



Get started with SDC Verifier

30 Dec 2020
version 2020.0.2

SDC Verifier is a powerful Simcenter add-on that helps verify structures according to standards and generates full calculations reports.

This step-by-step tutorial is designed to *get you started* with main SDC Verifier features:

- ▶ Creating new project;
- ▶ Create Individual Loads, Combinations and Envelop;
- ▶ Define Views;
- ▶ Model Setup report;
- ▶ Calculation report;
- ▶ Open as template feature;

Create new project

1

Launch **SDC Verifier 2020.0.2** for **Simcenter** 

2

Execute *File - New Project*.

3

Press  and select **Get_Started_Plate_s_1.sim** model.

4

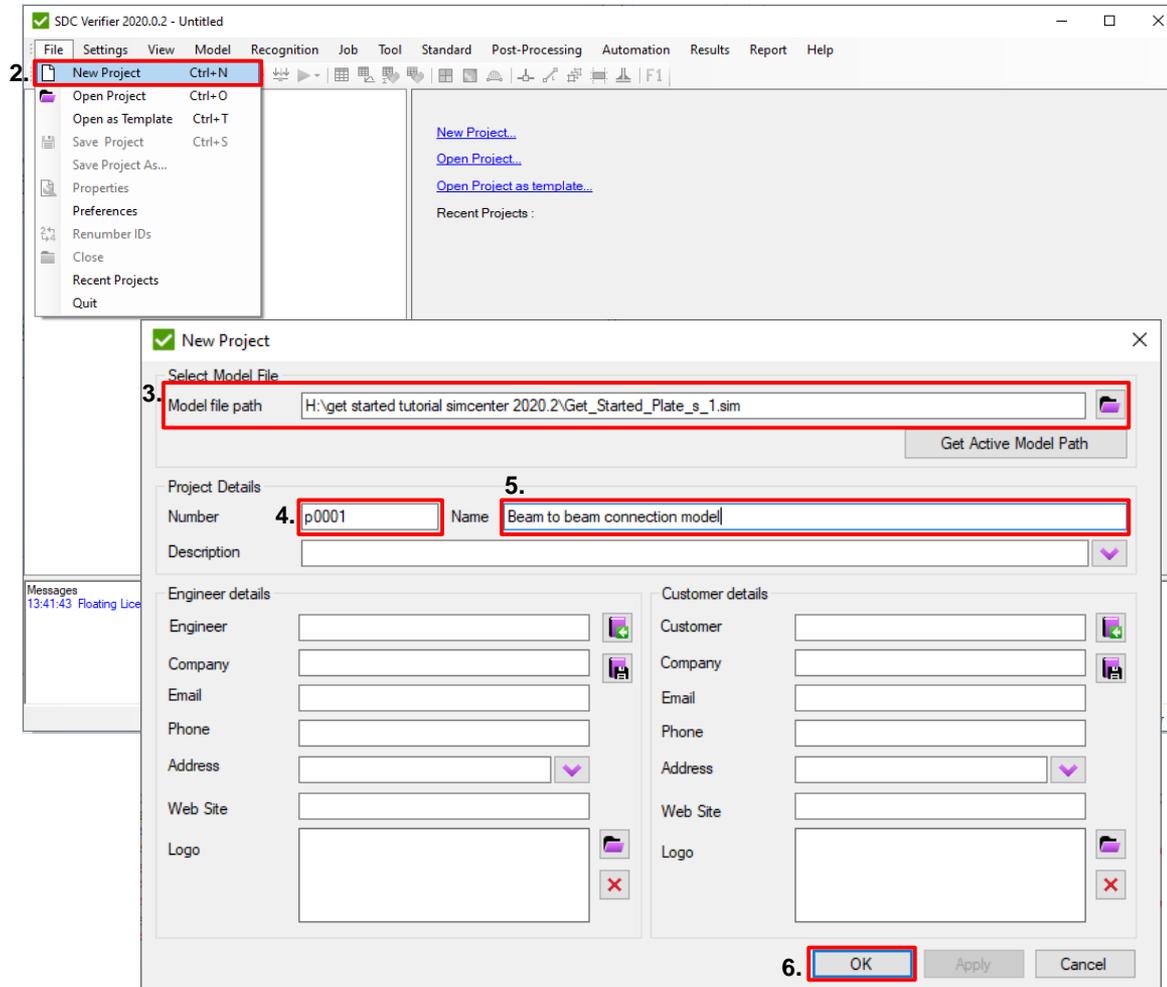
Number: **p0001**

5

Name: **Beam-to-beam connection model**

6

Press *OK*



Job explanation

1 Title: **Linear Static Analysis.**

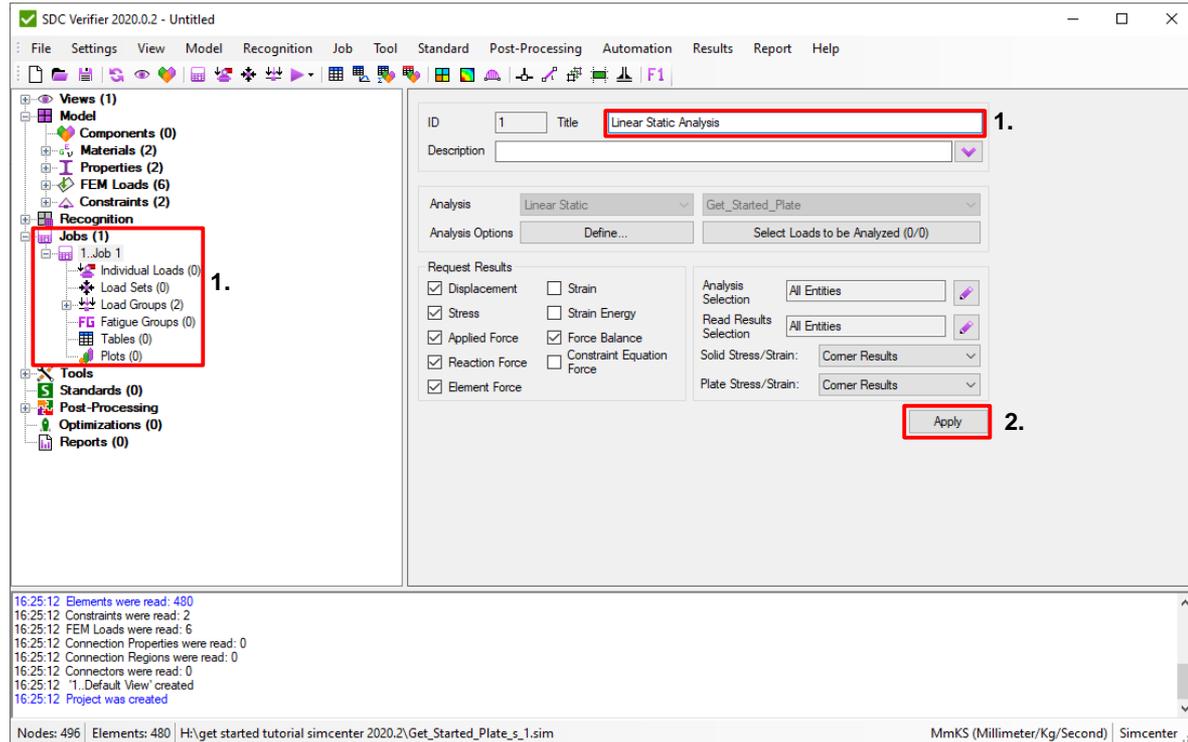
2 Press *Apply*.

Job – calculation set that contains analysis with options, boundary conditions, load combinations, envelopes and tables/plots.

Individual Loads = FEM load + Constraint.
Boundary condition + Output Set;

Load Sets – combination of individual loads with factors;

Load Groups (envelop – worst results among loads)



Create individual loads.

1 Select *Individual Loads* in the *Model Tree*.

2 Select *FEM Loads* with IDs 1-3 and *Constraints* with ID 1.

3 Press *Create*.

Individual Loads will be created automatically from combinations of all selected FEM Loads and Constraints. In our case 3 Individual loads.

If the model already contains Output Sets it is possible to create Individual Loads based on results without boundary conditions (see next slide).

The screenshot shows the SDC Verifier 2020.0.2 interface. On the left, the Model Tree is expanded to show 'Individual Loads (0)' with a red box and the number '1.' next to it. In the center, the 'Calculation Loads' dialog is open, showing a table with 'FEM Loads' and 'Constraints' columns. The 'FEM Loads' column contains three entries: '1. FORCE 1_Node ID Table', '2. FORCE 2_Node ID Table', and '3. FORCE 3_Node ID Table'. The 'Constraints' column contains two entries: '1.SPC1_4' and '2.SPC SS. SID 1'. A red box highlights these three rows, with the number '2.' next to it. At the bottom right of the dialog, the 'Create' button is highlighted with a red box and the number '3.' next to it. The status bar at the bottom shows 'Nodes: 496 | Elements: 480 | H:\get started tutorial simcenter 2020.2\Get_Started_Plate_s_1.sim' and 'MmKS (Millimeter/Kg/Second) | Simcenter ...'.

