Compliance Document for Scottsdale Self-Certification (AU Trusses) – V1.2

Self-Certification

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SCOTTSDALE

Introduction

The Compliance Document for Scottsdale Self-Certification (AU Trusses) consists of this Summary and two other documents:

- The Installation Manual (Construction), and
- The Self-Certification User Manual

Both documents are available for registered users of the Scottsdale Knowledge Base.

The Compliance Document for Scottsdale Self-Certification (AU Trusses) (this document) can be found on the Scottsdale Australia website at the following location:

https://www.scottsdalesteelframes.com/assets/entries/self-certification-compliance-document.pdf

SCOTTSDALE

General Information

Software Details

The following applications/modules provide the Scottsdale Self-Certification (AU Trusses) functionality and are incorporated in **Release 25.12.3012.1** of the Scottsdale Software (Release Date: **16th December 2025**).

Note: Scottsdale Self-Certification (AU Trusses) consists of specific functionality/modules/sub-components within the wider Scottsdale Software suite, and is provided by multiple applications (listed below)

Application	Executable	Version Number	Description
N/A	Scottsdale Self-Certification (AU Trusses)	1.1	The Self-Certification functionality version.
ScotSteel	SCSDesign.exe	25.12.3012.4001	ScotSteel is the complete design software package.
ScotEnvironment	SCSEnviro_SC.exe	25.12.3012.2122	Engineering environment configuration software
ScotEngineering	SCSEngineering.exe	25.12.3012.1142	Structural analysis, load generation and member checking for the Australian Standard

Organisation Details

The **Scottsdale Self-Certification (AU Trusses)** functionality is part of the Scottsdale Software Suite, which is produced and distributed by:

Scottsdale Australia Pty Ltd
Unit 4, 5 Henry Street
Loganholme QLD 4129
Australia

Scope and Limitations

Scope

Cold-formed steel trusses using Top Hat and/or C-section for roof and floor.

Limitations

1) Geometrical limits of the buildings must conform to limitations (a) to (e) of the ABCB Protocol for Structural Software as shown below:

   a) The average roof height must be less than 7.25m
   b) The building width, including roofed verandas, must be less than 16.0 m
   c) The building length must be less than 5 times the building width
   d) The roof pitch must not exceed 35°

   The software checks for all the geometric limits and does not allow proceeding with self-certifications if any of them exceed the limit.

   The programme has validation on the building width, length, height, and the roof pitch dimensions. If these limits are exceeded, the software will not allow the user to proceed. It gives the user a warning message as shown in Figure 1. If the dimensions are correct based on the building plan, the user must exit the environment and select the non-self-certification window as shown in Figure 2.

Figure 1 – Self-certification limit validation

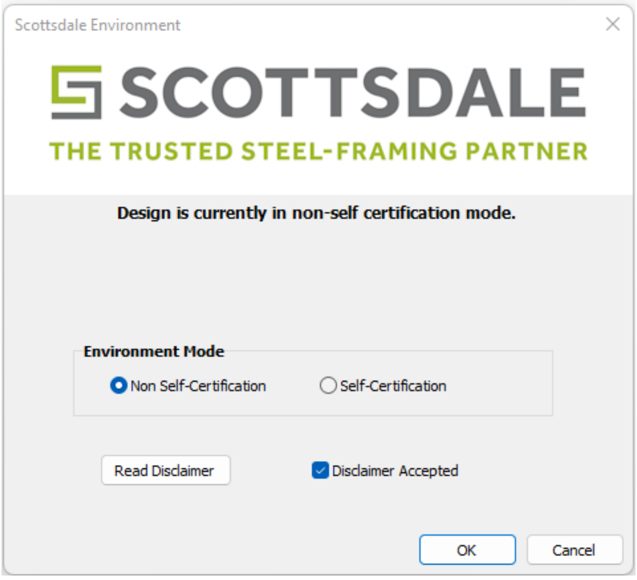


Figure 2 - Non-self-certification selection window

As explained above, if the user enters dimensions outside of the limits, the software will not proceed or create the report. The screenshots below show each limitation with the warning message. Refer to Figures 3 to 6 below.

