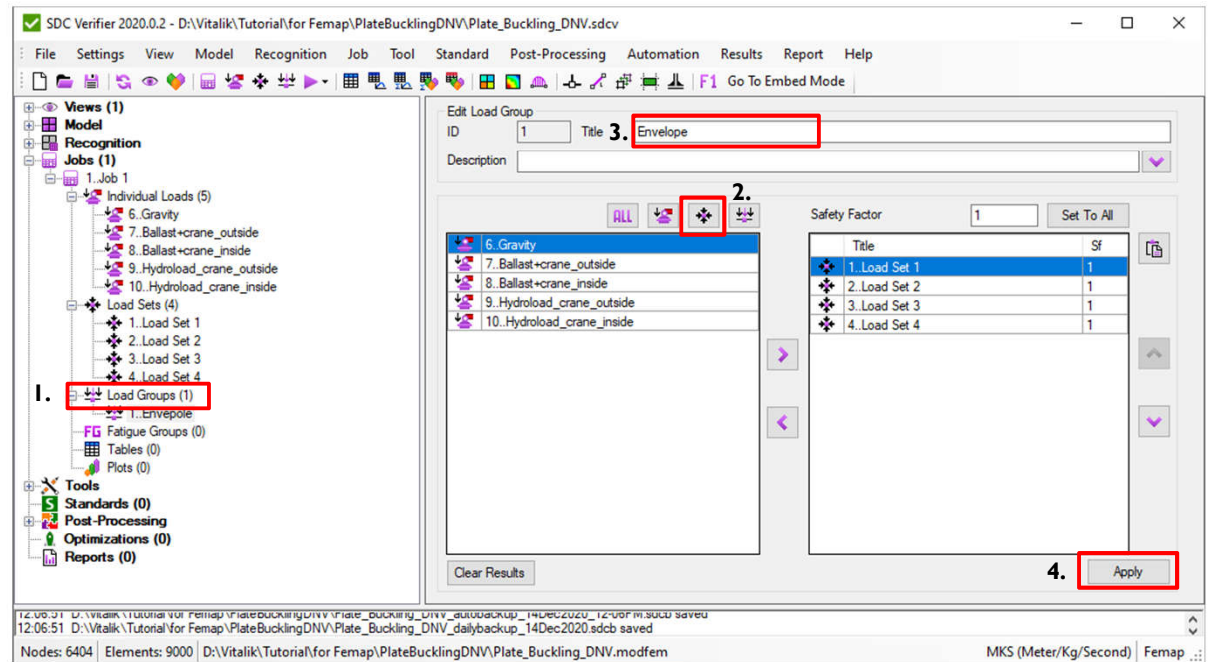
Load Groups

1 Click on **Load Groups**

2 Press  to select all Load Sets

3 **Title: Envelope;**

4 Press **Create**



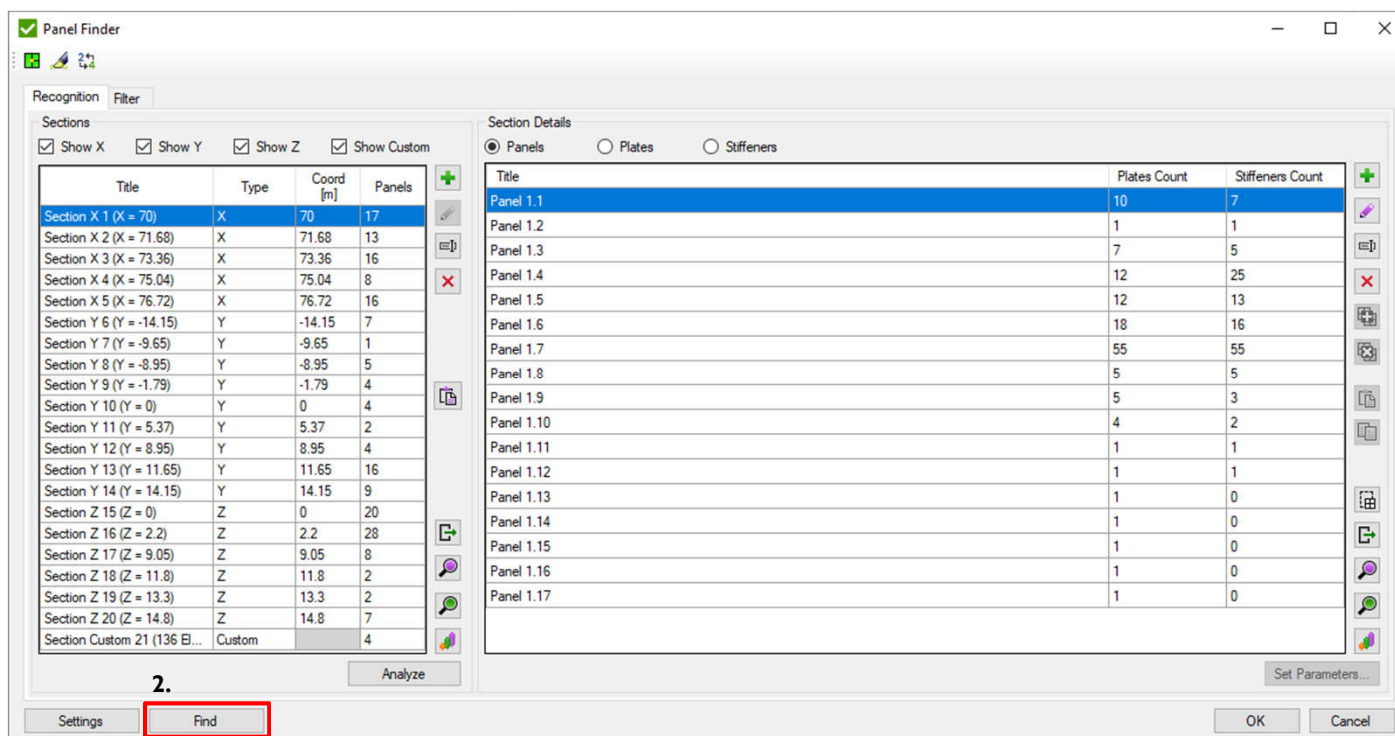
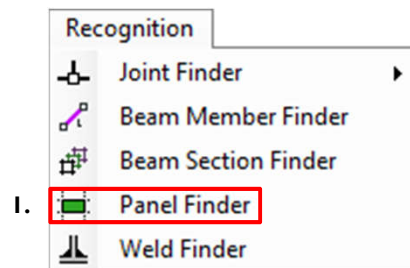
Note: Load Sets and Load Groups are analyzed by SDC Verifier.

Panel Finder. Recognize Sections.

1 Execute *Recognition - Panel Finder* from main menu

2 Click on *Find*


All Frames, Longitudinals and Desks were automatically.



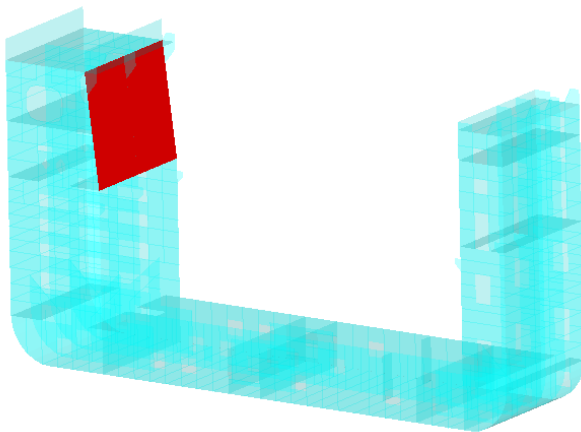
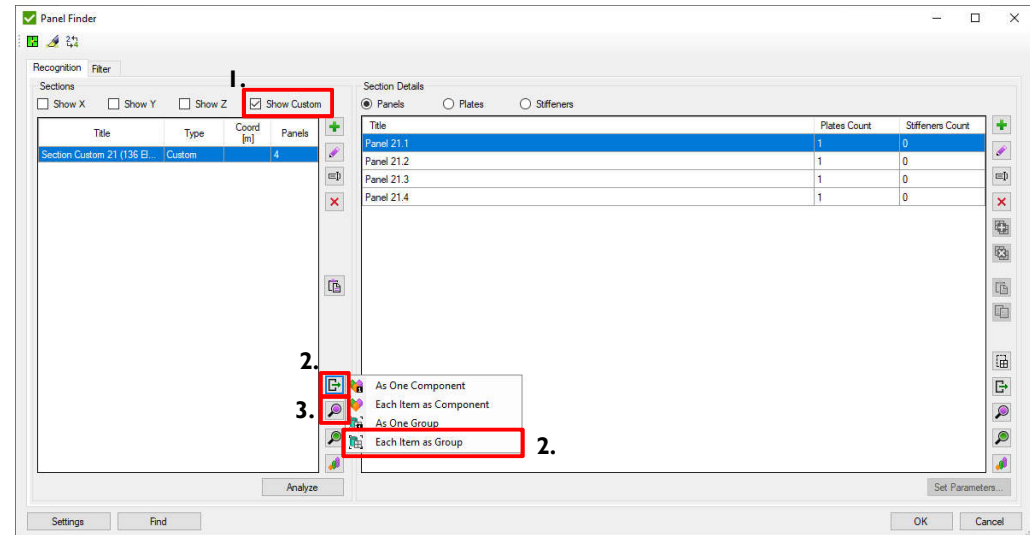
Panel Finder. Custom Section

1 Show Custom: **ON** (rest OFF)

2 Press  and  to export selected sections to groups

3 Press 


Custom Section should be used for inclined/curved sections and selections like hull.

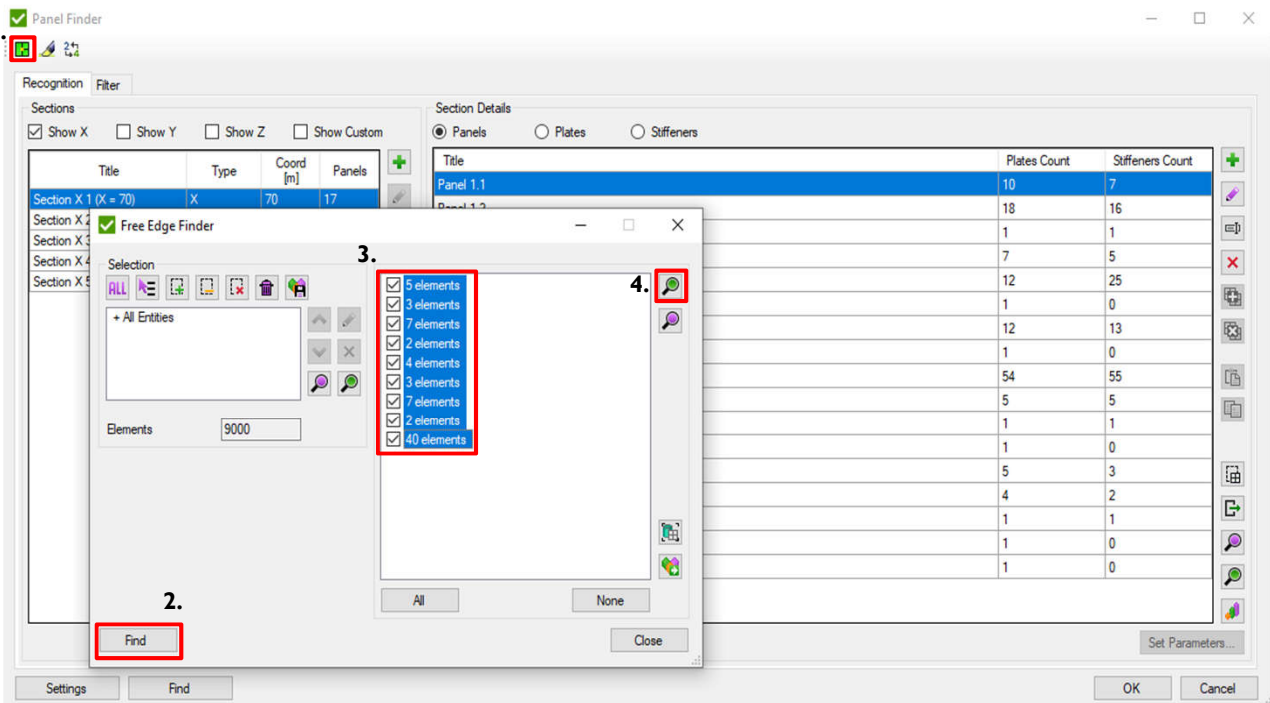


Example: It is possible to create custom section based on hull selection:

Panel Finder. Find Free Edges

Note: Before plates recognition, the model should be checked on free edges. Not correct plate dimensions/direction, plates with undefined dimensions and as result wrong buckling factor – possible consequences of free edges.