Note: Use option “Inertia Relief” to create Individual Loads based on FEM Loads only (without constraint).

Create individual loads from existing results.

This slide demonstrates alternative method how to create individual loads based on Result Cases. Tutorial model does not contain any results yet, steps from this slide should be skipped.

1 Activate *Individual Loads* in the *Model Tree*.

2 Select *From Existing results* option.

3 Select all Result Cases.

4 Press *Create*.

3 Individual Loads will be created based on 3 Result Cases

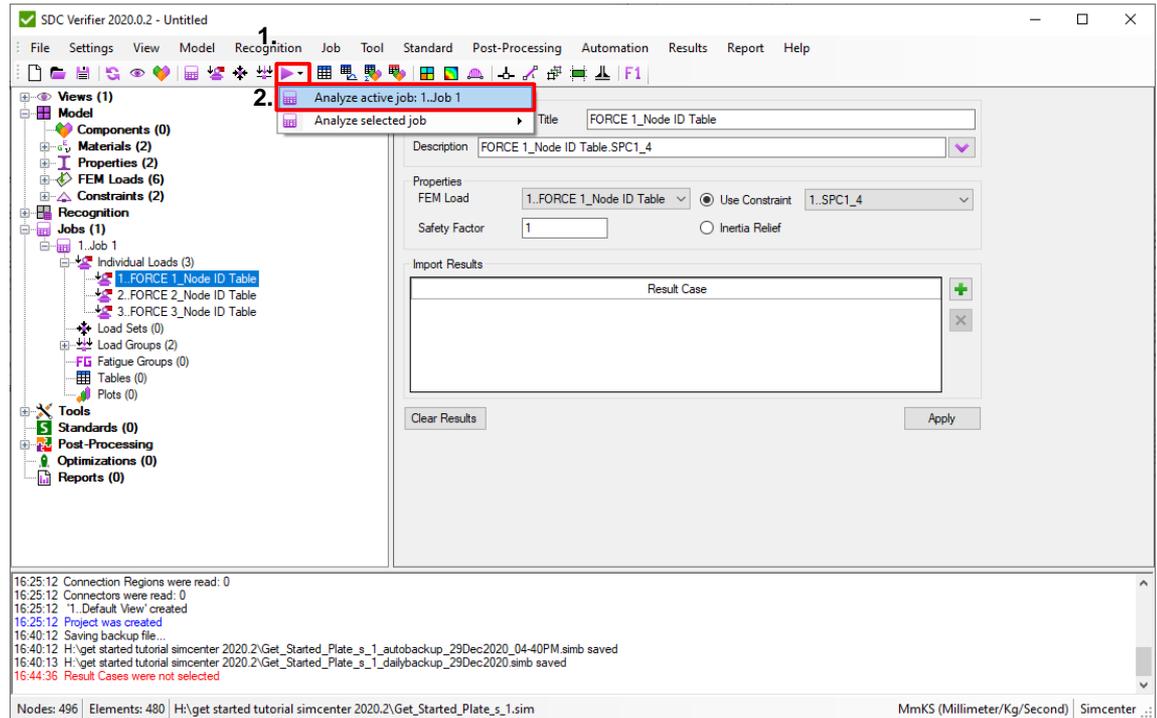
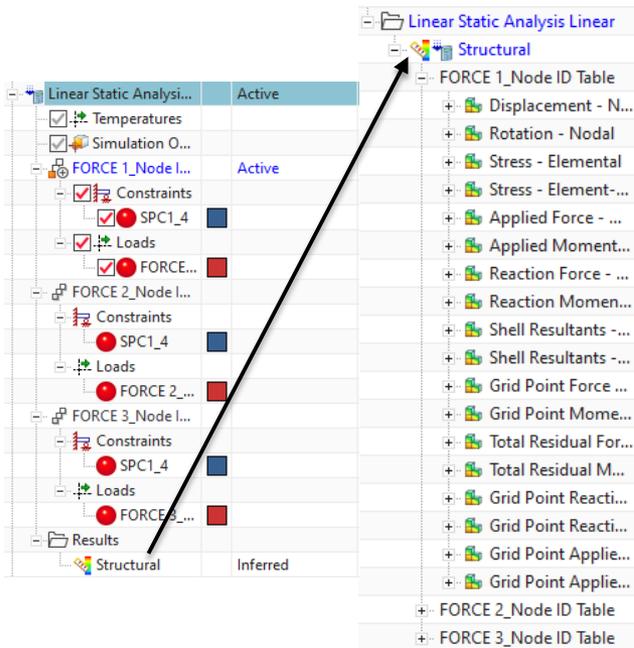
The screenshot shows the SDC Verifier 2020.0.2 interface. On the left, the Model Tree is expanded to show 'Individual Loads (3)' under '1. Linear Static Analysis'. A red box highlights this folder, labeled '1'. In the center, the 'Calculation Loads' dialog is open, showing the 'From Existing Results (based on Result Cases)' option selected, labeled '2'. Below this, three result cases are listed and selected with blue highlights: 'Linear Static Analysis Linear - FORCE_1_Node ID Table (Static Step 1)', 'Linear Static Analysis Linear - FORCE_2_Node ID Table (Static Step 1)', and 'Linear Static Analysis Linear - FORCE_3_Node ID Table (Static Step 1)', labeled '3'. At the bottom right of the dialog, the 'Create' button is highlighted with a red box, labeled '4'. The bottom status bar shows 'Nodes: 496 Elements: 480' and the file path 'H:\get started tutorial simcenter 2020.2\Get_Started_Plate_s_1.sim'.

Analyze Job

1 Press on toolbar to analyze job.

2 Select *Analyze active job*

Solution with 3 cases will be created and run. Result Cases will be automatically linked to analyzed Individual Loads after analysis is finished.



Note: If Individual Loads were created based on Output Sets running analysis is not required.

Create load combinations (Logic LS)

- 1 Activate *Load Sets* in the *Model* tree.
- 2 Title: **All_combinations**
- 3 Select all Individual Loads from the list of loads.
- 4 Press to add items to load set.
- 5 Select all Individual Loads from the list of loads.
- 6 Press *Add Logic Factor* (each item will be added with positive and negative factor).
- 7 Press *Create*

The screenshot shows the SDC Verifier 2020.0.2 interface. The 'Add Load Set' dialog is open, showing the 'Title' field set to 'All_combinations'. The 'Loads' list contains three items: '1..FORCE 1_Node ID Table', '2..FORCE 2_Node ID Table', and '3..FORCE 3_Node ID Table'. The 'Factor 1' and 'Factor 2' columns are both set to 1. The 'Add Logic Factor' button is highlighted.

Below the dialog, a table shows the resulting load combinations:

	Safety Factor	IL1..Top_Edge_Vertical	IL2..Top_Edge_Lateral	IL3..Side_Edge_Lateral
All_combinations.1	1	1	1	1
All_combinations.2	1	-1	1	1
All_combinations.3	1	1	-1	1
All_combinations.4	1	-1	-1	1
All_combinations.5	1	1	1	-1
All_combinations.6	1	-1	1	-1
All_combinations.7	1	1	-1	-1
All_combinations.8	1	-1	-1	-1

List of the created Load Sets

Edit Multiple Load Sets. Modify factors

- 1 Execute *Edit multiple* in the Load Sets node in the *Model* tree.
- 2 Select cells for All_combinations with IDs 1-4 in column IL3
- 3 Factor: **1.1**. Press *Set*
- 4 Select cells for All_combinations with IDs 5-8 in column IL3
- 5 Factor: **-1.1**. Press *Set*
- 6 Press *OK*.

Tip: It is possible to export/import table to excel using *Copy* and *Paste* buttons.

All_combinations 1	1	1	1	1.1
All_combinations 2	1	-1	1	1.1
All_combinations 3	1	1	-1	1.1
All_combinations 4	1	-1	-1	1.1
All_combinations 5	1	1	1	-1.1
All_combinations 6	1	-1	1	-1.1
All_combinations 7	1	1	-1	-1.1
All_combinations 8	1	-1	-1	-1.1

The screenshot shows the SDC Verifier interface with the 'Create/Edit Multiple LoadSets' dialog box open. The dialog box contains a table with the following structure:

	Safety Factor	IL1..FORCE 1 Node ID Table	IL2..FORCE 2 Node ID Table	IL3..FORCE 3 Node ID Table	
All_combinations.1	1	1	1	1.1	3 and 5.
All_combinations.2	1	-1	1	1.1	2.
All_combinations.3	1	1	-1	1.1	
All_combinations.4	1	-1	-1	1.1	
All_combinations.5	1	1	1	-1.1	4.
All_combinations.6	1	-1	1	-1.1	
All_combinations.7	1	1	-1	-1.1	
All_combinations.8	1	-1	-1	-1.1	

The 'Factor' field is set to 1.1. The 'OK' button is highlighted with a red box.