Figure 3 - Building width validation

Figure 4 - Building length validation

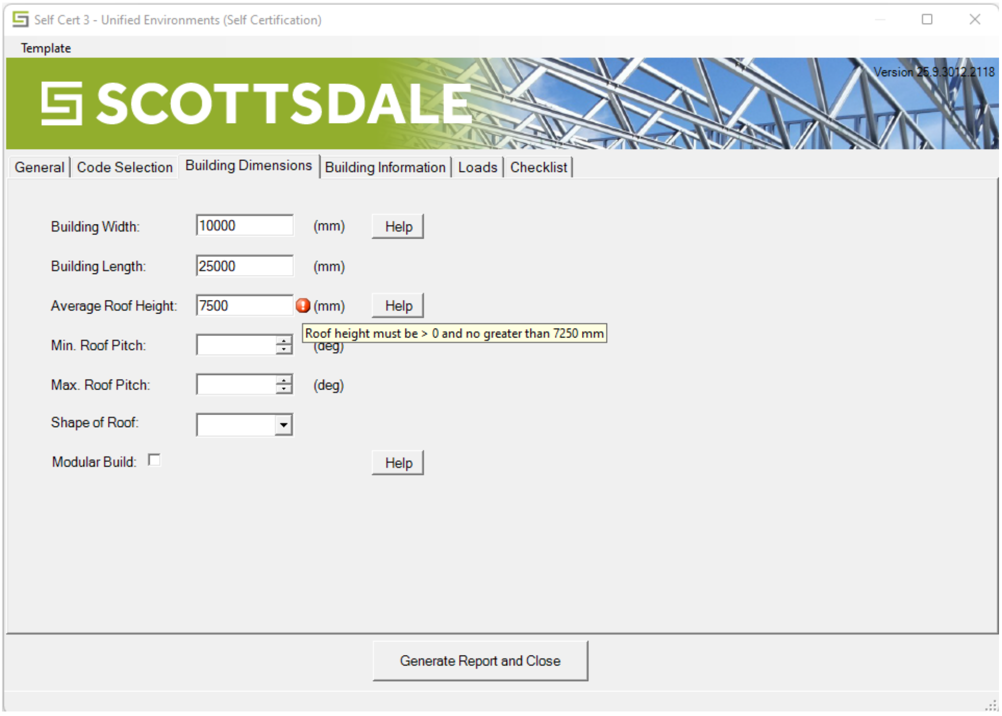


Figure 5 - Building height validation

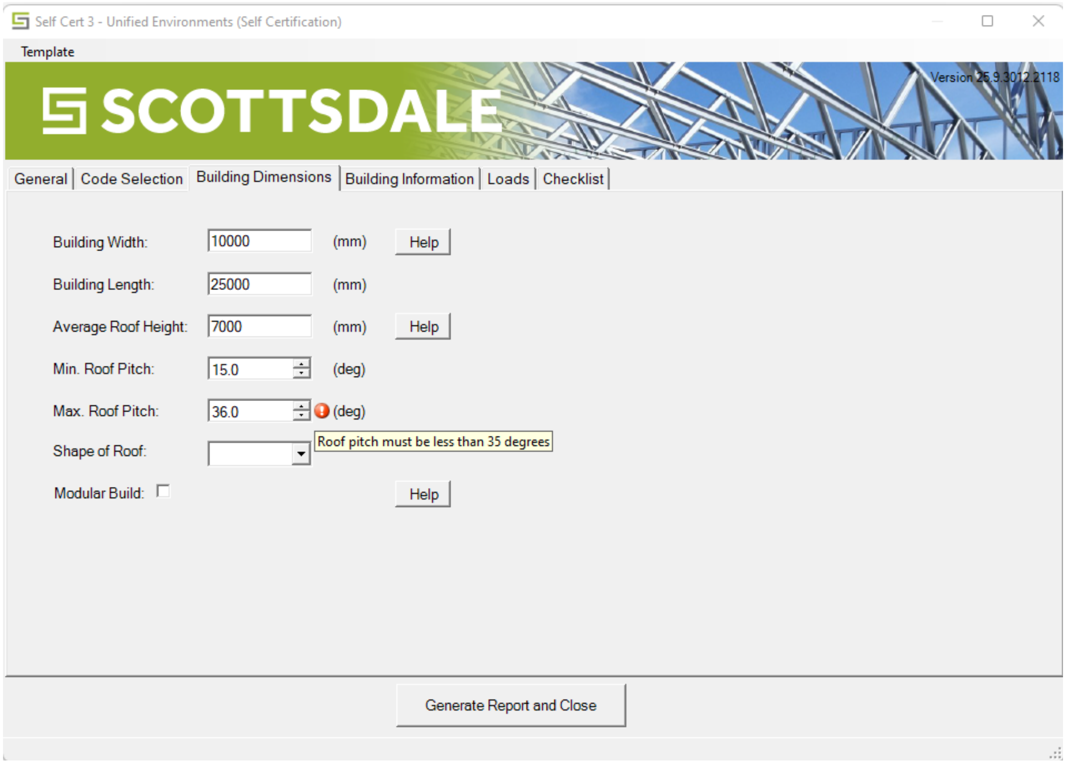
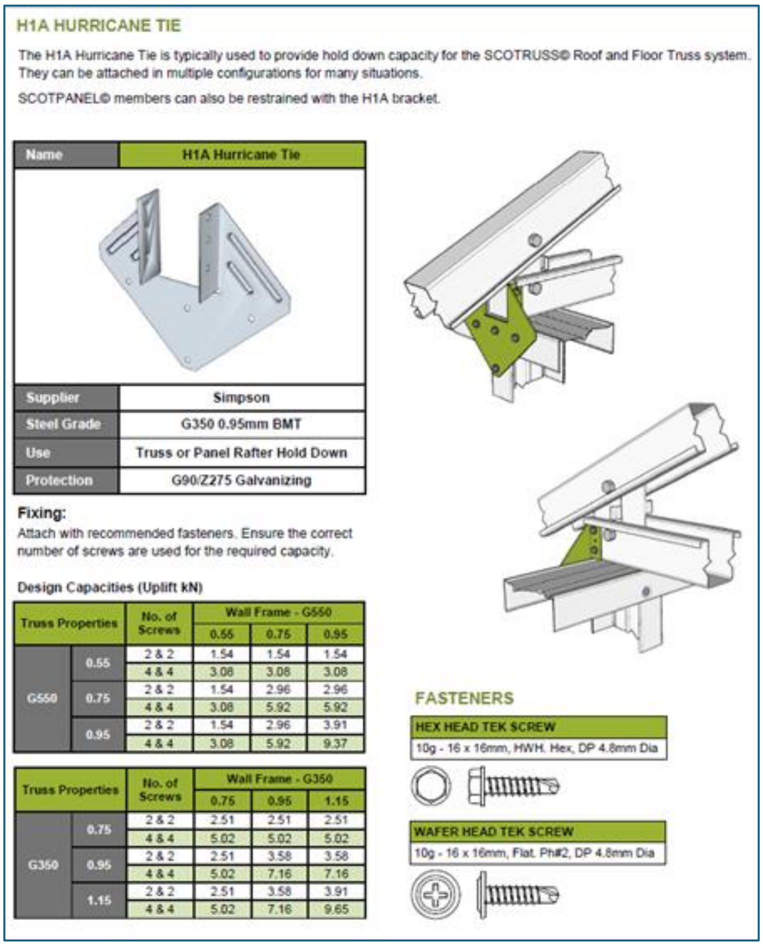


Figure 6 - Roof angle validation

2) The software package is designed to interface with Scottsdale's design software, ScotSteel, and must be used only in this context.

3) The software does not include the tie downs of the trusses, including child trusses to girder trusses. Tie down is not part of the truss software. The software calculates the critical reactions at the support points. These reactions are displayed in the truss output report. The Scottsdale Design Engineering Manual (within the Scottsdale Knowledge Base) provides the tie-down bracketry details, including the number of screws. An example of an H1A Hurricane Tie is shown in Figure 7 below. The recommended tie-down details are provided with the truss output report.