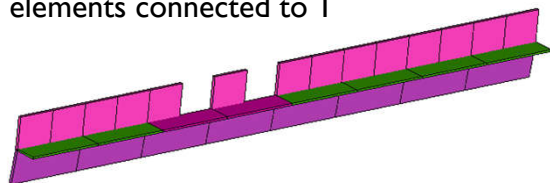
1. Click **Find Free edges**
2. Press **Find**
3. Select all free edges
4. Press  to preview elements with free edges



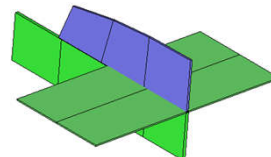
Title	Type	Coord [m]	Panels
Section X 1 (X = 70)	X	70	17
Section X 2			
Section X 3			
Section X 4			
Section X 5			

Title	Plates Count	Stiffeners Count
Panel 1.1	10	7
Panel 1.2	18	16
	1	1
	7	5
	12	25
	1	0
	12	13
	1	0
	54	55
	5	5
	1	1
	1	0
	5	3
	4	2
	1	1
	1	0
	1	0

2 elements connected to 1



Mesh does not coincide



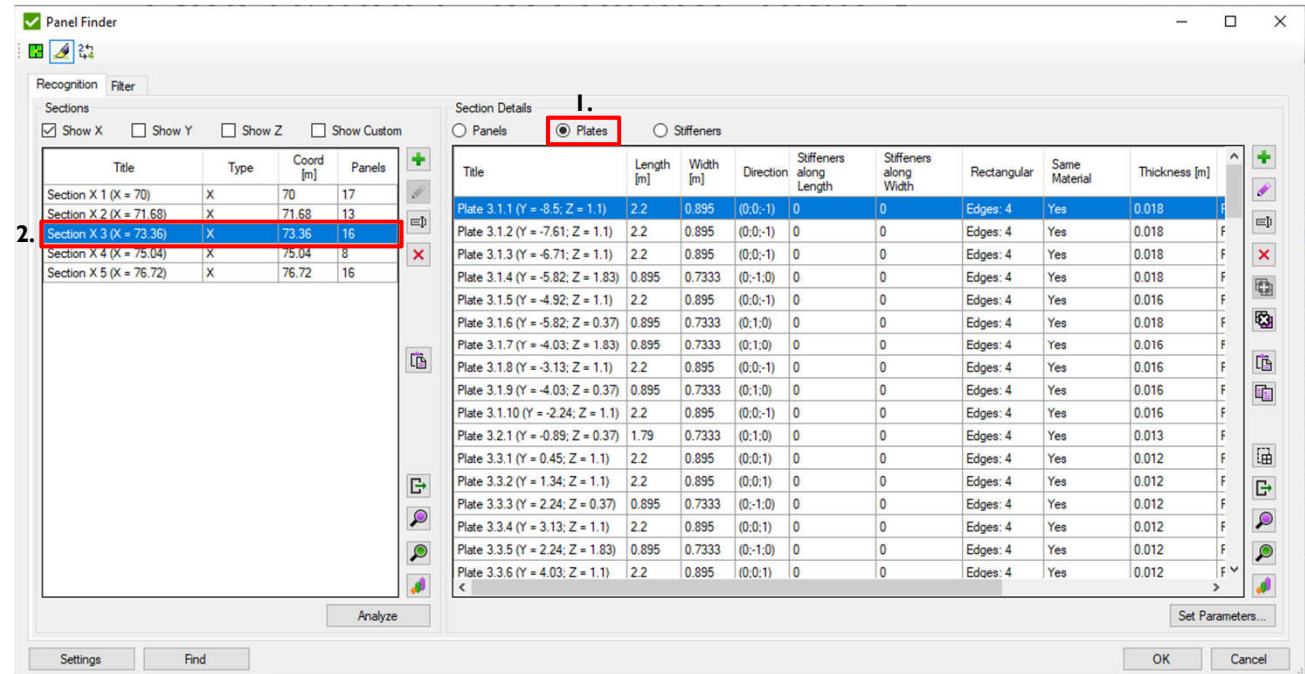
Note: Free edges should be fixed by remeshing the model and run recognition of plates. (In tutorial we skipped step with remeshing but for commercial project it is crucial step to do).

Panel Finder. Recognize plates

1 In Selection details Press **Plates**

2 Select **Section X3**.

Tip: If it is necessary to recognize plates only for one section press *Analyze*



Title	Length [m]	Width [m]	Direction	Stiffeners along Length	Stiffeners along Width	Rectangular	Same Material	Thickness [m]
Plate 3.5.15 (Y = 13.73; Z = 1...	0.8333	0.75	(0;1;0)	0	0	Edges: 4	Yes	0.012
Plate 3.6.1 (Y = 12.9; Z = 2.39)	2.5	1.5333	(0;1;0)	0	0	Edges: 8	Yes	Min = 0.016

Section ID. Panel ID. Plate ID

Plate is rectangle with all corners = 90 degrees

Plate has elements more than from one property

Plate Dimensions and Thicknesses

Dimensions: Results depend on plate dimensions and direction and it is important to understand how Panel Finder performs recognition. Length is considered the longest edge of plate and width the longest perpendicular to the longest edge:

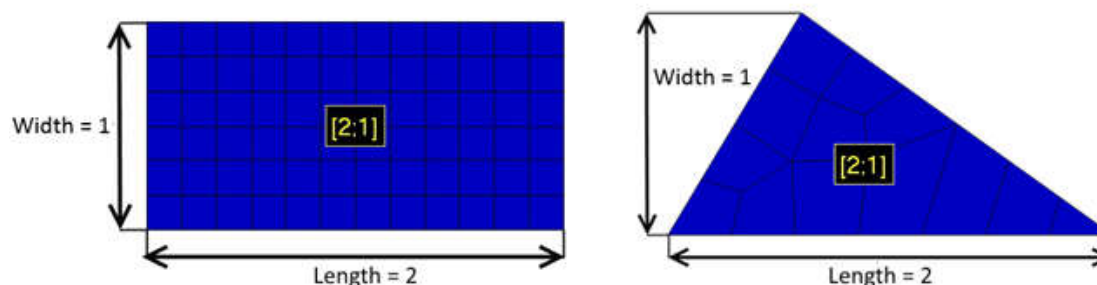


Plate Thickness: Calculations are performed on every element and thickness is taken directly from each element. It is possible to set thickness manually for plate, in this case element thickness will be ignored and user defined thickness will be used. Example: Plate with 2 properties 0.01 and 0.02 thicknesses. Left picture displays property labels with property thicknesses and right presents plate buckling plot of thickness parameter:

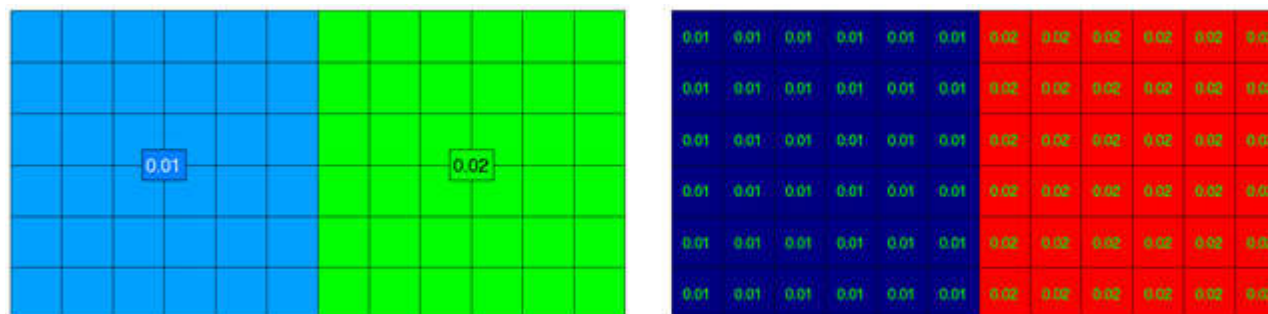
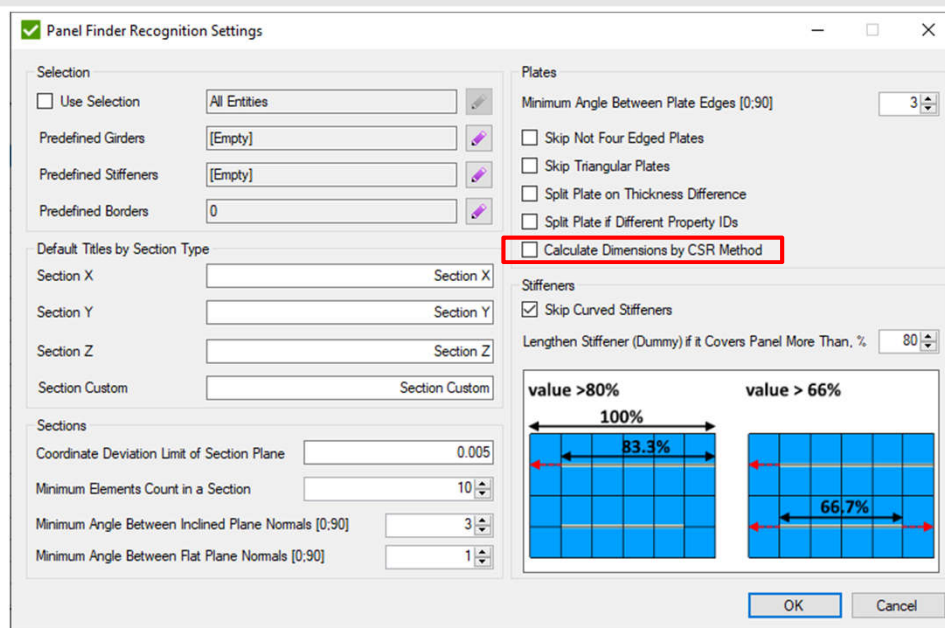


Plate Buckling Dimensions by CSR



2.3.2 Modelling of an unstiffened panel with irregular geometry

Unstiffened panels with irregular geometry are to be idealised to equivalent panels for plate buckling assessment according to the following procedure:

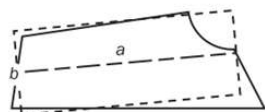
- e) The length of shorter side, b in mm, is to be taken as:

$$b = A/a$$

where:

A : Area of the plate, in mm^2

a : length defined in (d), in mm

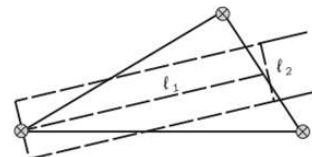


- c) The width of the model, ℓ_2 , in mm, is to be taken as:

$$\ell_2 = A/\ell_1$$

where:

A : Area of the plate, in mm^2



Editing plates manually

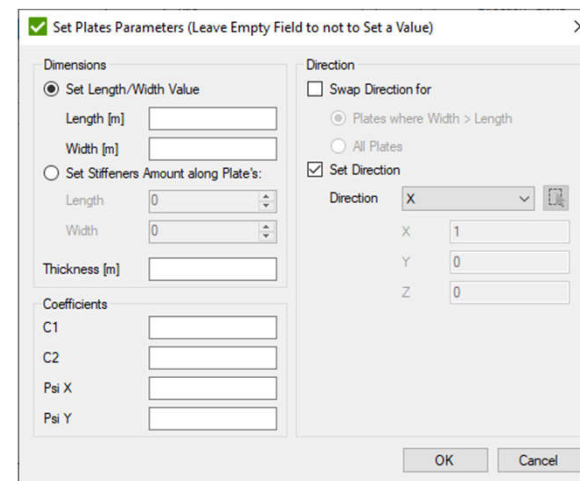
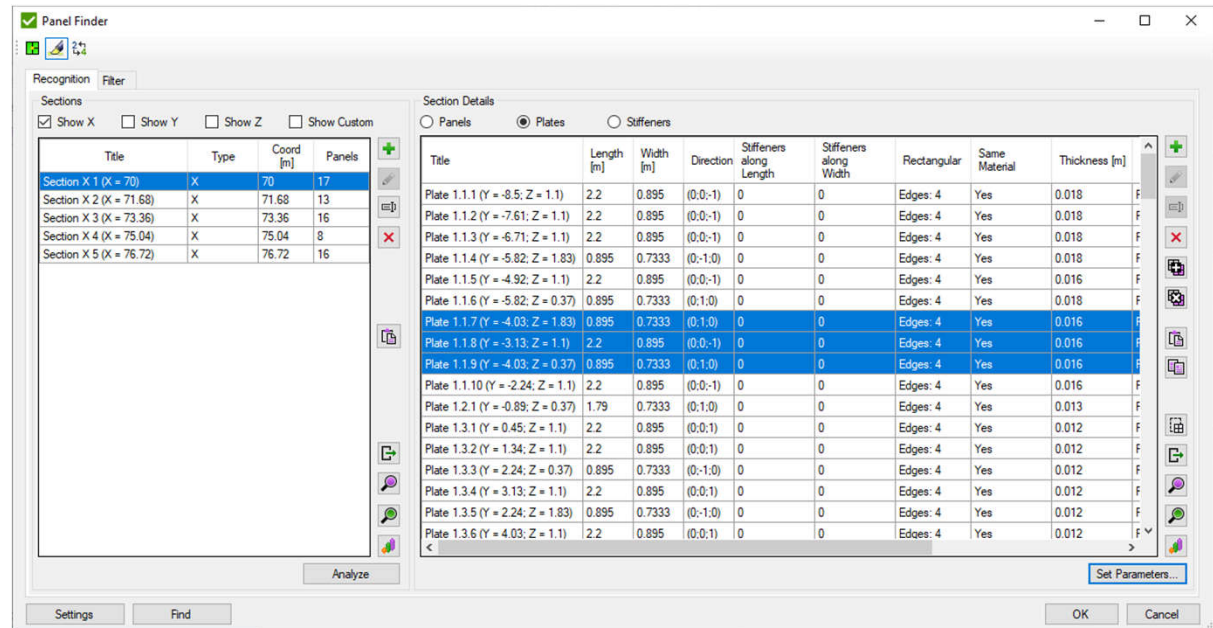
To modify plates select them from the list and press *Set Parameters*. It is possible to edit (Length / Width / Thickness / Coefficients / Direction).

It is possible to define parametric stiffeners along the Length and Width.

If thickness is changed you can see in table what was the original thickness recognized from model:

Thickness
0.016 (Original: 0.012)
0.016 (Original: 0.012)
0.016 (Original: 0.012)

Usually you should not modify plate directions. But in case it is required press *Set Direction*.



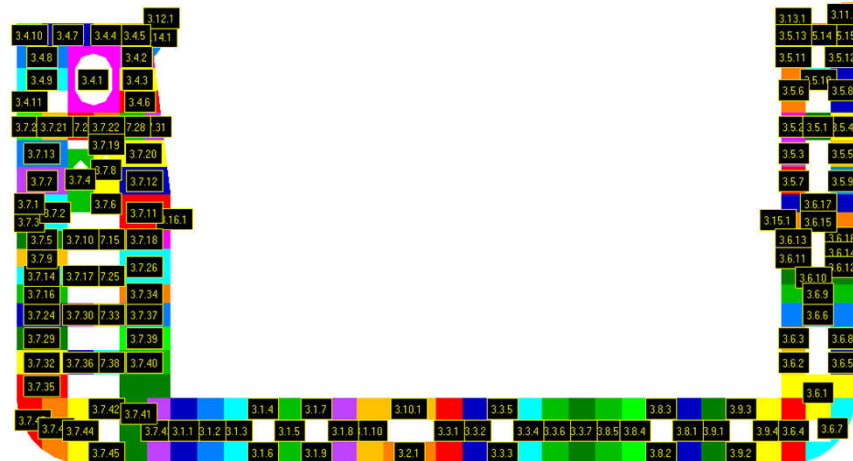
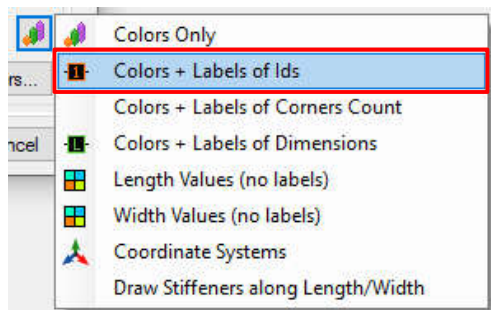
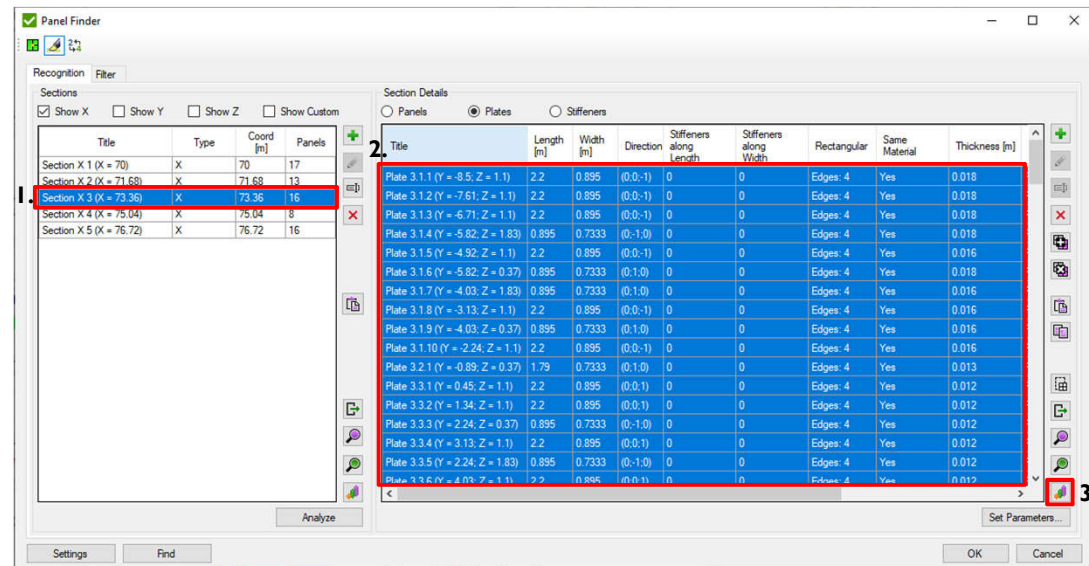
Panel Finder. Plates Plot

1 Select **Section X3**

2 Select All *Plates*

3 Press 

4 Click on *Colors + Labels of Ids*.



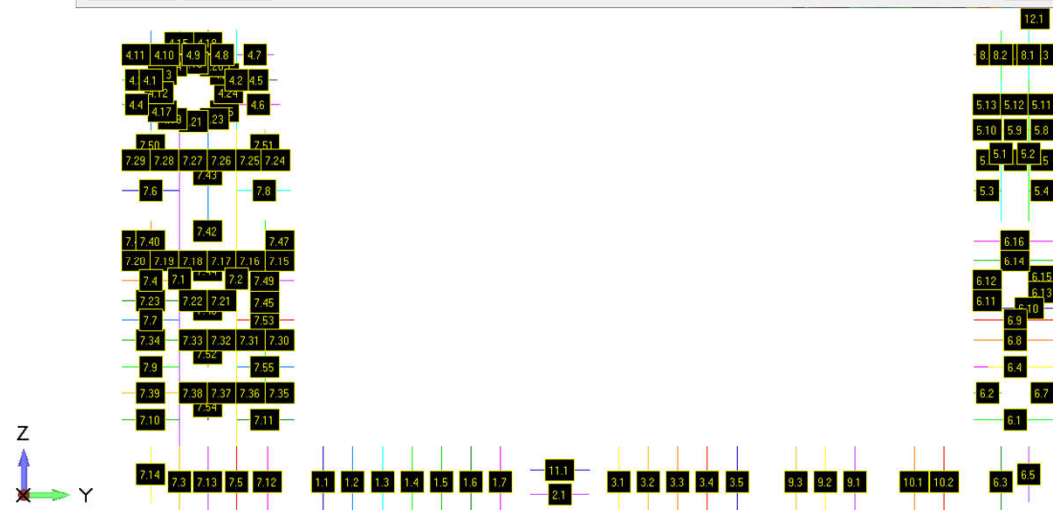
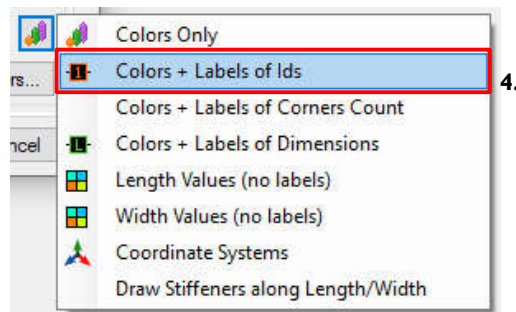
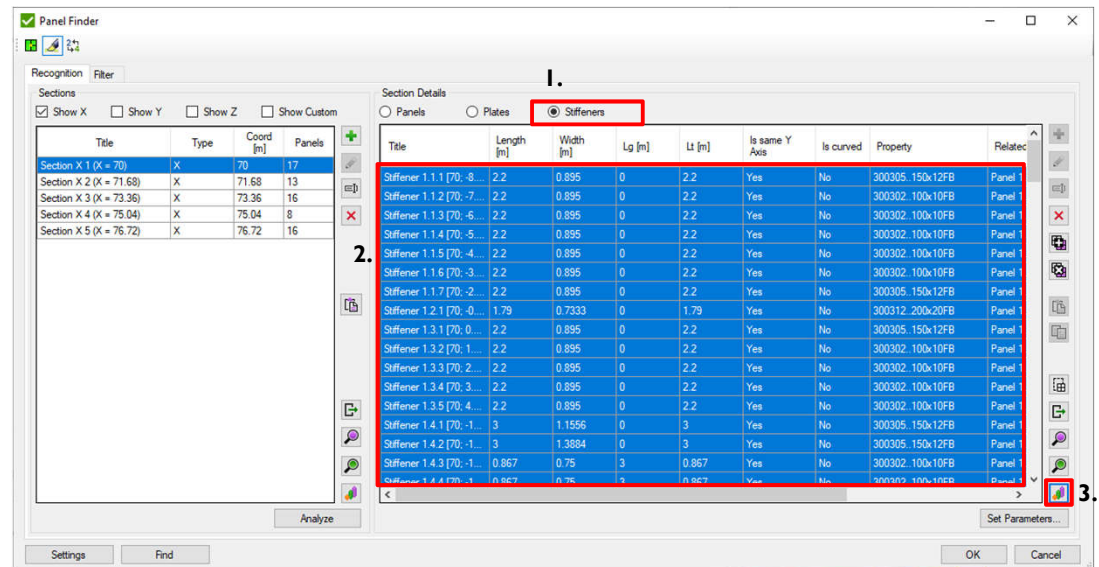
Panel Finder. Stiffeners Plot