Create Load Group (Envelop)

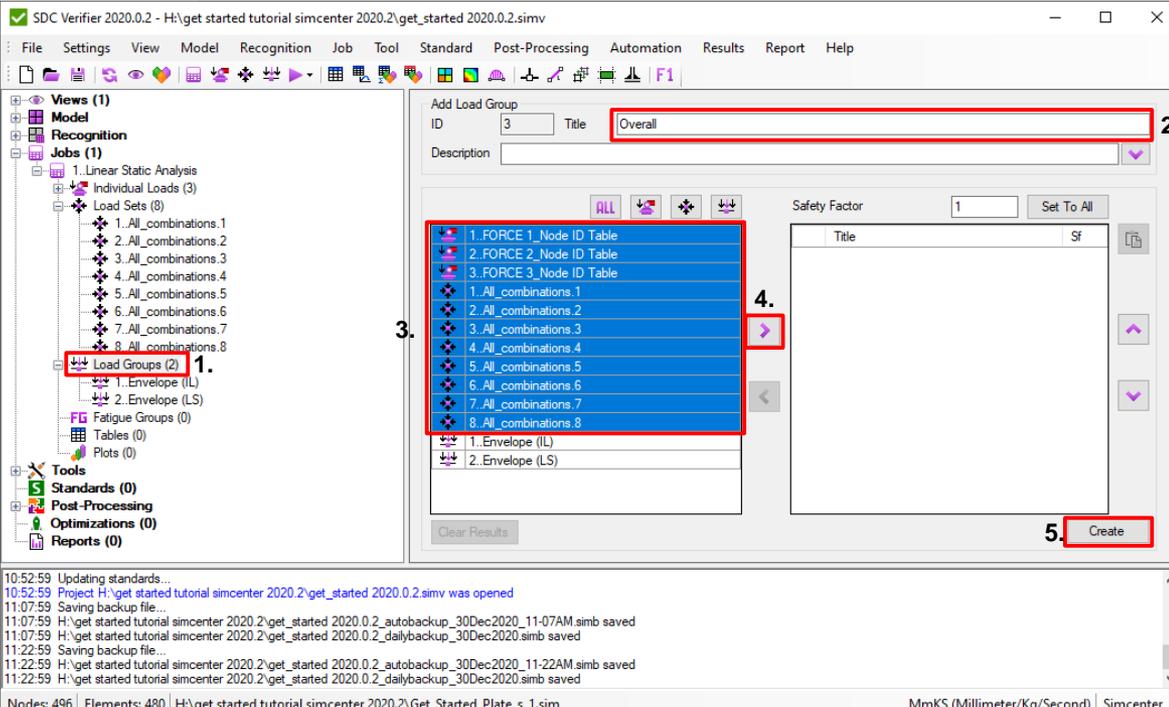
1 Activate *Load Groups* node in the *Model* tree.

2 Title: **Overall**

3 Select all Loads from the list of loads except Envelope (IL) and Envelope (LS).

4 Press  to move selected Loads to Load Group.

5 Press *Create*.



SDC Verifier 2020.0.2 - H:\get started tutorial simcenter 2020.2\get_started 2020.0.2.simv

File Settings View Model Recognition Job Tool Standard Post-Processing Automation Results Report Help

Views (1)
Model
Recognition
Jobs (1)
1.Linear Static Analysis
Individual Loads (3)
Load Sets (8)
1.All_combinations.1
2.All_combinations.2
3.All_combinations.3
4.All_combinations.4
5.All_combinations.5
6.All_combinations.6
7.All_combinations.7
8.All_combinations.8
Load Groups (2) 1.
1. Envelope (IL)
2. Envelope (LS)
Fatigue Groups (0)
Tables (0)
Plots (0)
Tools
Standards (0)
Post-Processing
Optimizations (0)
Reports (0)

Add Load Group
ID 3 Title Overall
Description
ALL
Safety Factor 1 Set To All
Title Sf
Clear Results Create

10:52:59 Updating standards...
10:52:59 Project H:\get started tutorial simcenter 2020.2\get_started 2020.0.2.simv was opened
11:07:59 Saving backup file...
11:07:59 H:\get started tutorial simcenter 2020.2\get_started 2020.0.2_autobackup_30Dec2020_11-07AM.simv saved
11:07:59 H:\get started tutorial simcenter 2020.2\get_started 2020.0.2_dailybackup_30Dec2020.simv saved
11:22:59 Saving backup file...
11:22:59 H:\get started tutorial simcenter 2020.2\get_started 2020.0.2_autobackup_30Dec2020_11-22AM.simv saved
11:22:59 H:\get started tutorial simcenter 2020.2\get_started 2020.0.2_dailybackup_30Dec2020.simv saved

Nodes: 496 | Elements: 480 | H:\get started tutorial simcenter 2020.2\Get_Started_Plate_s_1.sim | MmKS (Millimeter/Kg/Second) | Simcenter ...

Load Group is envelope for Individual Loads, Load Sets, and other Load Groups. It allows to determine minimum, maximum and absolute values of stresses, displacements, forces, etc.

Create 2 general Views for plots

1. Locate Model in Simcenter as shown on pic. Front View.

2. Execute *View – Add* from context menu

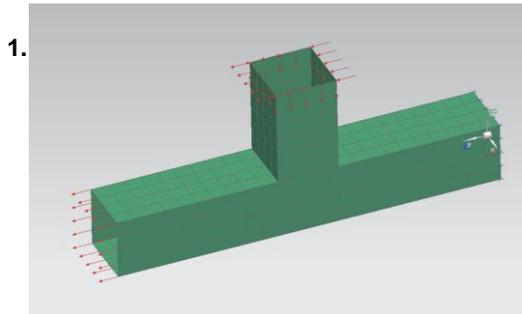
3. Title: **Front View**. Press *OK*.

4. Locate the Model in Simcenter as shown on pic. Back View.

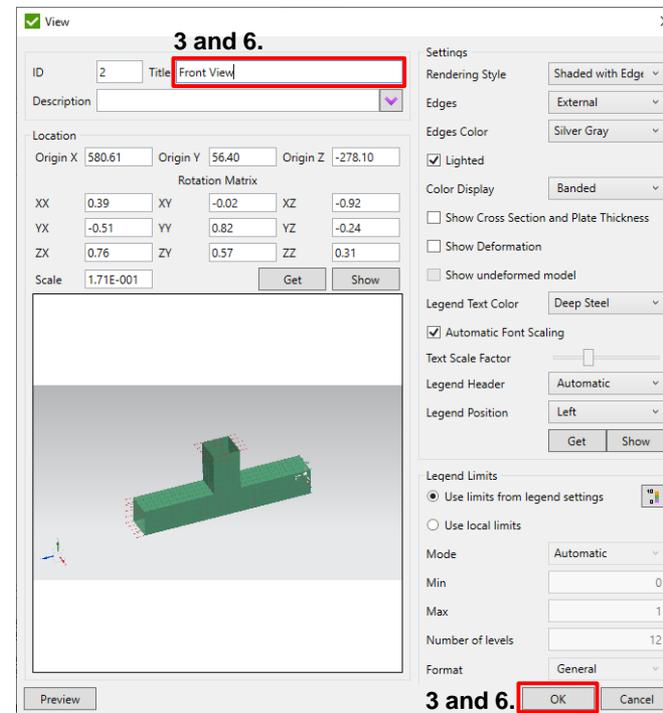
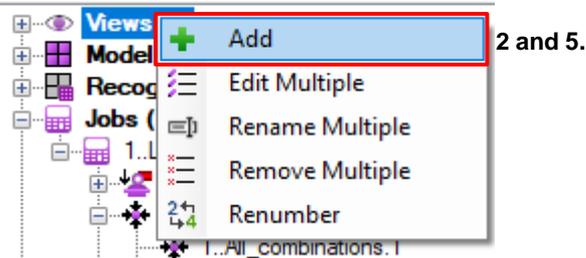
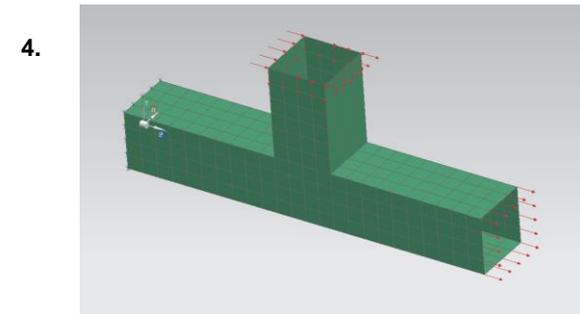
5. Execute *View – Add* from context menu

6. Title: **Back View**. Press *OK*.

Front View



Back View



Create 2 detailed Views

1. Locate Model in Simcenter as shown on pic. Front Detail.

2. Execute *View – Add* from context menu

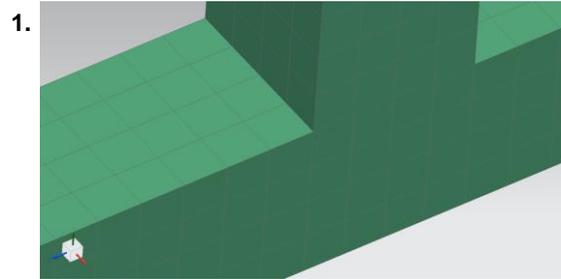
3. Title: **Front Detail**. Press *OK*.