H1A HURRICANE TIE

The H1A Hurricane Tie is typically used to provide hold down capacity for the SCOTRUSS© Roof and Floor Truss system. They can be attached in multiple configurations for many situations.

SCOTPANEL© members can also be restrained with the H1A bracket.

Name	H1A Hurricane Tie
Supplier	Simpson
Steel Grade	G350 0.95mm BMT
Use	Truss or Panel Rafter Hold Down
Protection	G90/Z275 Galvanizing

Fixing:
Attach with recommended fasteners. Ensure the correct number of screws are used for the required capacity.

Design Capacities (Uplift kN)

Truss Properties		No. of Screws	Wall Frame - G550		
			0.55	0.75	0.95
G550	0.55	2 & 2	1.54	1.54	1.54
		4 & 4	3.08	3.08	3.08
	0.75	2 & 2	1.54	2.96	2.96
		4 & 4	3.08	5.92	5.92
	0.95	2 & 2	1.54	2.96	3.91
		4 & 4	3.08	5.92	9.37

Truss Properties		No. of Screws	Wall Frame - G350		
			0.75	0.95	1.15
G350	0.75	2 & 2	2.51	2.51	2.51
		4 & 4	5.02	5.02	5.02
	0.95	2 & 2	2.51	3.58	3.58
		4 & 4	5.02	7.16	7.16
	1.15	2 & 2	2.51	3.58	3.91
		4 & 4	5.02	7.16	9.65

FASTENERS

HEX HEAD TEK SCREW
10g - 16 x 16mm, HWH, Hex, DP 4.8mm Dia

WAFER HEAD TEK SCREW
10g - 16 x 16mm, Flat, Ph#2, DP 4.8mm Dia

Figure 7 - Example Tie Instruction

User Qualification

Users of the software must be:

- Fully trained in accordance with the Scottsdale Training Manual with a Certificate of Completion.
- Fully identified and recognised by Scottsdale as a competent user with experience in construction and/or manufacturing of trusses.
- Fully informed by Scottsdale on any up-to-date enhancements/additions to the software.
- The validity of the certification will last a period of no more than 3 years.

History of Revisions/Updating

The software version number consists of 4 numbers: Year.Month.Major Build.Minor Build.

The last six releases of ScotSteel were:

- 16 December 2025 – Version 25.12.3012.1
- 08 December 2025 – Version 25.12.3012
- 12 May 2025 – Version 25.5.3011.1
- 28 April 2025– Version 25.4.3011
- 16 October 2024– Version 24.10.3010
- 27 August 2024- Version 24.8.3009

Below is the link to the information containing all releases, along with release notes for each version (stored on the Scottsdale Knowledge Base for authorised users):

https://knowledge.scottsdalesteelframes.com/software-releases

Software Features

Referenced Documents

The software is based on information from the following NCC and other referenced documents:

NCC references

- AS-NZS 1170 -Part 0: 2002 General Principles (Incorporating Amendment Nos 1,2,3,4 and 5)
- AS-NZS 1170 -Part 1: 2002 Permanent Imposed and Other Actions (Incorporating amendment Nos 1 and 2-Reconfirmed 2016)
- AS-NZS 1170 -Part 2: 2021 Wind Actions (Incorporating amendment No 1)
- AS 4055: 2021 Wind load for housing (Fourth edition 2021)
- AS-NZS 1170 -Part 3: 2003-Snow and Ice Actions (Incorporating amendment Nos 1 and 2)
- AS/NZS 4600:2018 Cold-formed steel structures
- Building Code of Australia 2022 Volume 1 and 2
- NASH Standard Residential and Low-rise steel framing – Part1 – Design Criteria (2005) – Incorporating Amendment C: September 2011
- NASH Standard Residential and Low-rise steel framing – Part2 – Design Solutions (2014) – Incorporating Amendment A:2015

Other references

- NASH Handbook - Design of Residential and Low-rise Steel Framing 2009

Inputs

Loads

Loads can be entered in the window as shown in Figure 8 below.

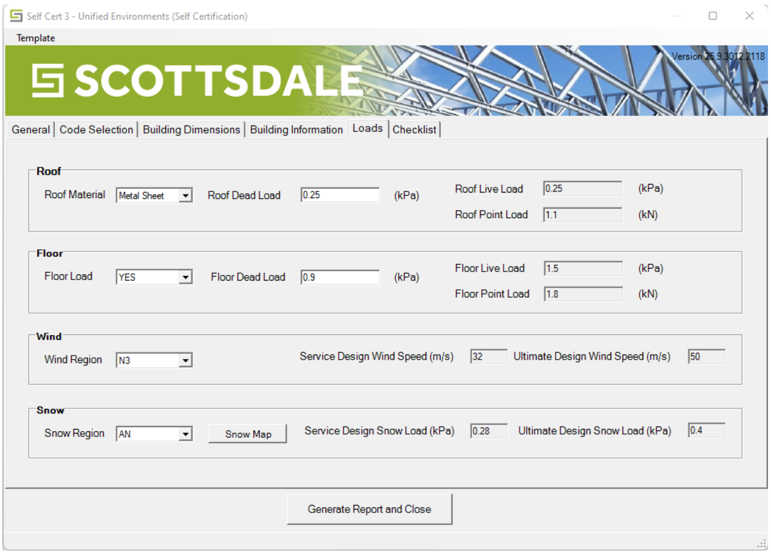


Figure 8 - Load input window

Dead load

- **Roof dead load:** based on the roof material (sheet roof - 0.25 kPa, Tile roof – 0.75 kPa)
- **Ceiling dead load:** Hard Coded as 0.2 kPa
- **Floor dead load:** Hard Coded as 0.9 kPa

Live Load

User can select the building usage from the drop-down list as shown in Figure 9 below. The live load will be automatically determined from the software based on the building usage.