1 Select *Stiffeners*

2 Select All *Stiffeners*

3 Press 

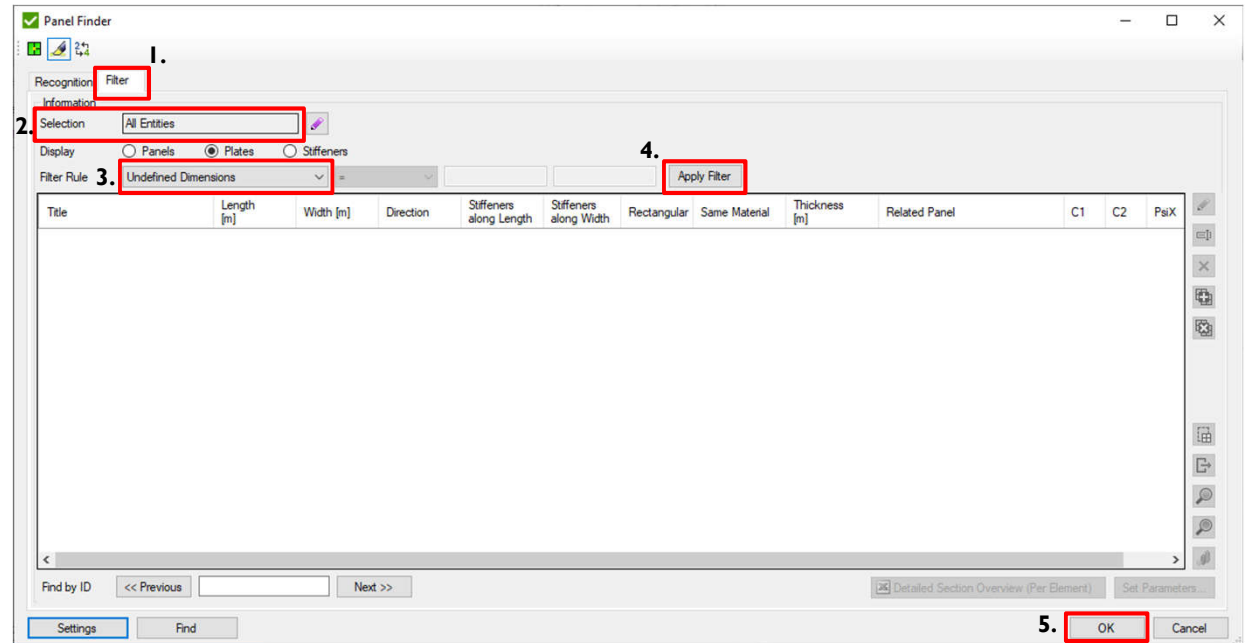
4 Click on *Colors + Labels of Ids*.



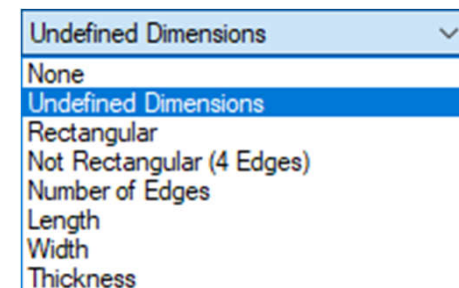
Panel Finder. Filter

Note: It is very important to check that all plates dimensions were recognized. If in the model, there are coincident nodes, coincident elements or free edges Panel Finder cannot recognize plate dimensions.

- 1 Click on *Filter* tab
- 2 Selection: **All Entities**
- 3 Filter: **Undefined dimensions**
- 4 Press *Apply Filter*
- 5 Table with plates is empty means that there is no plates with undefined dimensions. Press *OK*



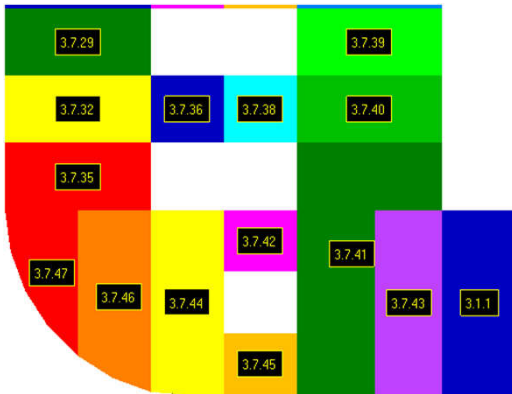
Tip: It is also possible to filter plates by shape (triangle, rectangular) or number of edges parameters.
E.g. Plates with numbers of edges > 4 can be displayed.
Control using Selection plates from which Sections should be filtered.



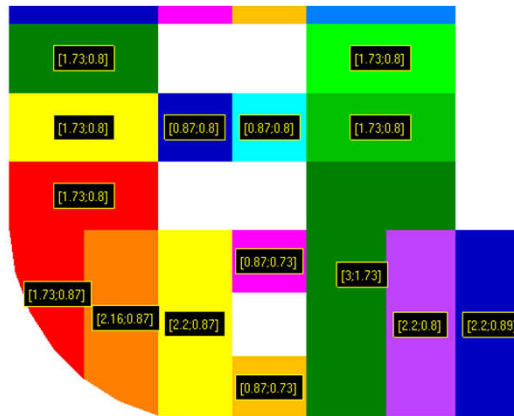
Note: Plate Plot can be displayed with different colors labels (labels of ids, labels of corners count or labels of dimensions). Also it is possible to show plates in length and width, coordinate systems etc.

- Colors Only
- Colors + Labels of Ids
- Colors + Labels of Corners Count
- Colors + Labels of Dimensions
- Length Values (no labels)
- Width Values (no labels)
- Coordinate Systems
- Draw Stiffeners along Length/Width

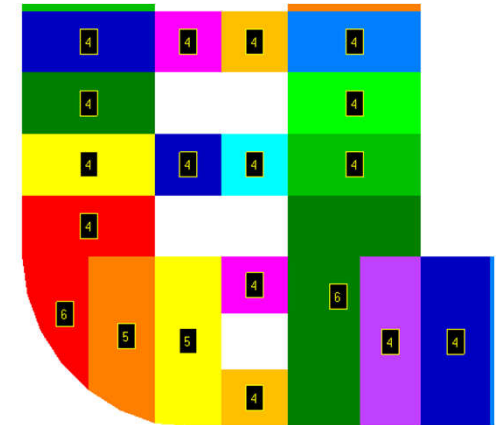
Labels of Ids



Labels of dimensions

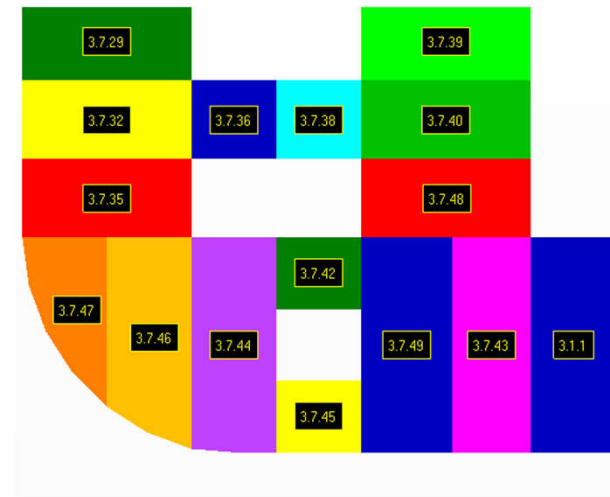
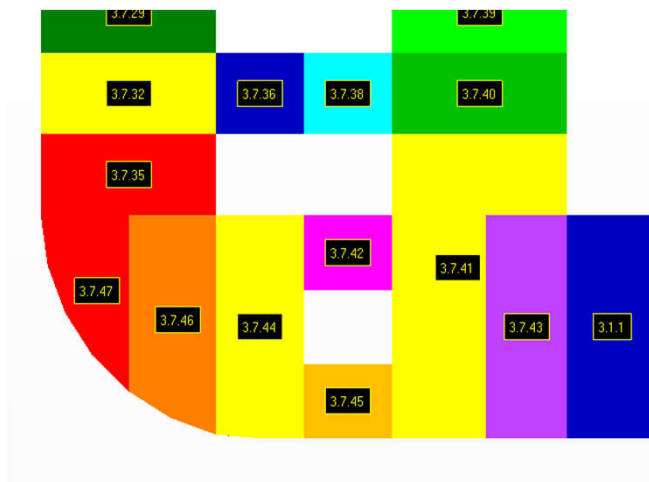


Labels of Corners Count



Panel Finder. Update Plates

In some cases (e.g. stiffener is not modeled) plate is recognized not correctly, dimensions are bigger than in reality which leads to wrong results. Plate has to be updated manually. In Section X3 plate with Id = 3.7.41 should be split on 2 plates



Note: if plates were modified manually and later user decided to run recognition of plates - Panel Finder will ask what to do with modified plates:

- Keep plates that was modified;
- Clear everything and recognition from scratch;



Panel Finder. Split Plate

1 Select **Section X3**

2 Select **Plate 3.7.41**.

3 Press **Split by elements**

4 Selected plate is displayed in Femap. Select elements for one plate. And press OK

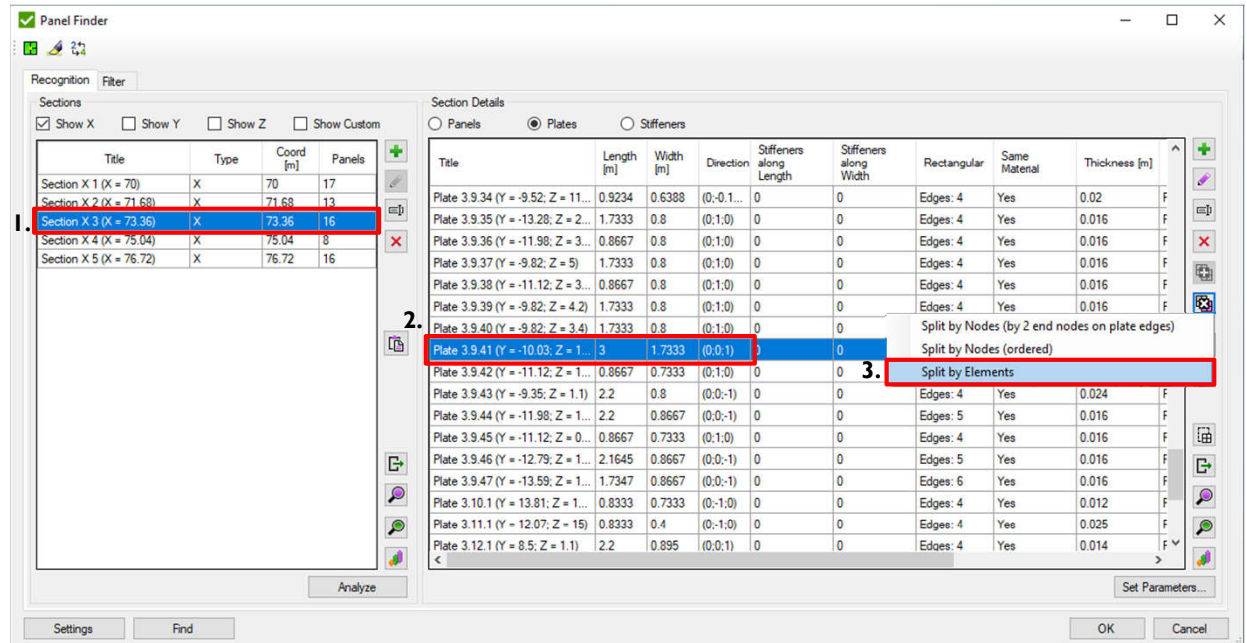
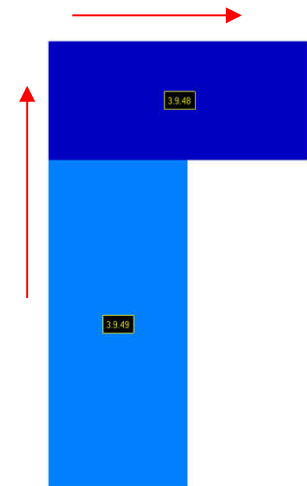
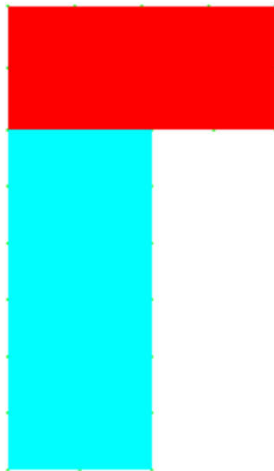


Plate 3.7.41 is replaced with Plates 3.9.48 and 3.9.49
Dimensions and directions are updated automatically



Plate 3.9.48 (Y = -9.8; Z = 2.6)
Plate 3.9.49 (Y = -10.22; Z = 1...)