4. Locate the Model in Simcenter as shown on pic. Back Detail.

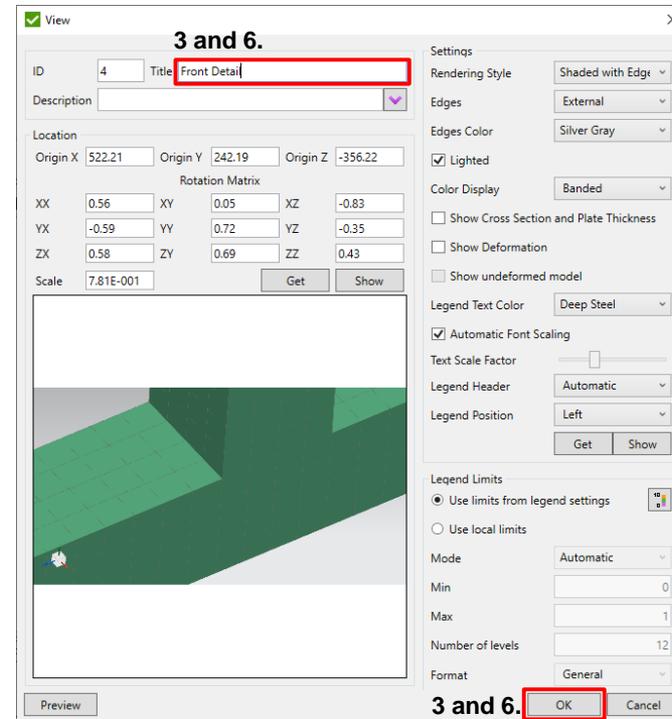
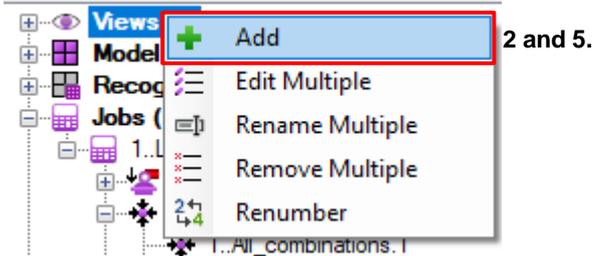
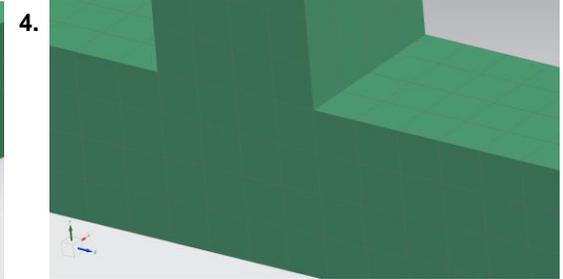
5. Execute *View – Add* from context menu

6. Title: **Back Detail**. Press *OK*.

1. Front Detail



4. Back Detail



Report Wizard – Model Setup report

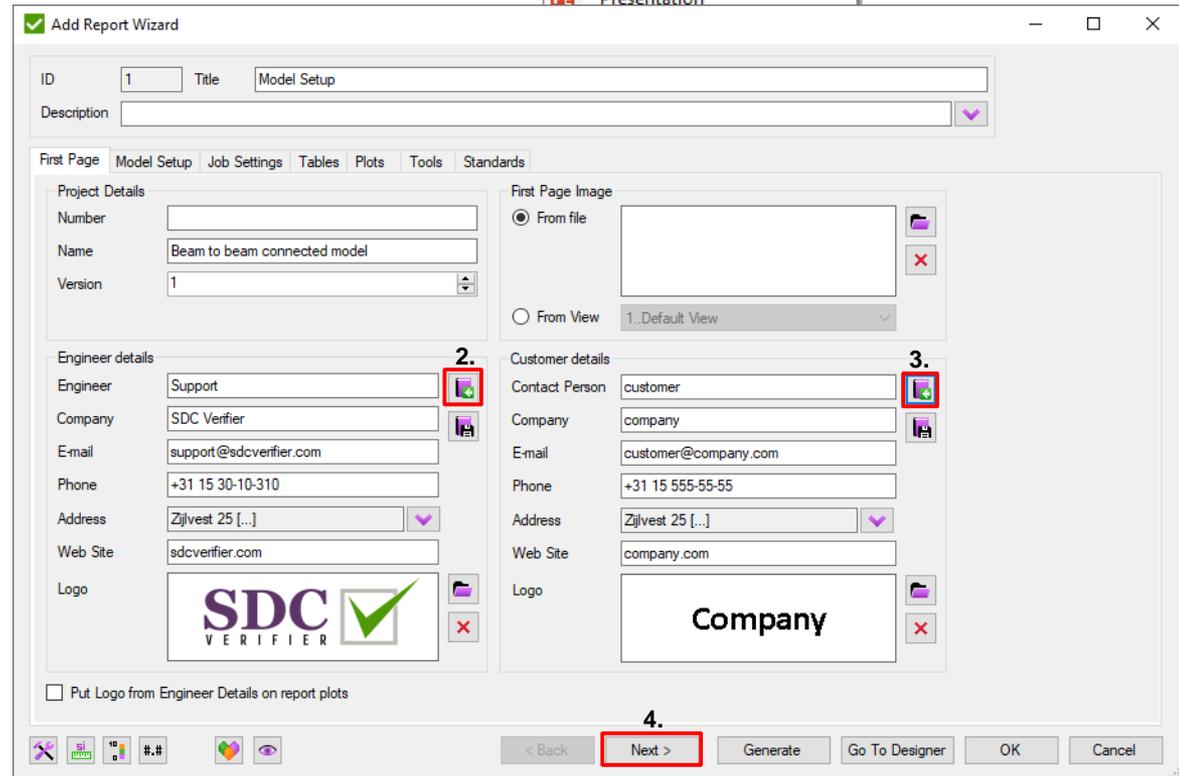
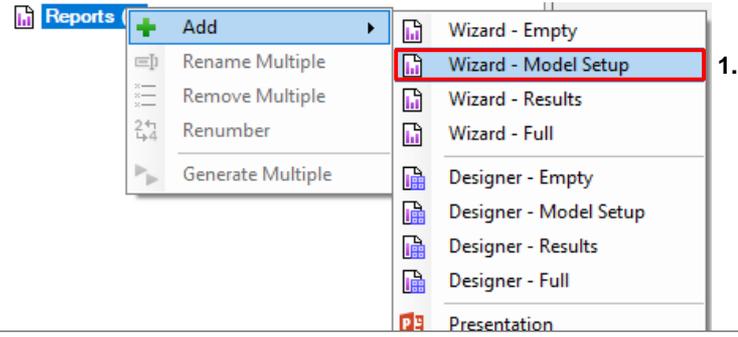
1 Execute Add -> Wizard - Model Setup from Reports in the Model tree.

2 Press  and select Support Engineer from the library

3 Press  and select Customer from the library

4 Press Next.

Note: Engineer and customer information is used on the report's first page and in footer (company name and logo).