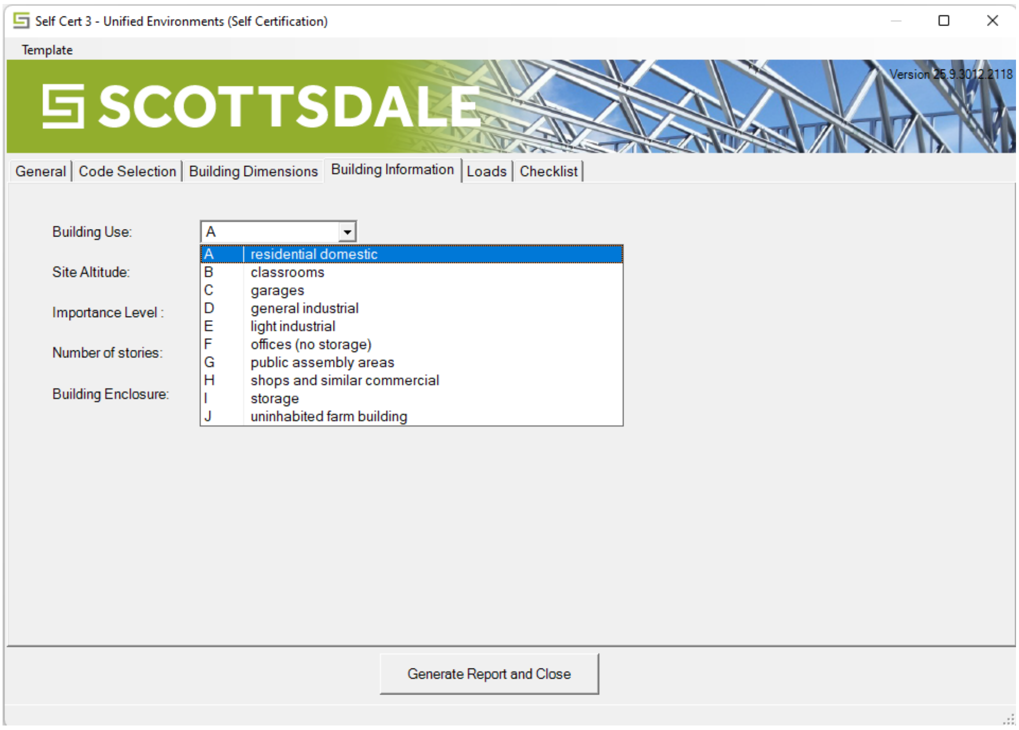


Figure 9 - Building usage selection

- **Roof Live load:** 0.25 kPa
- **Floor Live load:** Will be automatically changed based on the building usage (refer Table 1 below)
- **Roof Point load:** 1.1 kN for residential and 1.4 kN for commercial
- **Floor Point load:** Will be automatically changed based on the building usage (refer Table 1 below)

Building Use		Floor Live (kPa)	Floor Point (kN)
A	Residential	1.5	1.8
B	Classroom	3	2.7
C	Garages	2.5	13
D	General Industrial	5	4.5
E	Light Industrial	3	3.5
F	Offices (no Storage)	3	2.7
G	Public assembly area	4	2.7
H	Shops and similar	4	3.6
I	Storage	7.5	4.5
J	Farm Building	5	4.5

Table 1 - Live Loads Vs. building usage

- **Ceiling Point load:** 1.1 kN when the head height is greater than 1.2 m and 0.9 kN when the clearance is less than 1.2 m

Wind Load

User can select the wind class from the drop-down list (N1 to N6 or C1 to C6). Once user select the wind region, software can determine the design wind velocity based on the hard-coded tables (Figure 10 below) in accordance with AS 4055 -2021 and as shown below.

Table 2.1(A) — Design gust wind speed (V_h) for non-cyclonic Regions A and B

Site wind classification	Design gust wind speed (V_h) at height (h) m/s	
	Serviceability limit state ($V_{h,s}$)	Ultimate limit state ($V_{h,u}$)
N1	26	34
N2	26	40
N3	32	50
N4	39	61
N5	47	74
N6	55	86

Table 2.1(B) — Design gust wind speed (V_h) for cyclonic Regions C and D

Site wind classification	Design gust wind speed (V_h) at height (h) m/s	
	Serviceability limit state ($V_{h,s}$)	Ultimate limit state ($V_{h,u}$)
C1	32	50
C2	39	61
C3	47	74
C4	55	86
NOTE Section 3 may present different pressures for the same wind speed depending on classification.		

Figure 1 - Design gust wind speed

The wind pressure is calculated from the determined design wind velocity. The software detects the wind coefficient based on the average building height, building width, truss length, the roof pitch, and the truss shape.

Snow Load

User can select the snow region from the drop-down list as “N/A, AN, AC, AS and AT” and enter the site elevation under the building information. Based on the snow region and the elevation, the software can calculate the ground snow load as shown in Figure 11 below.

SNOW CALCULATION	
region	AN
elevatation above sea level, (m)	900
ground snow load, (kPa)	0.4
Exposure Reduction Coefficient	1
service snow load, (kPa)	0.28
ultimate snow load, (kPa)	0.4

Figure 2 - Snow load calculation

The software can calculate all the possible scenarios of applied snow load on the truss by considering the roof pitch/truss shape. There are four different snow load cases as shown in Figure 12 below.