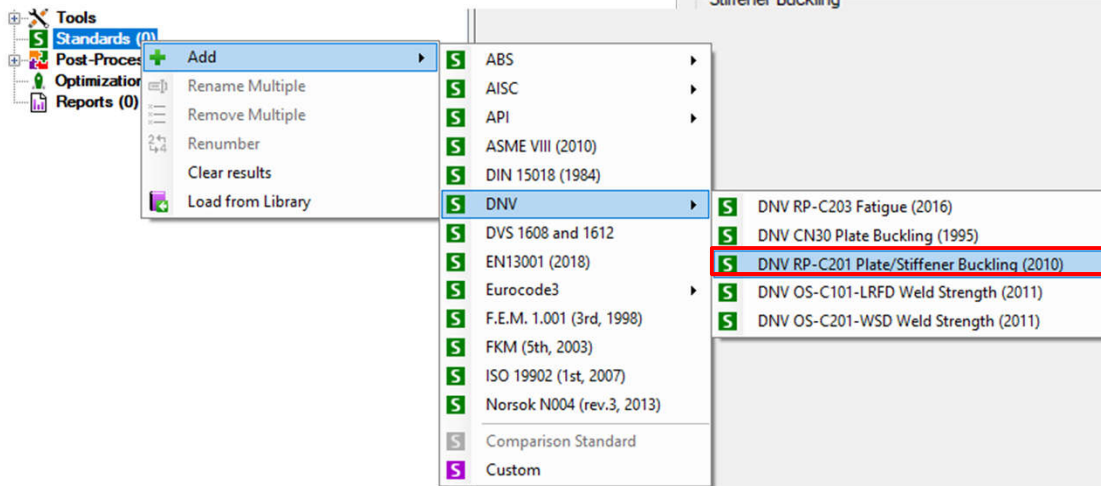
Add Plate Buckling DNV 2010 standard

1 In Standards Context menu execute
Add => DNV Plate/Stiffener Buckling
(2010)

2 Utilization Factor (Eta) = **1.15**

3 Use Plate Average Stress: **On**

4 Press **OK**



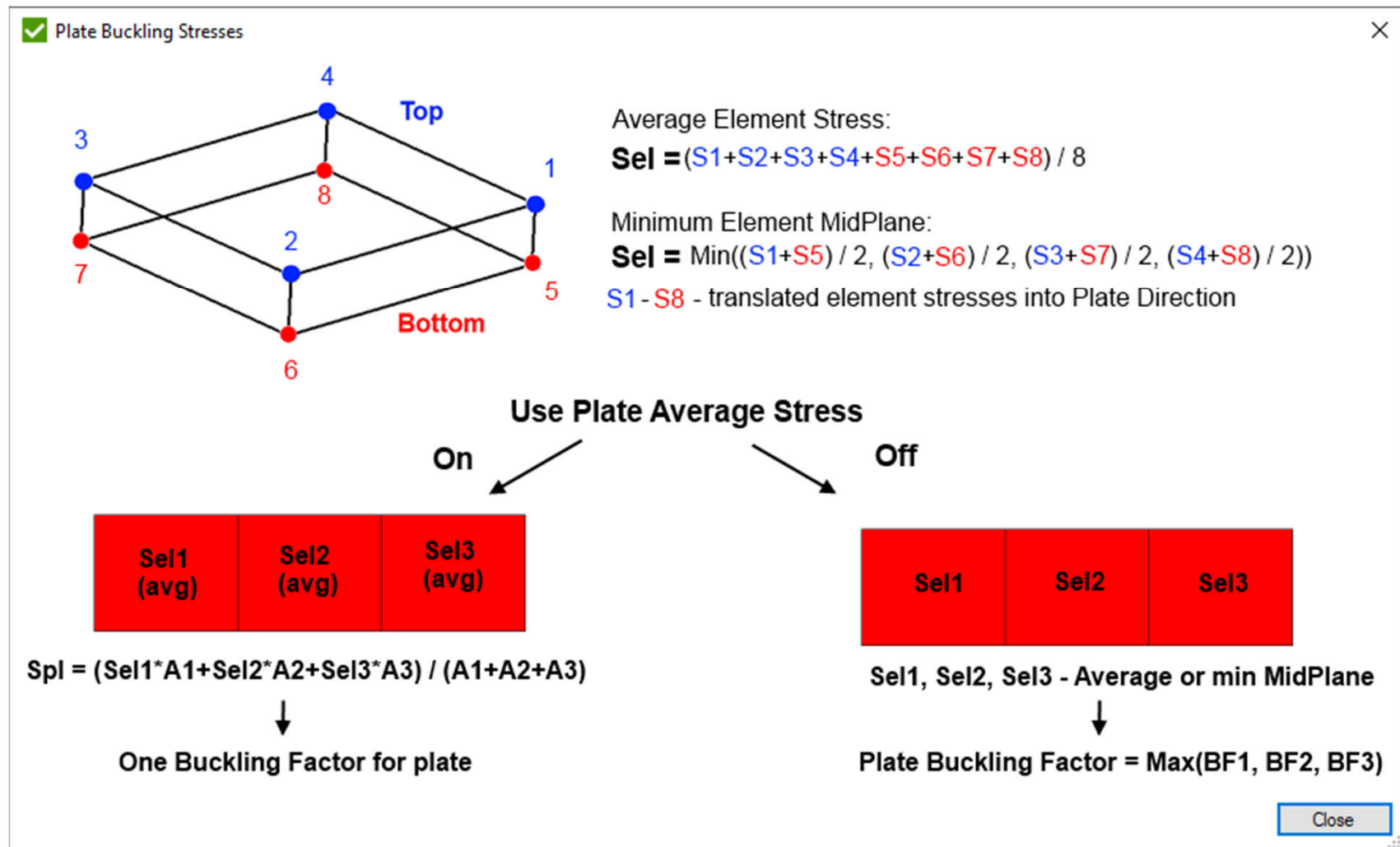
Thickness factor gives a possibility to increase / decrease all plates thicknesses without reanalyzing the model. E.g. 1.2 means increase thickness on 20% and decrease stresses

Materials with Yield Stress = 0 shows how many materials have yield equal to 0. If value is > 0 press to define yield.

By default all sections will be checked. Click to modify.

1. Plate Buckling transforms stresses automatically into plate direction. Options about element stresses and plate stresses are described on the next slide

Plate Buckling Stresses



Views

1 Execute Views => **Add**

2 Title: **Frame**

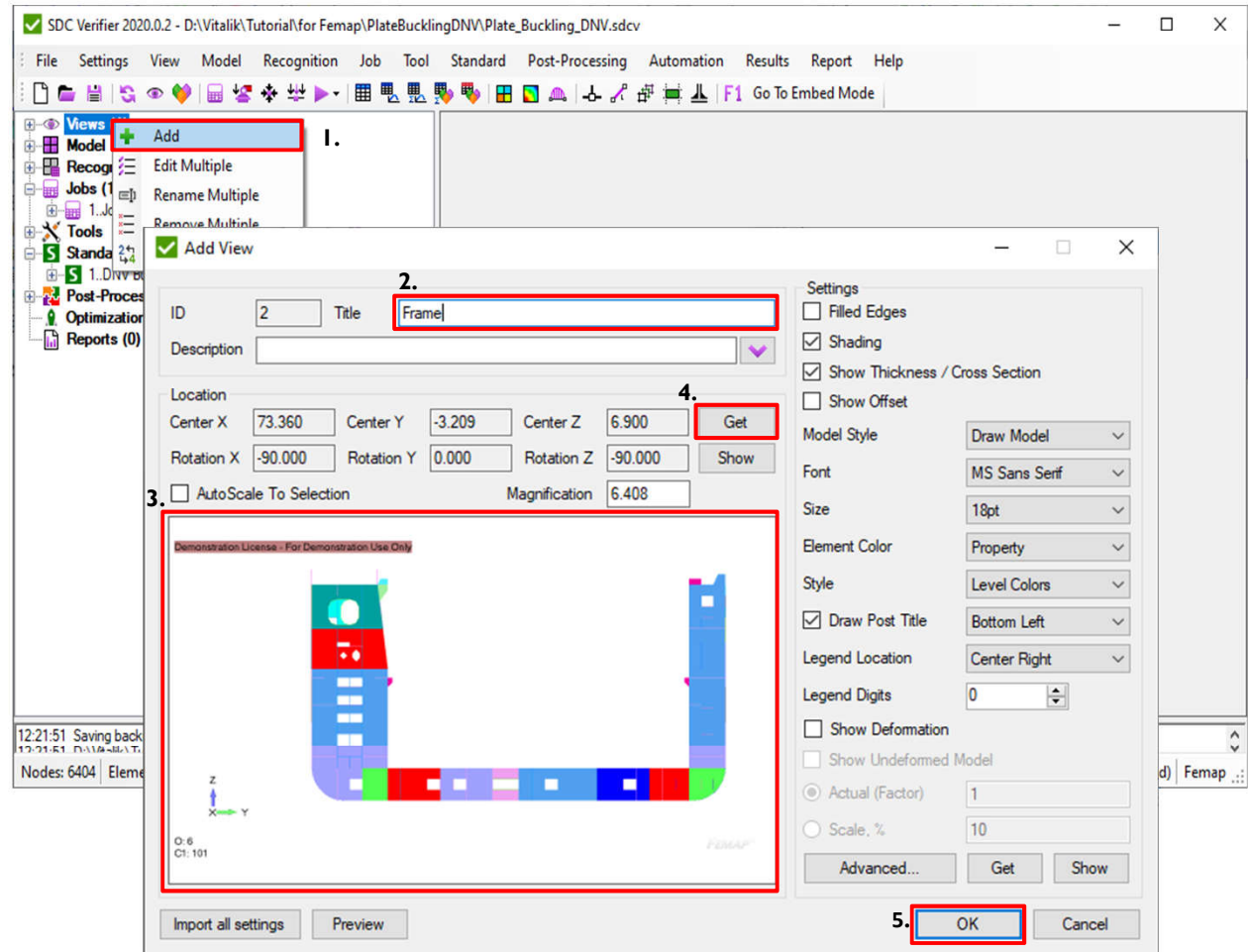
3 Orient model in Femap as shown on picture below (ZY plane)

4 Press **Get**

5 Press **OK**

To make nice plots first Views should be created (set of settings how to display plot).