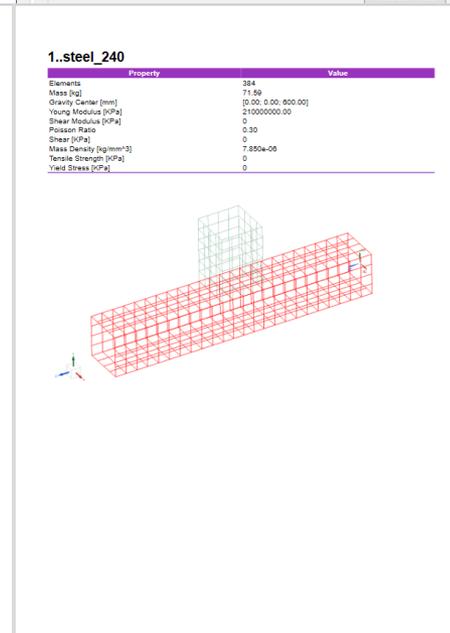
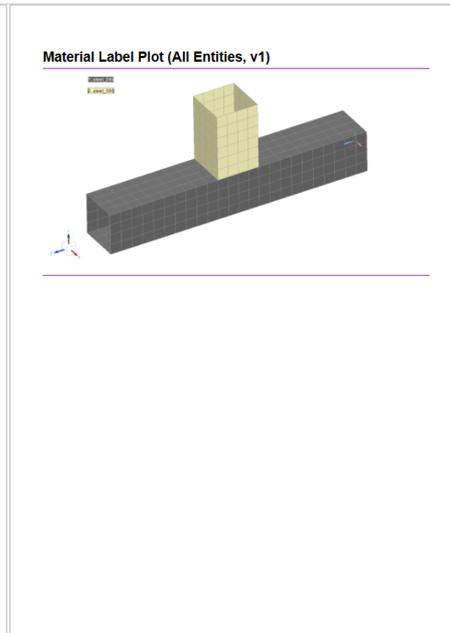
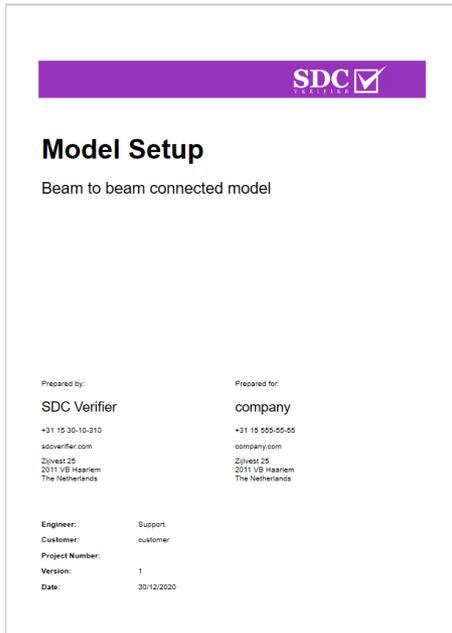
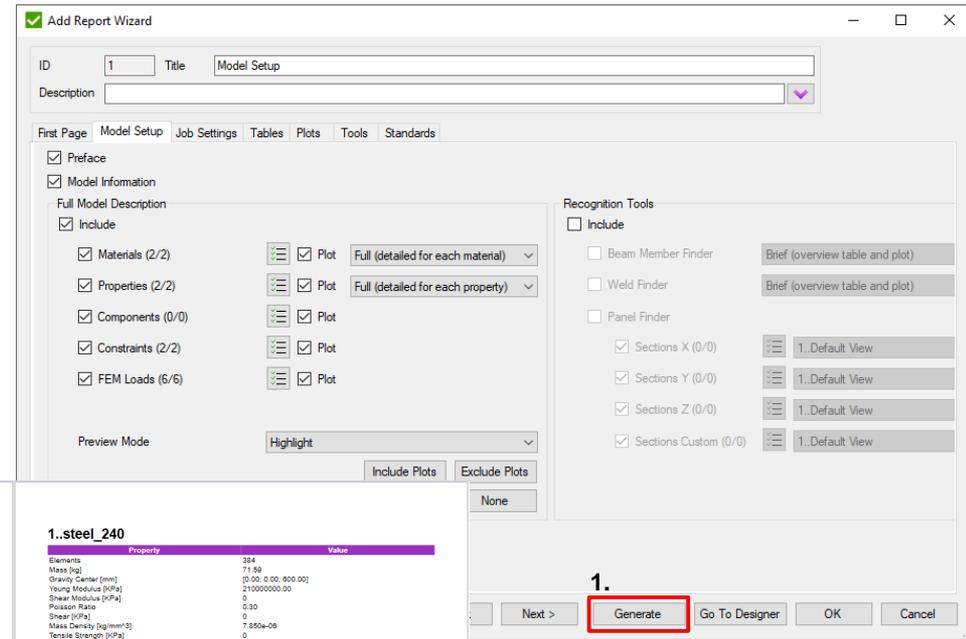
2.

3.

4.

Model Setup options

1 Press *Generate*.



Model setup report has been generated with a default view and opened in MS Word. Using the *Report Designer* you can print out the report without any text editor installed.

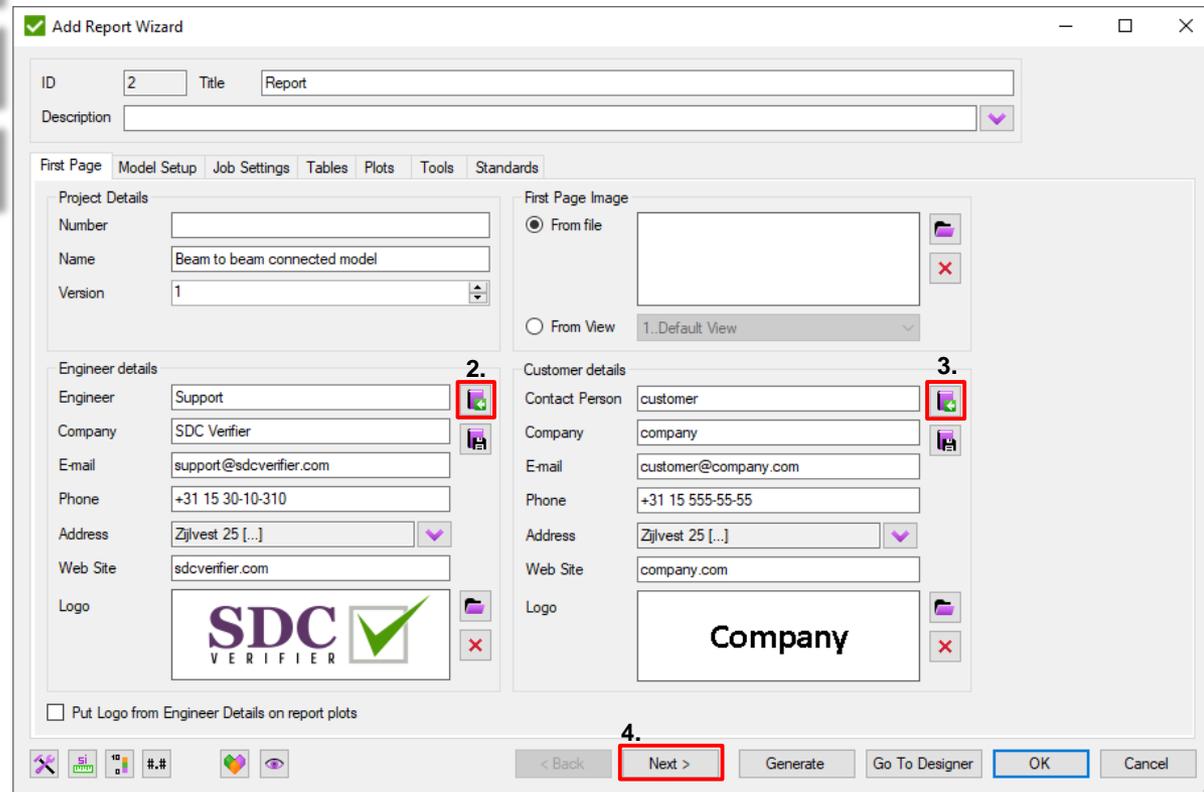
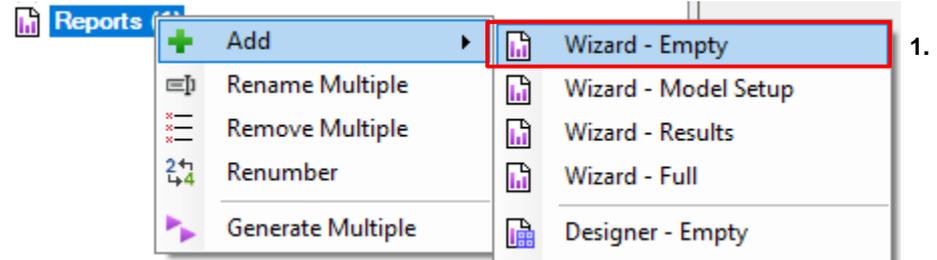
Create calculation report