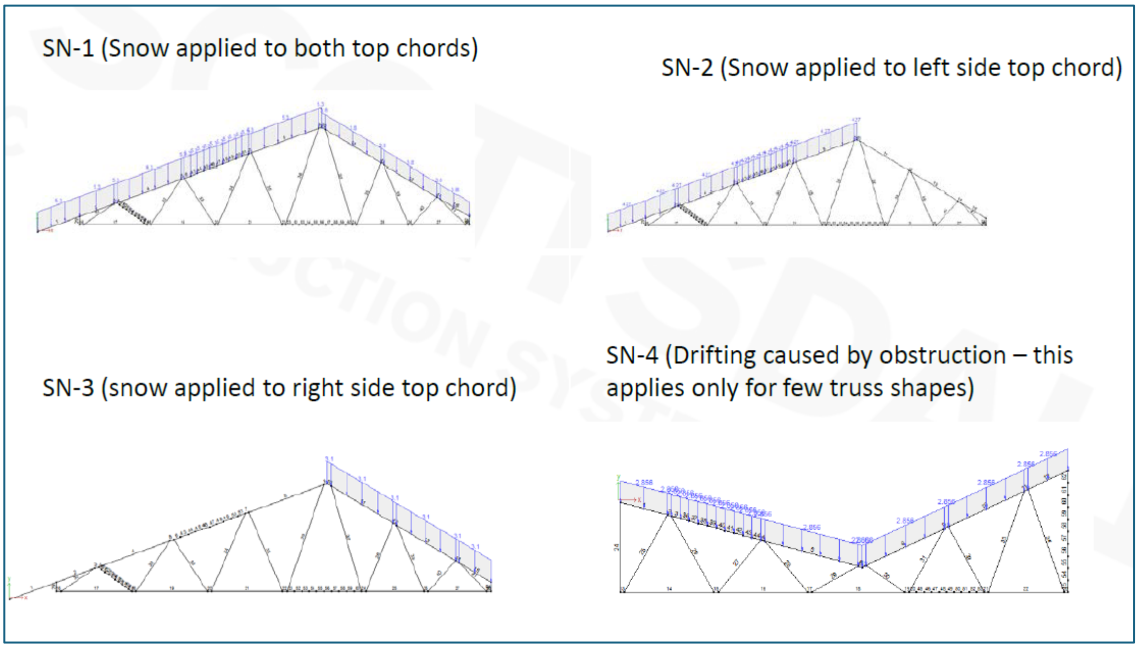


Figure 3 - Snow load display

Load combinations

Serviceability Design

Serviceability Design is conducted to check the deflection of the truss nodes. Following deflection limits are considered.

For roof

- Dead = Span/300 or 12 mm, whichever is the minimum
- Live = Span/250
- Wind = Span/150

For floor

- Dead = Span/300 or 12 mm, whichever is the minimum
- Live = Span/250

The following loads are considered in the software.

1) Dead Load
   a) Roof - Roof dead load + ceiling dead load
   b) Floor - Floor dead load + ceiling under floor
2) Live Load
   a) Roof - Roof live load + ceiling live load
   b) Floor - Floor live load + ceiling under floor live load (ceiling live load is considered as zero)
3) Snow Load - Applied only on roof trusses

Snow load is calculated as per the section 3.2.1.4 given above and applied as 4 separate cases SN-1 to SN-4.

4) Wind Load - Applied only on roof trusses
Wind loads are calculated by determining both external and internal coefficients. Both upward and downward loads are calculated. External wind loads are calculated by considering 4 different directions, as shown in Figure 13 below. WE and EW load cases represent the wind loads along the truss in both directions. NS load case represents the wind load across the truss by considering the truss as an edge truss. So that NS wind load gives the highest uplift load on the truss. The SN load case is also for the crosswind, and the truss will be at the far end of the building. This load case gives the maximum downward load. Internal load is calculated by considering non-cyclonic and cyclonic conditions.

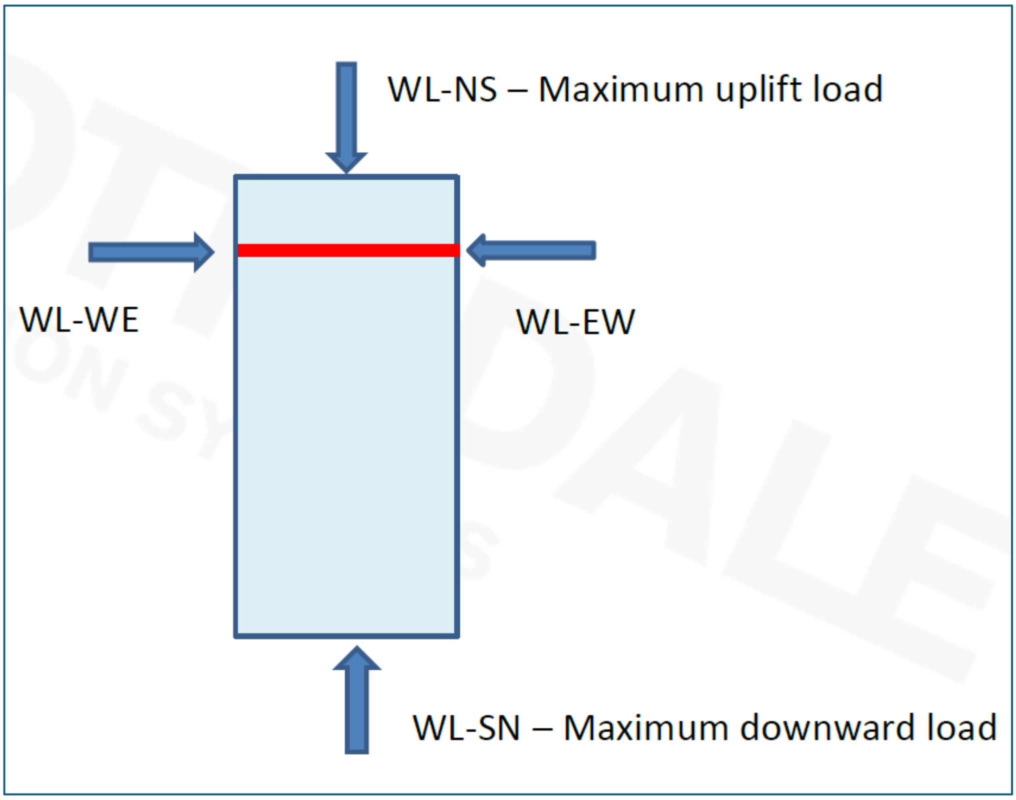


Figure 4 - Wind direction

External and internal wind loads are then combined to get the service wind load cases as shown in Table 2 below. The software applies all the specified wind combinations and determines the critical deflection values.