Repeat Steps 1-5 2 times to create view for Longitudinals (plane ZX) and Decks (plane XY)



Views

1 Execute Views => **Add**

2 Title: **Stiffeners**

3 Orient model in Femap as shown on picture below (ZY plane)

4 Press **Get**

5 Press **OK**

To make nice plots first Views should be created (set of settings how to display plot).

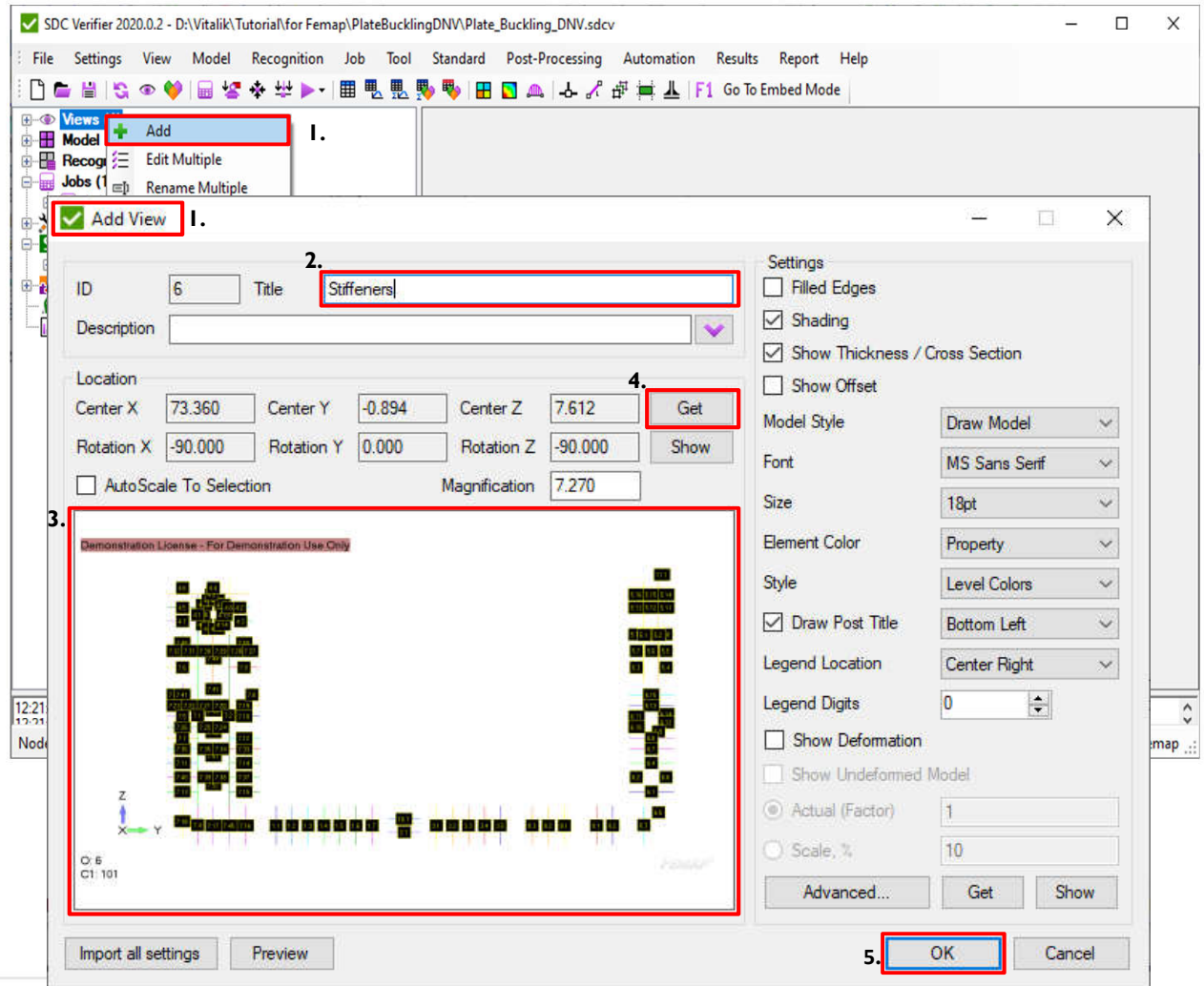




Plate Buckling Plot

- 1 Execute *Criteria Plot* from Plate Buckling DNV 2010 context menu
- 2 Load Group: **1..Envelope**
- 3 View: **2..Frame**
- 4 Press  Select: **Section X3**
- 5 Press  *Preview*

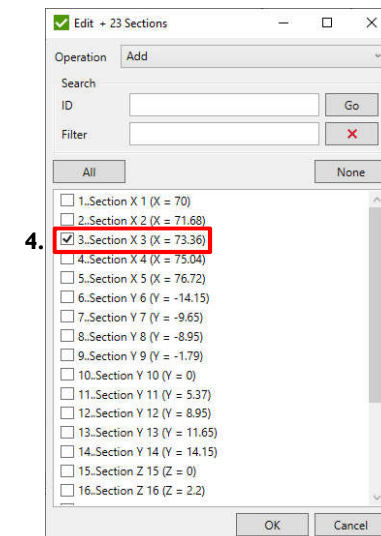
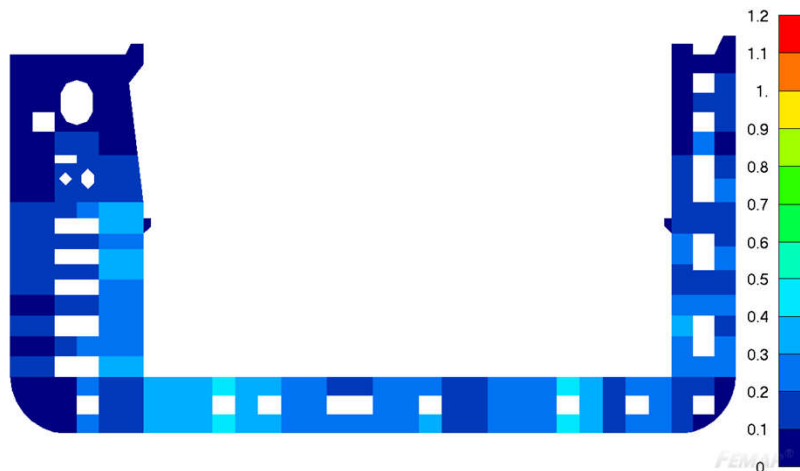
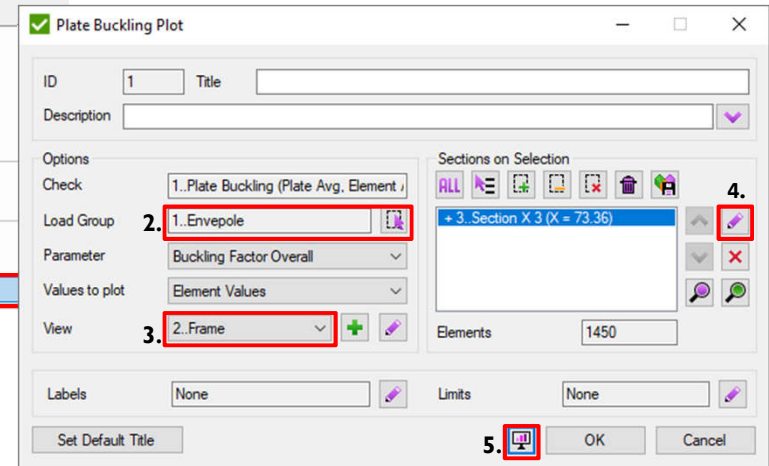
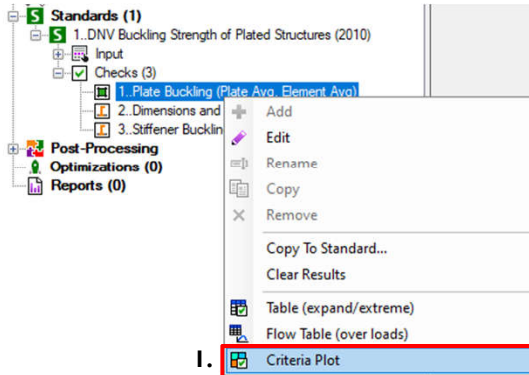


Plate Buckling Table

1

Execute *Table(expand/extreme)* from Plate Buckling DVN 2010 context menu

2

Load Group: **1..Envelope**

3

Show plates results: **OFF**

4

Press *Fill Table*

Use **Show plates results** for detailed table with results for all plates. Otherwise only the worst results over Sections will be shown.

The screenshot shows the 'Plate Buckling Table' dialog box with the following settings:

- Check:** 1..Plate Buckling (Plate Avg, Element Avg)
- Load Group:** 1..Envelope
- Table Type:** Expand
- Search Type:** Related To Last Parameter
- Show plates results:** ☐ (unchecked)
- Display governing loads:** ☒ (checked)
- Filter by:** Parameter: None, Value: 1
- Sort by:** Parameter: Buckling Factor Overall, Order: Descending
- Sections on Selection:** + 23 Sections
- Elements:** 8970
- Buttons:** Set Default Title, Fill Table (highlighted with a red box and labeled '4.')



The 'Table (expand/extreme)' context menu is also shown, with options: Add, Edit, Rename, Copy, Remove, Copy To Standard..., Clear Results, and Table (expand/extreme) (highlighted with a red box and labeled '1.').