1 Execute Add -> Wizard - Empty on Reports in the Model tree.

2 Press  and select Support Engineer from the library

3 Press  and select Customer from the library

4 Press Next 2 times.



Predefined Job Tables

1 Jobs: **ON**

2 Plot Individual Loads: **ON**

3 Include Sum of Forces: **ON**

4 Press *Next*.

1. Include Jobs

2. Plot Individual Load

3. Include Sum of Forces

4. Next >

Add displacements plots

1 Click on *Plots* in the Toolbar.

2 Select All Loads from the list.

3 Press  to add contour plot.

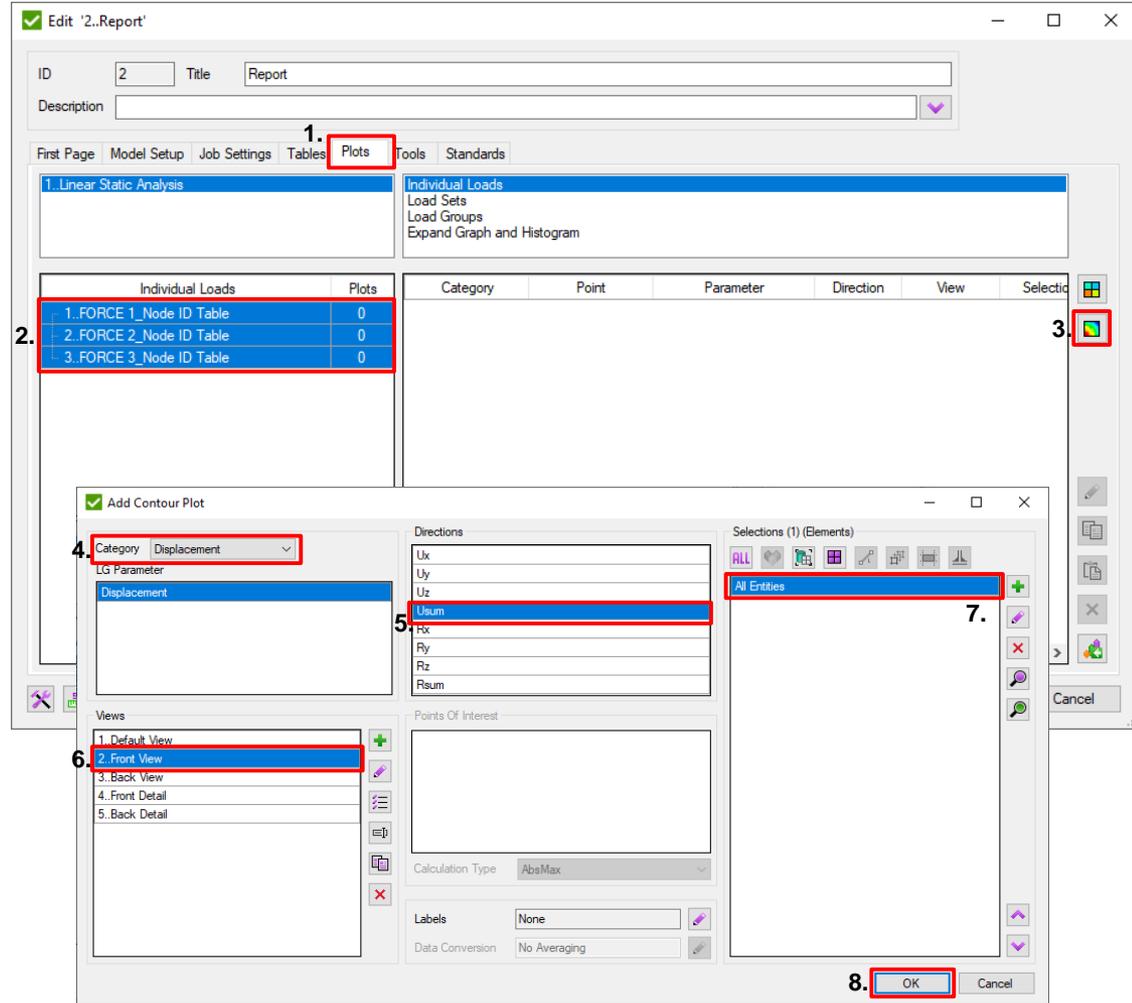
4 *Category: Displacement*

5 *Direction: Usum*

6 *Views: Front View*

7 *Selection: All Elements*

8 Press *OK*.



Add stress plots

1 Select All Loads from the list.

2 Press  to add criteria plots.

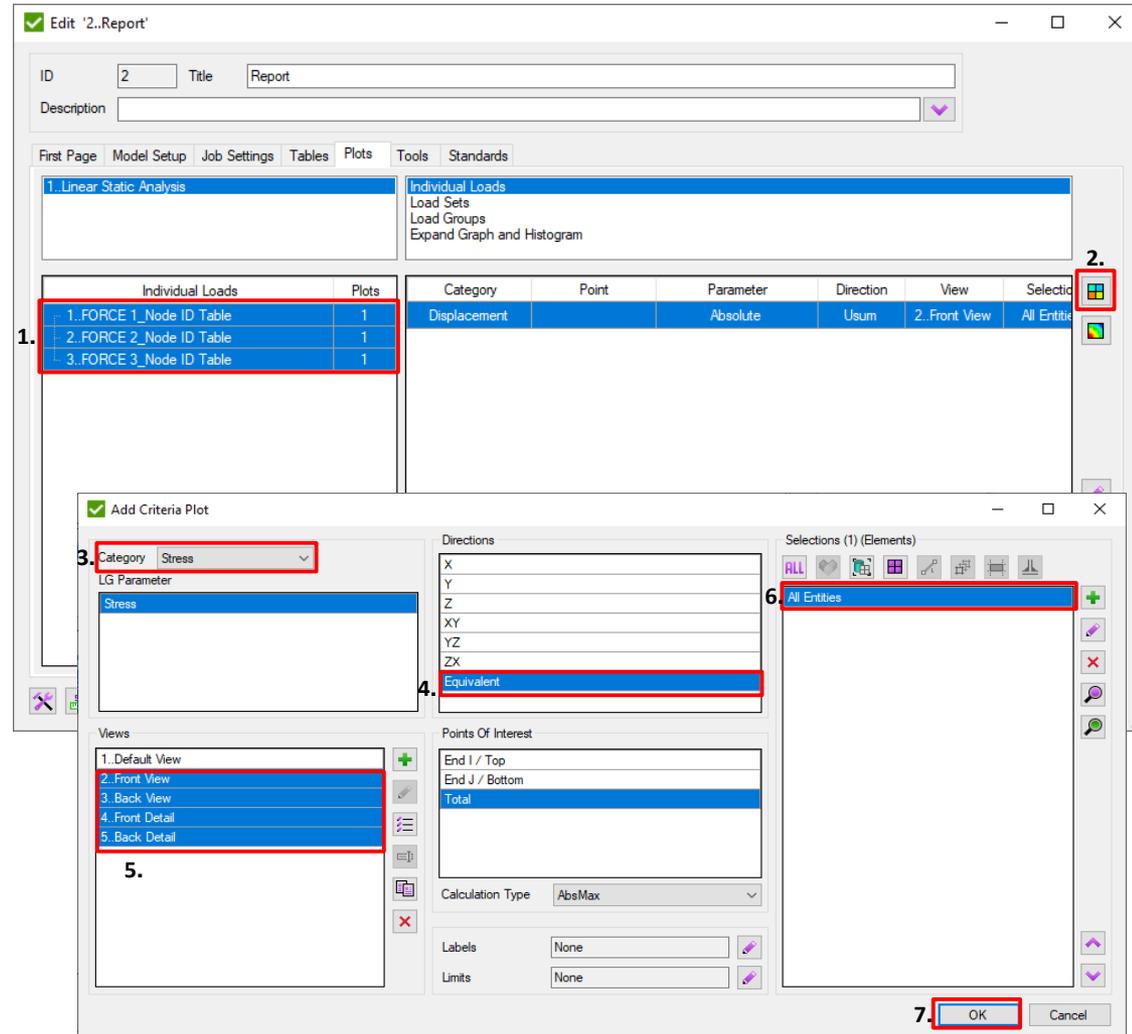
3 *Category: Stress*

4 *Direction: Equivalent.*

5 Select 4 Views: ID from 2 to 5

6 *Selection: All Elements*

7 Press *OK*.



The screenshot shows the 'Edit Report' window with the 'Plots' tab selected. A table lists individual loads, with three rows highlighted in blue and numbered '1'. A red box highlights the 'Criteria Plot' icon in the top right corner, numbered '2'. Below, the 'Add Criteria Plot' dialog is open. The 'Category' dropdown is set to 'Stress' (numbered '3'), and the 'Direction' dropdown is set to 'Equivalent' (numbered '4'). The 'Views' list has four items selected (numbered '5'). The 'Selections' list has 'All Entities' selected (numbered '6'). The 'OK' button at the bottom right is highlighted with a red box and numbered '7'.

Individual Loads	Plots
1..FORCE 1_Node ID Table	1
2..FORCE 2_Node ID Table	1
3..FORCE 3_Node ID Table	1

Category	Point	Parameter	Direction	View	Select
Displacement		Absolute	Usum	2.. Front View	All Entities

Category
Stress

Directions
X
Y
Z
XY
YZ
ZX
Equivalent

Views
1..Default View
2..Front View
3..Back View
4..Front Detail
5..Back Detail

Selections (1) (Elements)
All Entities

Copy plots to Load Sets and Load Groups

- 1 Select all plots from the list.
- 2 Press to copy plot to clipboard.
- 3 Plot Type: **Load Sets**
- 4 Select all loads sets.
- 5 Press to paste.
- 6 Plot Type: **Load Groups**
- 7 Select **Overall** Load Group.
- 8 Press to paste.

The screenshots show the 'Edit Report' dialog in SDC Verifier. The first screenshot shows the 'Plots' tab with three plots selected (1, 2, 3) and the 'Load Sets' section highlighted. The second screenshot shows the 'Load Sets' section with eight combinations selected (1 through 8) and the 'Load Groups' section highlighted. The third screenshot shows the 'Load Groups' section with the 'Overall' group selected. Red boxes and numbers 1 through 8 indicate the steps described in the list on the left.