The table below shows the wind load external and internal combinations by considering all 4 directions specified in Figure 13 above. It combines External uplift + Internal uplift, External uplift + internal downwind, External downwind + internal uplift, and External downwind + internal downwind for all the directions

WL-WE1	WL-WE2	WL-EW1	WL-EW2	WL-NS1	WL-SN1	WL-IP1	WL-IP2	WL-IP3	WL-IP4
1	0	0	0	0	0	1	0	0	0
1	0	0	0	0	0	0	1	0	0
0	1	0	0	0	0	1	0	0	0
0	1	0	0	0	0	0	1	0	0
0	0	1	0	0	0	1	0	0	0
0	0	1	0	0	0	0	1	0	0
0	0	0	1	0	0	1	0	0	0
0	0	0	1	0	0	0	1	0	0
0	0	0	0	1	0	0	0	1	0
0	0	0	0	1	0	0	0	0	1
0	0	0	0	0	1	0	0	1	0
0	0	0	0	0	1	0	0	0	1

Table 2 - SLS load combinations

Ultimate Design

- Roof Trusses
    - 1.35 Dead = 1.35 X (Roof dead load + ceiling dead load)
    - 1.2 Dead + 1.5 Live = 1.2 X (Roof dead load + ceiling dead load) + 1.5 X (Roof live load + ceiling live load)
    - 1.2 Dead + 1.5 Point Load = 1.2 X (Roof dead load + ceiling dead load) + 1.5 X (Roof point load)
    - 1.2 Dead + Snow = 1.2 X (Roof dead load + ceiling dead load) + (Snow load on roof)
    - 1.2 Dead + Wind = 1.2 X (Roof dead load + ceiling dead load) + (External wind load + internal wind load)
    - Wind - 0.9 Dead = (External wind load + internal wind load) - 0.9 X (Roof dead load + ceiling dead load)
- Floor Trusses
    - 1.35 Dead = 1.35 X (Floor dead load + ceiling under floor dead load)
    - 1.2 Dead + 1.5 Live = 1.2 X (Floor dead load + ceiling under floor dead load) + 1.5 X (Floor live load)
    - 1.2 Dead + 1.5 Point Load = 1.2 X (Floor dead load + ceiling under floor dead load) + 1.5 X (Floor point load)

Note: More details about the load combinations are available in the documents "LoadCombinations_SLS" and "LoadCombinations_ULS" which are attached below.

RoofTruss_LoadCombinations_SLS.csv FloorTruss_LoadCombinations_ULS.csv FloorTruss_LoadCombinations_SLS.csv RoofTruss_LoadCombinations_ULS.csv

Analysis and Design

Load application

Uniformly distributed loads are applied to the top and bottom chords as required.

A concentrated load is applied on the centre of every member, one at a time. This applies to both the top and the bottom chord of the truss between nodal points. Concentrated load is combined with dead loads (1.2 Dead Load + 1.5 Point Load). The software determines the induced forces with this load. Figures 14 and 15 below show the typical position of a concentrated load on the main member and the joint, respectively.

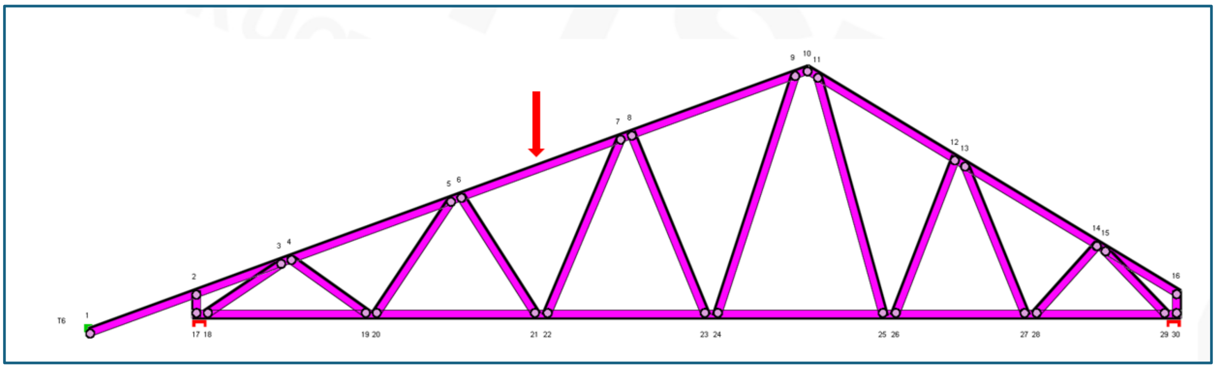


Figure 5 - Concentrated load on the main Top Chord panel member. Applied at the centre of the member

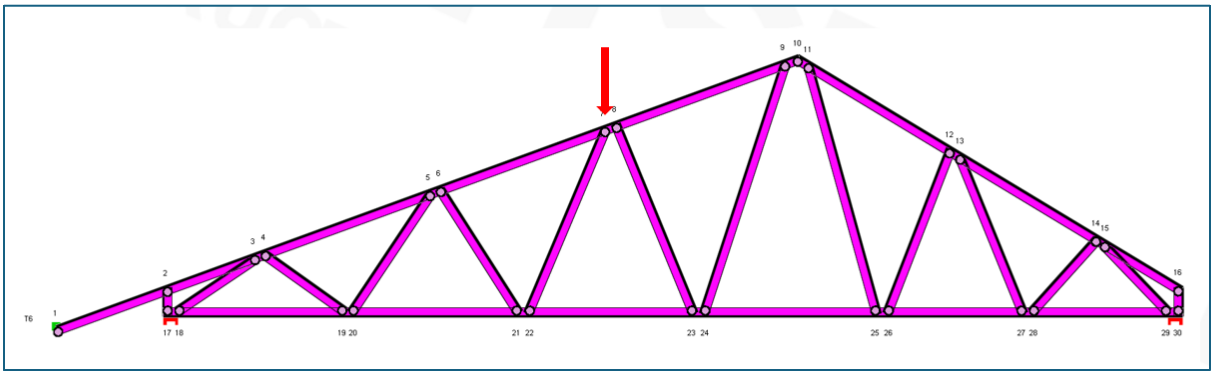


Figure 6 - Concentrated load on the Top Chord joint. Applied at the centre of the joint

Member section details

The most common sections of the truss can be seen from Tables 3 and 4 below.