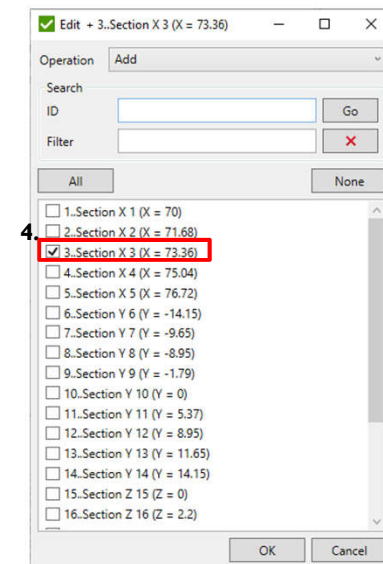
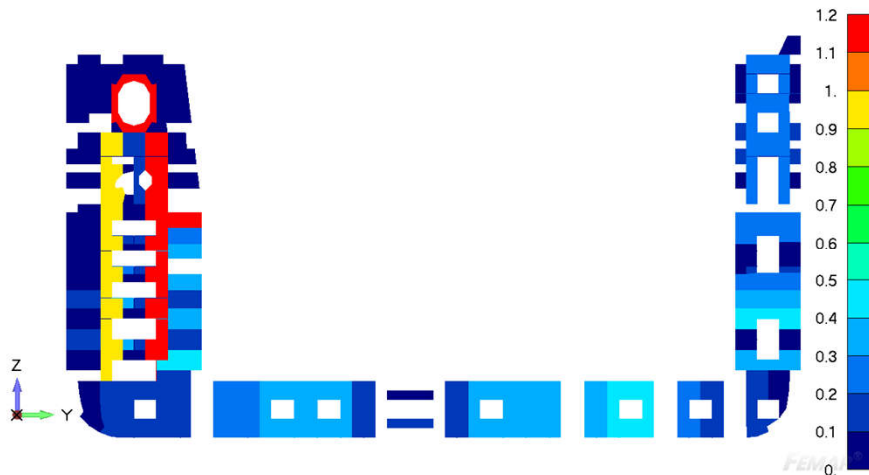
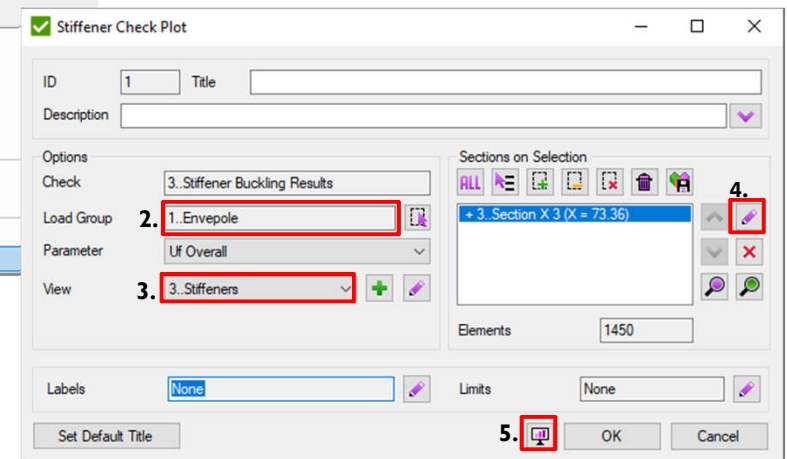
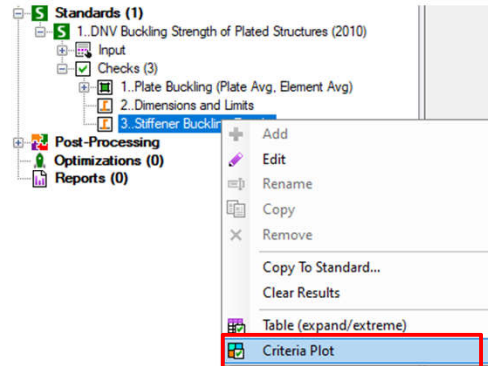
Section Title	n plate direction [Pa]	Seqv [Pa]	Are Requirements Valid	Buckling Factor Combined	Buckling Factor Overall	Load
8. Section Y 8 (Y = ...)	1.77e+6	34.68e+6	1	0.80	0.90	LS4
15. Section Z 15 (...)	-1.50e+6	47.17e+6	1	0.65	0.82	LS4
5. Section X 5 (X = ...)	-63.07e+6	145.65e+6	1	0.49	0.70	LS1
13. Section Y 13 (...)	7.94e+6	37.21e+6	1	0.48	0.70	LS3
1. Section X 1 (X = ...)	-53.62e+6	130.48e+6	1	0.39	0.63	LS1
14. Section Y 14 (...)	-7.71e+6	43.48e+6	1	0.34	0.59	LS4
16. Section Z 16 (...)	-3.80e+6	45.58e+6	1	0.34	0.59	LS4
3. Section X 3 (X = ...)	-52.55e+6	95.10e+6	1	0.22	0.47	LS3
2. Section X 2 (X = ...)	-7.23e+6	22.83e+6	1	0.13	0.36	LS4
4. Section X 4 (X = ...)	-7.16e+6	22.45e+6	1	0.13	0.36	LS4
11. Section Y 11 (...)	7.76e+6	22.24e+6	1	0.08	0.28	LS4
19. Section Z 19 (...)	11.91e+6	21.29e+6	1	0.07	0.27	LS1
21. Section Custo...	1.34e+6	11.92e+6	1	0.03	0.19	LS4
12. Section Y 12 (...)	-14.20e+6	24.60e+6	1	0.03	0.19	LS1
22. Section Custo...	3.09e+6	12.34e+6	1	0.02	0.15	LS1
9. Section Y 9 (Y = ...)	12.92e+6	22.49e+6	1	0.02	0.15	LS4
6. Section Y 6 (Y = ...)	12.45e+6	28.81e+6	1	0.02	0.14	LS1
17. Section Z 17 (...)	-3.13e+6	6.00e+6	1	0.01	0.10	LS1
20. Section Z 20 (...)	-6.44e+6	12.98e+6	1	0.01	0.09	LS4
10. Section Y 10 (...)	7.44e+6	12.93e+6	1	0.01	0.08	LS1
18. Section Z 18 (...)	2.79e+6	4.84e+6	1	0.01	0.08	LS1
23. Section Custo...	0.41e+6	6.88e+6	1	0.00	0.05	LS4
7. Section Y 7 (Y = ...)	0.00e+6	0.50e+6	1	0.00	0.00	LS1
Max over Sectio...	1.77e+6	34.68e+6	1	0.80	0.90	LS4

Section Title	Plate Length [m]	Plate Width [m]	Plate Thickness [m]	Sx in plate direction [Pa]	Sy in plate direction [Pa]	Sxy in plate direction [Pa]	Seqv [Pa]	Buckling Factor Combined	Buckling Factor Overall
1..Section X 1 (X = 70)	3.00	2.25	0.05	0.00e+6	0.00e+6	40.46e+6	130.48e+6	0.39	0.63

All results(dimensions, stresses) are from the plate which cause highest BF=0.55 because Search Type = Related to Last Parameter

Stiffener Buckling Plot

- 1 Execute *Criteria Plot* from Stiffener Buckling results context menu
- 2 Load Group: **1..Envelope**
- 3 View: **5..Stiffeners**
- 4 Press  Select: **Section X3**
- 5 Press  *Preview*



Stiffener Buckling Table

1

Execute *Table(expand/extreme)* from Stiffener Buckling Results context menu

2

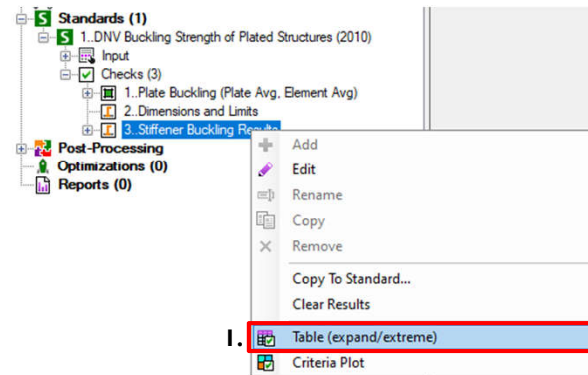
Load Group: **1..Envelop**

3

Show stiffeners results: **ON**

4

Press *Fill Table*



3. ☒ Show Stiffeners results

4.

Stiffener / Element	Qsd	Nsd [N]	Vsd [N]	M1Sd [N m]	M2Sd [N m]	Uf Shear	Uf Plate Side
1. Section X 1 (X = 70)	30363294...	14091895...	0.0	45488264.0	22744132.0	12345678...	12345678...
1. Stiffener 1.1.1 [70; -8.06; 1.1]	4998.00	80010.5	0.0	2015.9	1007.9	0.00	0.19
2. Stiffener 1.1.2 [70; -7.16; 1.1]	2759.77	17879.1	0.0	1113.1	556.6	0.00	0.19
3. Stiffener 1.1.3 [70; -6.26; 1.1]	3136.38	37183.2	0.0	1265.0	632.5	0.00	0.26
4. Stiffener 1.1.4 [70; -5.37; 1.1]	3072.16	47752.8	0.0	1239.1	619.6	0.00	0.27
5. Stiffener 1.1.5 [70; -4.48; 1.1]	3126.18	46905.4	0.0	1260.9	630.4	0.00	0.29
6. Stiffener 1.1.6 [70; -3.58; 1.1]	2944.26	41800.2	0.0	1187.5	593.8	0.00	0.27
7. Stiffener 1.1.7 [70; -2.68; 1.1]	2993.36	39955.8	0.0	1207.3	603.7	0.00	0.12
1.. Stiffener 1.2.1 [70; 12.9; 6.01]	2584.03	5011.8	0.0	1345.8	672.9	0.00	0.18
2. Stiffener 1.2.2 [70; 13.32; 6.37]	3600.62	-20918.7	0.0	833.8	416.9	0.00	0.13
3. Stiffener 1.2.3 [70; 12.07; 6.62]	4225.19	41204.9	0.0	244.3	122.2	0.00	0.05
4. Stiffener 1.2.4 [70; 12.9; 5.4]	2947.59	16372.7	0.0	1535.2	767.6	0.00	0.22
5. Stiffener 1.2.5 [70; 12.07; 7.22]	5923.32	-8261.5	0.0	342.5	171.3	0.00	0.05
6. Stiffener 1.2.6 [70; 12.9; 4.6]	4287.50	16634.2	0.0	2233.1	1116.5	0.00	0.32
7. Stiffener 1.2.7 [70; 12.9; 4.6]	4287.50	16634.2	0.0	2233.1	1116.5	0.00	0.32
8. Stiffener 1.2.8 [70; 13.73; 6.86]	5148.33	-11131.3	0.0	297.7	148.8	0.00	0.05
9. Stiffener 1.2.9 [70; 12.9; 7.83]	3591.10	4221.7	0.0	1870.4	935.2	0.00	0.25
10. Stiffener 1.2.10 [70; 12.07; 3.8]	7961.92	-2627.8	0.0	460.4	230.2	0.00	0.07
11. Stiffener 1.2.11 [70; 13.73; 7.35]	4501.09	7894.9	0.0	260.3	130.1	0.00	0.04
12. Stiffener 1.2.12 [70; 12.9; 8.44]	2851.93	7975.8	0.0	1485.4	742.7	0.00	0.20
13. Stiffener 1.2.13 [70; 12.9; 3]	3082.19	62955.5	0.0	1605.3	802.7	0.00	0.28
14. Stiffener 1.2.14 [70; 13.73; 3.8]	4153.39	14012.8	0.0	240.2	120.1	0.00	0.04
15. Stiffener 1.2.15 [70; 12.48; 1.11]	981.87	49950.3	0.0	377.2	188.6	0.00	0.09

Use **Show stiffener results** for detailed table with results for all stiffeners. Otherwise only the worst results over Sections will be shown.

Report. Tables

1 Execute Reports => Add =>
Designer - Results

2 Results => Check Tables

3 Press => Check '1..Plate Buckling'
=>

4 Type: **Expand**

5 Press and select **LS; LG** loads.

6 Press **OK**

7 Press and Execute **From List**

8 Select all **X Sections**

9 Press **OK**

9 Press **OK**

The screenshot illustrates the workflow for generating a Plate Buckling Table report in SDC Verifier. The steps are as follows:

- Reports Menu:** The 'Add' option is selected, leading to the 'Designer - Results' option.
- Report Designer:** The 'Results' tab is active, and the 'Check Tables' icon is clicked.
- Add Check Tables:** The 'Standard '1..DNV Buckling Strength of Plated Structures (2010)'' is selected, and the 'Check '1..Plate Buckling (Plate Avg. Element Avg)'' option is chosen.
- Plate Buckling Table:** The 'Table Type' is set to 'Expand'.
- Load Selection:** The 'LS; LG' loads are selected.
- Select Items:** The 'From List' option is selected, and the 'OK' button is pressed.
- Section Selection:** All 'X Sections' are selected.
- OK:** The 'OK' button is pressed to generate the report.