Individual Loads	Plots	Category	Point	Parameter	Direction	View	Selection	Type
1. FORCE_1_Node ID Table	5	Displacement	Total(AbsMax)	Absolute	Usum	2. Front View	All Entities	
2. FORCE_2_Node ID Table	5	Stress	Total(AbsMax)	Absolute	Equivalent	2. Front View	All Entities	
3. FORCE_3_Node ID Table	5	Stress	Total(AbsMax)	Absolute	Equivalent	3. Back View	All Entities	
		Stress	Total(AbsMax)	Absolute	Equivalent	4. Front Detail	All Entities	
		Stress	Total(AbsMax)	Absolute	Equivalent	5. Back Detail	All Entities	

Load Sets	Plots	Category	Point	Parameter	Direction	View	Selection	Type
1. All_combinations.1	0							
2. All_combinations.2	0							
3. All_combinations.3	0							
4. All_combinations.4	0							
5. All_combinations.5	0							
6. All_combinations.6	0							
7. All_combinations.7	0							
8. All_combinations.8	0							

Load Groups	Plots	Category	Point	Parameter	Direction	View	Selection	Type
1. Envelope (L)	0	Displacement	Total(AbsMax)	Absolute	Usum	2. Front View	All Entities	
2. Envelope (S)	0	Stress	Total(AbsMax)	Absolute	Equivalent	2. Front View	All Entities	
3. Overall	5	Stress	Total(AbsMax)	Absolute	Equivalent	3. Back View	All Entities	
		Stress	Total(AbsMax)	Absolute	Equivalent	4. Front Detail	All Entities	
		Stress	Total(AbsMax)	Absolute	Equivalent	5. Back Detail	All Entities	

Result Report Generation

1 Press *Generate*.

✓ Edit '2..Report'

ID: 2 Title: Report

Description: []

First Page | Model Setup | Job Settings | Tables | Plots | Tools | Standards

1. Linear Static Analysis

Individual Loads
Load Sets
Load Groups
Expand Graph and Histogram

Load Groups	Plots	Category	Point	Parameter	Direction	View	Selection	Type
1..Envelope (IL)	0	Displacement		Absolute	Usun	2. Front View	All Entities	[]
2..Envelope (LS)	0	Stress	Total(AbsMax)	Absolute	Equivalent	2. Front View	All Entities	[]
3..Overall	5	Stress	Total(AbsMax)	Absolute	Equivalent	3. Back View	All Entities	[]
		Stress	Total(AbsMax)	Absolute	Equivalent	4. Front Detail	All Entities	[]
		Stress	Total(AbsMax)	Absolute	Equivalent	5. Back Detail	All Entities	[]

1. Generate | Go To Designer | OK | Cancel

SDC Verifier

Report

Beam to beam connected model

Prepared by: SDC Verifier
+31 15 30-10-310
sdcverifier.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: 30/12/2020

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Results

1..Linear Static Analysis

Individual Loads

In this paragraph the influence of the different separate loads is described.

Individual Load '1..FORCE 1_Node ID Table'
FORCE 1_Node ID Table:SPC_4

Usun (IL, All Entities, v2)

Individual Load Selection	IL1_FORCE 1_Node ID Table	Parameter View	Displacement Usun
All Entities	All Entities	View	2. Front View

www.sdcverifier.com | Prepared by SDC Verifier | SDC Verifier | Prepared for company | Company

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Stress (IL1, All Entities, v5, Total)

Individual Load Selection	IL1_FORCE 1_Node ID Table	Parameter View	Stress Equivalent
All Entities	All Entities	Limits	0. Back Detail

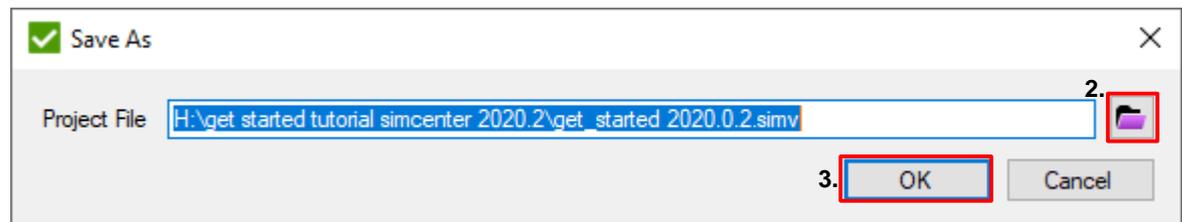
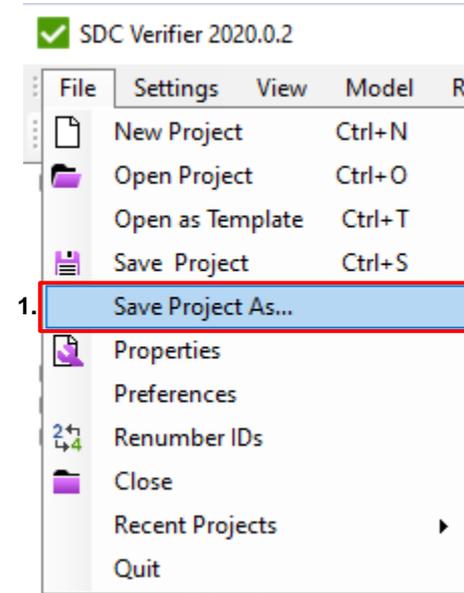
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Save SDC project

1 Execute *File - Save Project As*

2 Press  to browse location and define the filename

3 Press *OK*



Open As Template – solid model

Open As Template features allows to reuse project for similar Simcenter model. In our case a solid model with same boundary conditions

1 Execute *File - Open as Template*.

2 *Template Project: Get_Started_Plate.simv*

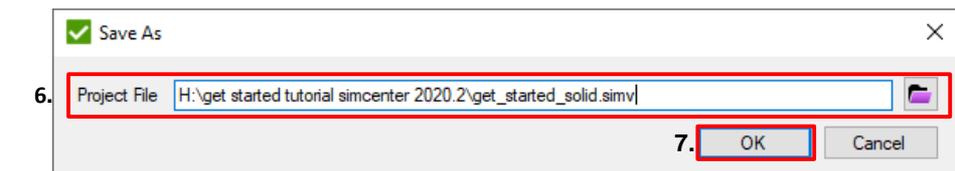
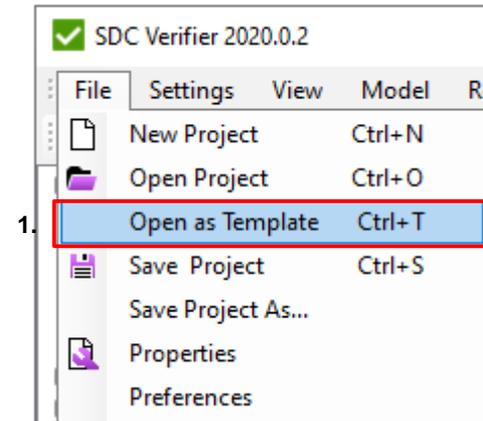
3 *Model File: Get_Started_solid_s.sim*