Designation	Depth (mm)	Web Width internal (mm)	Flange width (mm)	Lip depth (mm)	Radius	Feed width (mm)	Thickness (BMT) (mm)	Grade
6050/0.75/G350	51	39	14	7	2	173	0.75	G350
6050/0.95/G350							0.95	G350
6050/1.15/G350							1.15	G350
6050/0.55/G550	51	39	14	7	2	173	0.55	G550
6050/0.75/G550							0.75	G550
6050/0.95/G550							0.95	G550
6075/0.75/G550	77	39	14	7	2	224	0.75	G550
6075/0.95/G550							0.95	G550
6075/1.15/G350							1.15	G350
6075/0.95/G350	77	39	14	7	2	224	0.95	G350
6075/1.15/G350							1.15	G350

Table 3 - Top-hat sections

Designation	Stud depth (mm)	Flange width (mm)	Lip depth (mm)	Web stiffener distance (mm)	Corner web stiffener offset (mm)	Corner radius	Feed width (mm)	Thickness (BMT)) (mm)	Grade
C63_37/0.55/G550	63	37	7.5	25	1	2	143	0.55	G550
C63_37/0.75/G550								0.75	G550
C63_37/0.95/G550								0.95	G550
C63_37/0.75/G350								0.75	G350
C70_37/0.55/G550	70	37	7.5	25	1	2	153	0.55	G550
C70_37/0.75/G550								0.75	G550
C70_37/0.95/G550								0.95	G550
C76_37/0.55/G550	76	37	7.5	25	1	2	156	0.55	G550
C76_37/0.75/G550								0.75	G550
C76_37/0.95/G550								0.95	G550
C90_37/0.75/G350	90	37	7.5	25	1	2	173	0.75	G350
C90_37/0.95/G350								0.95	G350
C90_37/1.15/G350								1.15	G350
C90_37/0.55/G550	90	37	7.5	25	1	2	173	0.55	G550
C90_37/0.75/G550								0.75	G550
C90_37/0.95/G550								0.95	G550
C90_47/0.75/G350	90	46	10	25	2	2	190	0.75	G350
C90_47/0.95/G350								0.95	G350
C90_47/1.15/G350								1.15	G350
C90_47/0.75/G550	90	46	10	25	2	2	190	0.75	G550
C90_47/0.95/G550								0.95	G550
C140_48/0.75/G350	140	46	10	46	1	2	244	0.75	G550

C140_48/0.95/G350								0.95	G550
C140_48/1.15/G350								1.15	G350
C140_48/0.75/G550	140	46	10	46	1	2	244	0.75	G550
C140_48/0.95/G550								0.95	G550

Table 4 - Lipped channel sections (C-section)

The geometries of the top-hat sections are shown in Figure 16, while Figure 17 shows the details of C-sections.