Report. Plots



1 Results => Check Plots

2 Press => Check '1..Plate Buckling'
=> 

3 Parameter: **Buckling Factor Overall.**

4 Views: **Frame.**

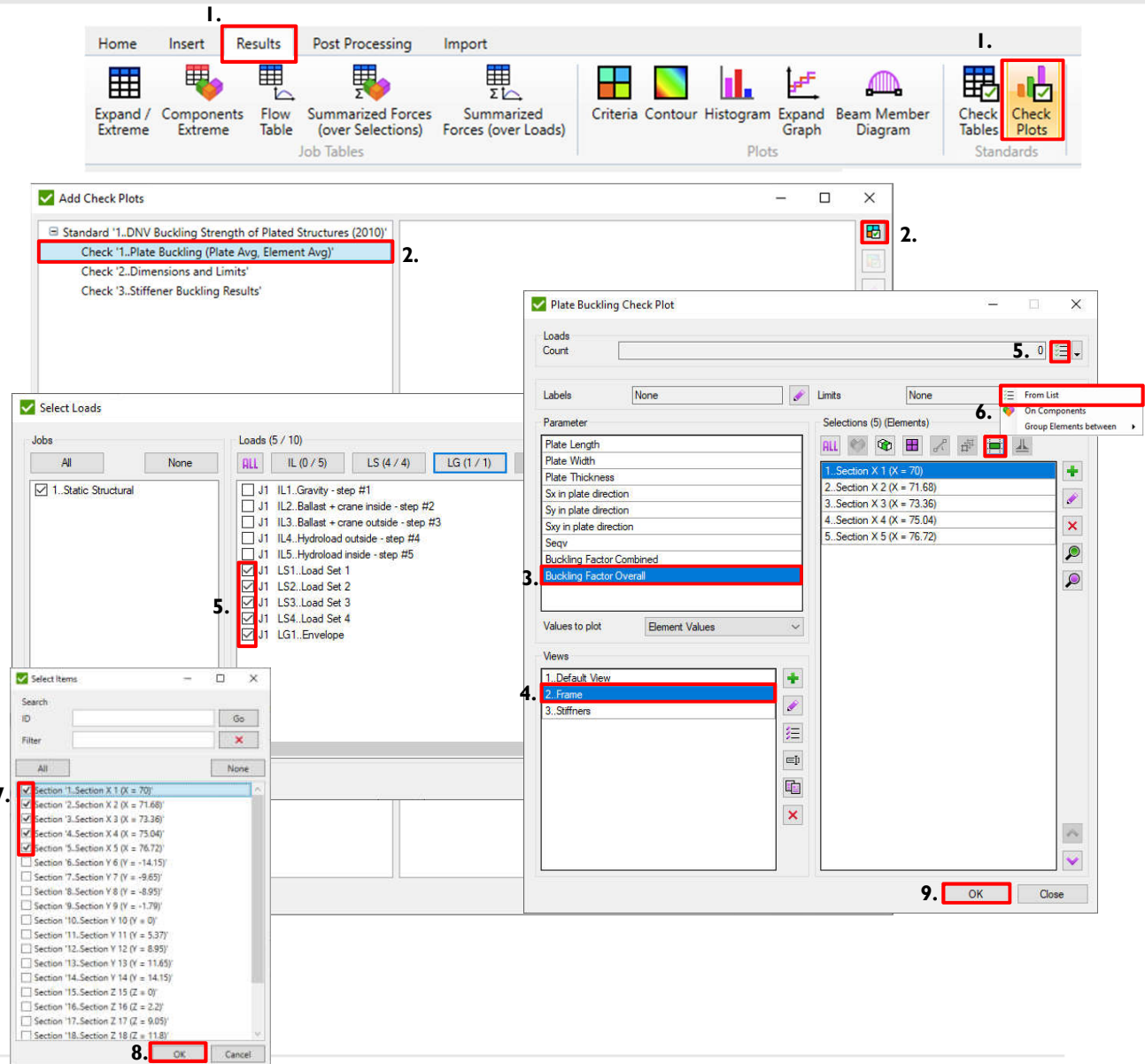
5 Press , select **LS; LG** Loads and Press **OK.**

6 Press  and Execute  **From List**

7 Select all **X** sections.


8 Press **OK.**

9 Press **OK.**




The screenshot illustrates the workflow in SDC Verifier to generate a buckling factor plot. The process involves navigating through the 'Results' tab, selecting 'Check Plots', and configuring the 'Plate Buckling Check Plot' dialog. Key steps include selecting the 'Standard 1..DNV Buckling Strength of Plated Structures (2010)', choosing 'Check 1..Plate Buckling (Plate Avg. Element Avg)', and selecting the 'Buckling Factor Overall' parameter. The 'Views' section is set to 'Frame', and the 'Loads' section is configured to include 'LS' and 'LG' loads. The 'Select Items' dialog shows the selection of all X sections (1 to 18). The final step is clicking 'OK' to generate the plot.



1. Results => Check Plots

2. Press => Check '1..Plate Buckling' => 

3. Parameter: **Buckling Factor Overall.**

4. Views: **Frame.**

5. Press , select **LS; LG** Loads and Press **OK.**

6. Press  and Execute  **From List**

7. Select all **X** sections.

8. Press **OK.**

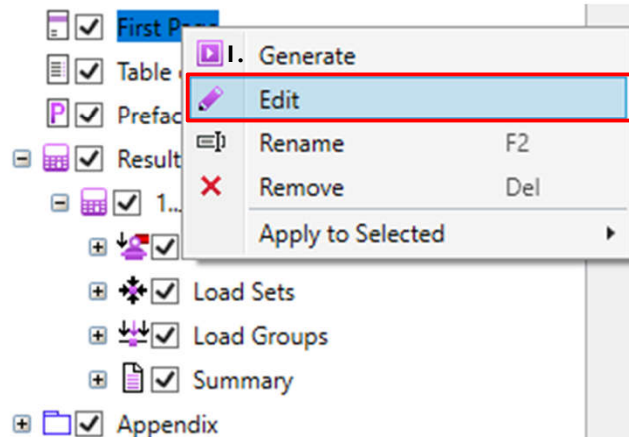
9. Press **OK.**

Report. First Page

1 Right click on *First Page* => **Edit**.

2 Fill in information about project.

3 Press **OK**.



A screenshot of the 'First Page Editor' dialog box. The dialog is divided into several sections: 'Engineer details', 'Customer details', 'Project Details', and 'Image'. The 'Engineer details' section contains fields for Engineer (Support), Company (SDC Verifier), E-mail (support@sdcverifier.com), Phone (+31 15 30-10-310), Address (Zijlvest 25 [...]), Web Site (sdcverifier.com), and a Logo field showing the SDC Verifier logo. The 'Customer details' section contains fields for Contact Person, Company (Femto Engineering), E-mail (info@femto.eu), Phone, Address, Web Site (www.femto.nl), and a Logo field showing the word 'Company'. The 'Project Details' section contains fields for Number, Version (1), and Name (Plate Buckling_DNV). The 'Image' section has radio buttons for 'From file' and 'From View' (selected), with a dropdown menu showing '2..Frame'. At the bottom right, there are 'OK' and 'Cancel' buttons, with the 'OK' button highlighted by a red rectangle and the number '3.' next to it.

Report

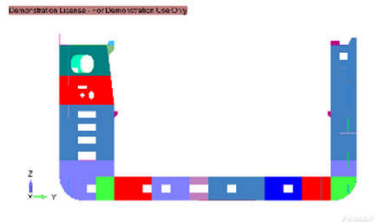


Press to generate complete report and press to convert report to word



Report

Plate Buckling_DNV



Prepared by:
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Zijlvest 25
2011 VB Haarlem
The Netherlands

Engineer: Support

Customer:
Project Number:

Version: 1

Date: 14/12/2020

Prepared for:
Femto Engineering

www.femto.nl



24/01/2020

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3..Stiffener Buckling Results

Property	Value
Category	Stiffener Buckling
Parameter Count	77

1..Plate Buckling (Plate Avg, Element Avg)

Property	Value
Category	Plate Buckling
Parameter Count	37
Use Absolute Shear	No
Convert Stresses into plate direction	Yes

LG1_Envelop

1..Buckling (LG1, 20 sections)									
Standard	1. DNV Buckling Strength of Plated Structures (2010)								
Load Group	LG1_Envelop								
Search Type	Maximum								
Section Title	Plate Length [m]	Plate Width [m]	Plate Thickness [mm]	Sx in plate direction [Pa]	Sy in plate direction [Pa]	Sxy in plate direction [Pa]	Serv [Pa]	Buckling Factor g	Load g Factor Overall
1..Section X 1 (X = 70)	3.00	2.25	0.05	0.00e+0	0.00e+0	40.48e+6	130.48e+6	0.39	0.83
2..Section X 2 (X = 71.68)	5.35	2.60	0.03	0.00e+0	0.00e+0	34.81e+6	73.33e+6	0.13	0.36
3..Section X 3 (X = 73.36)	2.50	1.73	0.05	0.00e+0	0.00e+0	53.53e+6	95.10e+6	0.22	0.47
4..Section X 4 (X = 75.04)	3.00	2.80	0.02	0.00e+0	0.00e+0	34.48e+6	61.40e+6	0.13	0.35
5..Section X 5 (X = 76.72)	3.00	2.60	0.05	0.00e+0	0.00e+0	46.82e+6	145.65e+6	0.49	0.70
6..Section Y 6 (Y = -14.15)	6.72	1.05	0.03	0.00e+0	0.00e+0	11.91e+6	28.04e+6	0.02	0.13
7..Section Y 7 (Y = -9.65)	6.72	1.05	0.03	-0.08e+6	-0.08e+6	0.00e+0	0.50e+6	0.00	0.00
8..Section Y 8 (Y = -8.95)	9.05	3.36	0.01	-1.65e+6	-1.65e+6	10.11e+6	36.12e+6	0.80	0.90
9..Section Y 9 (Y = -1.79)	2.20	1.68	0.01	-1.70e+6	-0.23e+6	12.92e+6	22.49e+6	0.02	0.15
10..Section Y 10 (Y = 0)	2.20	1.68	0.01	-1.48e+6	-0.02e+6	7.44e+6	12.93e+6	0.01	0.08
11..Section Y 11 (Y = 5.37)	2.20	0.84	0.01	-0.38e+6	-0.38e+6	7.78e+6	22.24e+6	0.08	0.28
12..Section Y 12 (Y = 8.95)	2.20	1.68	0.01	-0.72e+6	-0.38e+6	15.88e+6	27.57e+6	0.03	0.19
13..Section Y 13 (Y = 11.65)	6.85	3.36	0.01	-0.42e+6	-0.07e+6	8.51e+6	44.41e+6	0.48	0.70
14..Section Y 14 (Y = 14.15)	3.36	0.97	0.03	0.00e+0	-1.08e+6	44.18e+6	98.72e+6	0.34	0.59
15..Section Z 15 (Z = 0)	3.36	0.93	0.02	0.00e+0	0.00e+0	11.40e+6	54.00e+6	0.56	0.76
16..Section Z 16 (Z = 2.2)	8.95	3.36	0.02	0.00e+0	-0.87e+6	17.99e+6	45.58e+6	0.34	0.59
17..Section Z 17	3.36	2.60	0.01	-0.39e+6	-0.05e+6	0.28e+6	6.00e+6	0.01	0.10

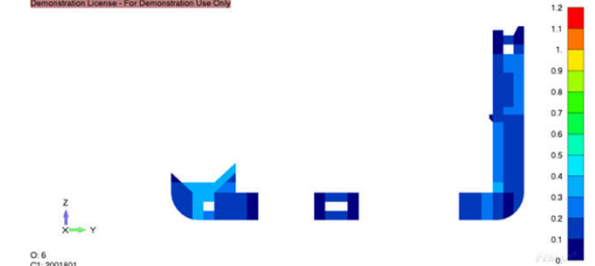


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Buckling Factor Overall (LG1, Component '3..Section X 2 (X = 71.68)', v2)

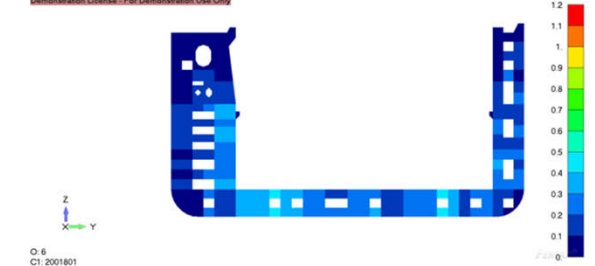
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Check	[S1] 1..Plate Buckling (Plate Avg, Element Avg)	Load Group	LG1_Envelop
Parameter View	Buckling Factor Overall	Selection	Component '3..Section X 2 (X = 71.68)'

Buckling Factor Overall (LG1, Component '4..Section X 3 (X = 73.36)', v2)

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Check	[S1] 1..Plate Buckling (Plate Avg, Element Avg)	Load Group	LG1_Envelop
Parameter View	Buckling Factor Overall	Selection	Component '4..Section X 3 (X = 73.36)'