4 Press *OK*.

5 Execute *File - Save Project as*

6 *Project File: Get_Started_solid.simv*

7 Press *OK*.



Generate report for Solid model

1 Select *Report* in the *Model* tree

2 Execute *Go To Designer* from the context menu

3 Add - Additional Items - Text

4 Title: **Conclusions**

5 Text:

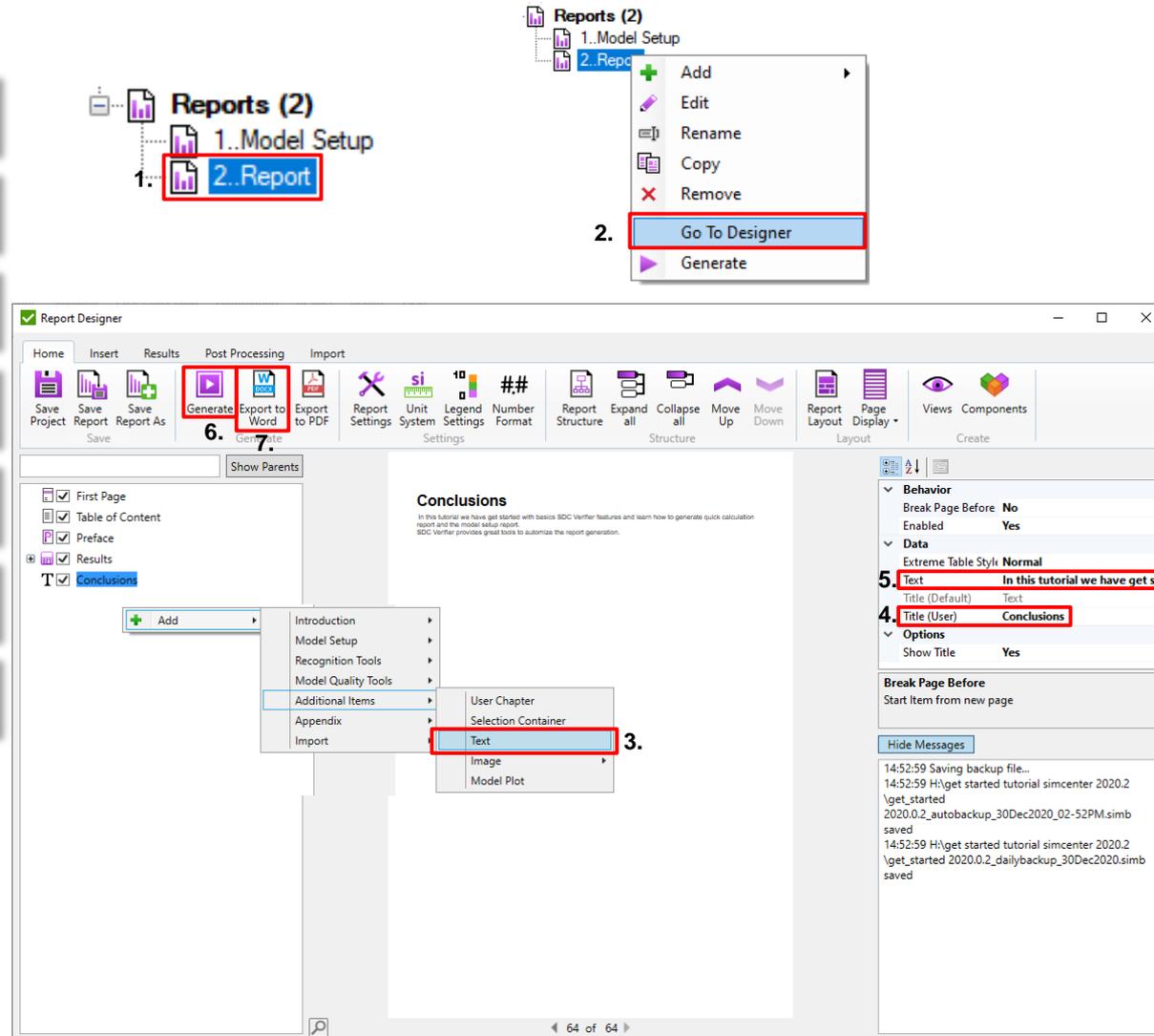
6 Press  to generate report

7 After generation is finished press  to export generated report to Word

Note:

Report Wizard guides you through the steps of building and running the report.

Whereas the Report Designer gives added ability to design your own reports.



1..Model Setup
2..Report

2. Go To Designer

Generate

Report Designer

Home Insert Results Post Processing Import

Save Save Report As Generate Export to Word Export to PDF Report Settings Unit System Legend Number Report Structure Expand Collapse Move Move Report Page Views Views Components

6. Generate 7.

Conclusions

In this tutorial we have get started with basics SDC Verifier features and learn how to generate quick calculation report and this model setup report. SDC Verifier provides great tools to automate the report generation.

Introduction Model Setup Recognition Tools Model Quality Tools Additional Items Appendix Import User Chapter Selection Container Text Image Model Plot

3.

5. Text In this tutorial we have get st

4. Title (User) Conclusions

Options Show Title Yes

Break Page Before Start Item from new page

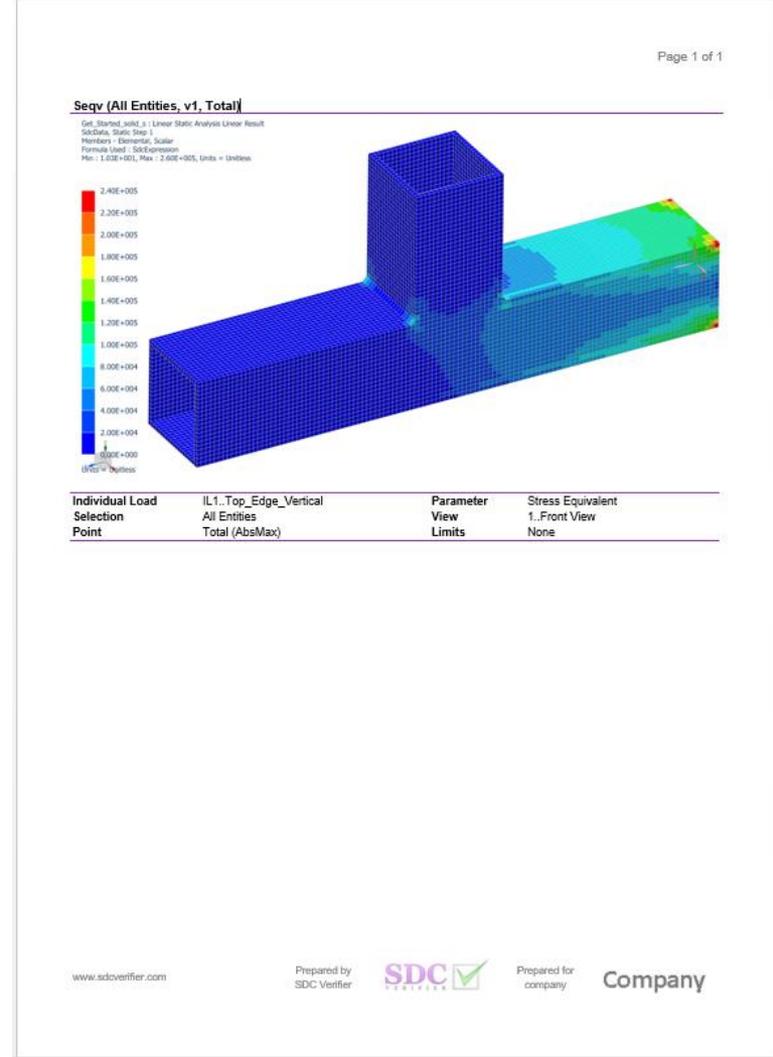
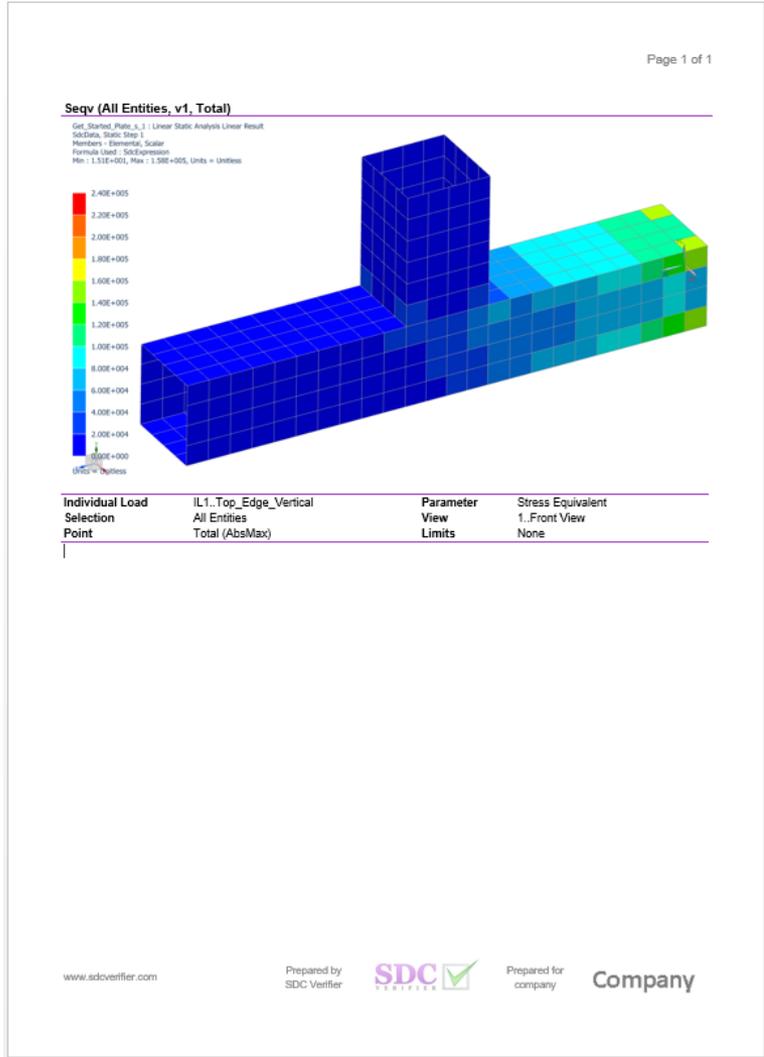
Hide Messages

14:52:59 Saving backup file...
14:52:59 H:\get started tutorial simcenter 2020.2
\get_started
2020.0.2_autobackup_30Dec2020_02-52PM.simb
saved
14:52:59 H:\get started tutorial simcenter 2020.2
\get_started 2020.0.2_dailybackup_30Dec2020.simb
saved

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Comments. Report on the volume model

Equivalent Stress plot is automatically displayed correct for plate and solid model.



Quick Support – remote access to your PC

1 Select *Help - Quick Support Tool*

2 Contact helpdesk by Team Viewer

3 Tell your ID to SDC specialist

Quick Support allows to get remote access to your PC by SDC Verifier specialist to solve your problem. All you need is to send your ID to us:
 by Skype: `sdcverifier_helpdesk`;
 by phone: `+31 15 30-10-310`;
 by email: support@sdcverifier.com

Quick Support tool is standalone program.
 Team Viewer is not required to be installed.