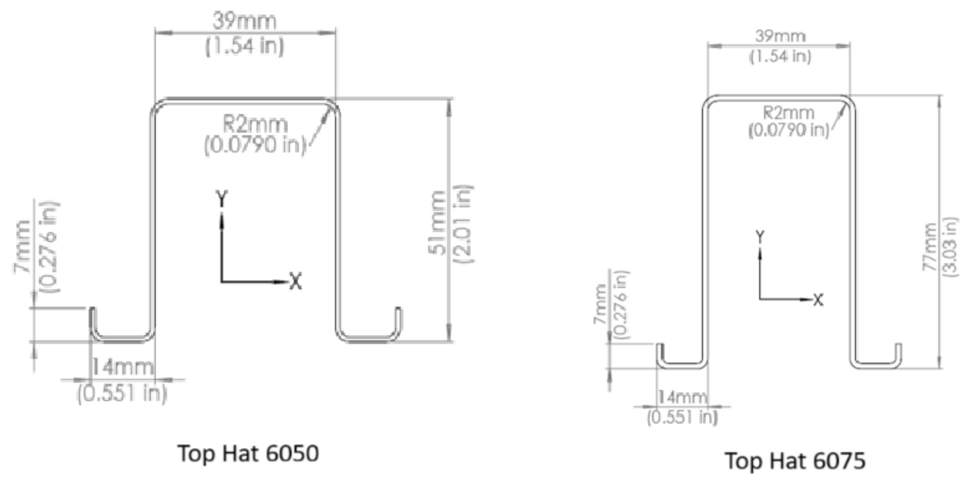


Figure 7 - Top-hat section geometries used in ScotSteel software

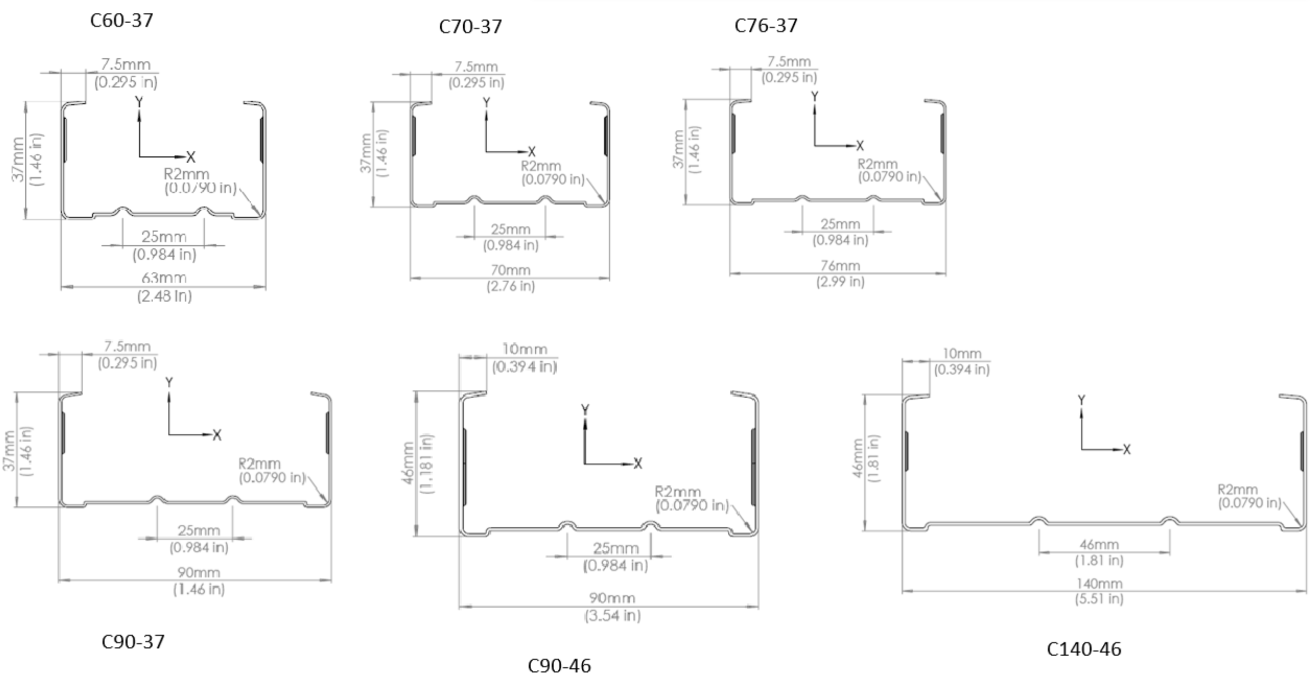


Figure 8 - Lipped channel section geometries used in ScotSteel software

Structural analysis

Structural analysis of the truss is carried out using the finite element analysis technique with beam elements. The beam element considered for the analysis consists of an element connected by two nodes. Each node in the element has three degrees of freedom, which include translation along two axes and rotation about one axis. The cross-section considered for analysis is constant throughout the analysis. The Analyser uses a standard Cholesky matrix decomposition as shown in Eq.(1) so that the entire truss is reduced to a solvable series of simultaneous equations that do not require the loads to be present. These loads can then be applied separately without repeating the decomposition of the structural assembly. This method is rapid, stable, and almost always converges. The trusses can be determinate or statically indeterminate. The Analyser is independent of the number of load cases and can be specifically tailored to suit various code requirements.

$$A = LL^T \quad (1)$$

Where:

- L = given matric
- LT = transpose of the matrix

Firstly, the software selects a truss based on an inbuilt prioritising algorithm wherein trusses of a similar shape carrying the same loads are grouped and analysed. Then the design of the corresponding trusses takes place based on the selected code of practice. The order of analysis also identifies the prerequisite trusses that need to be analysed in case of multiple auxiliary trusses connected to a main truss (e.g. Analysis of a Girder truss).

Design

If the building dimensions are within the limits of the self-certification requirements, the design will pass self-certification, and the user can proceed with the engineering. Otherwise, it will give a warning message and will not allow the user to proceed with the self-certification.

In the design software, when you engineer the trusses and they all pass, the summary window will pop up and the trusses become green as shown in Figure 18 below, to show the user they have passed:

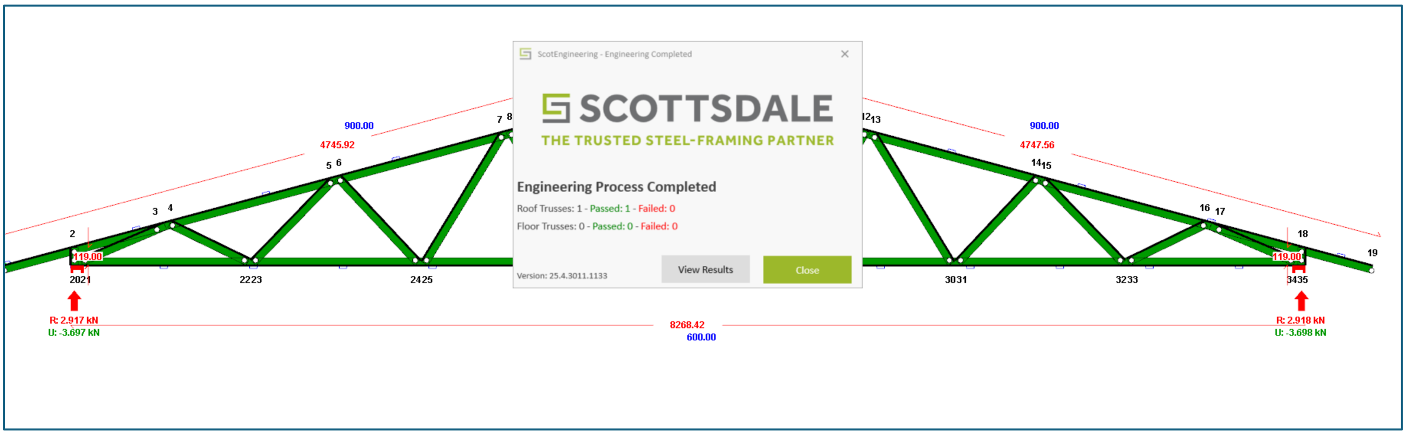


Figure 18 - Truss with passed status

If the design is not satisfactory, a pop-up window will appear advising of the failure, and the truss will turn red as shown in Figure 19 below. The user can then add more web members, select a thicker section, or add more trusses by reducing the spacing until the truss passes.

Figure 19 - Truss with failed status

Options for structural detail input

The members/sections are selected for roof trusses or floor trusses from the dropdown list, as shown in Figure 20 below. This list is established in accordance with AS/NZS 4600 by computing the capacities based on the effective width method. Software checks all the capacities like bending, shear, axial and combinations of them.

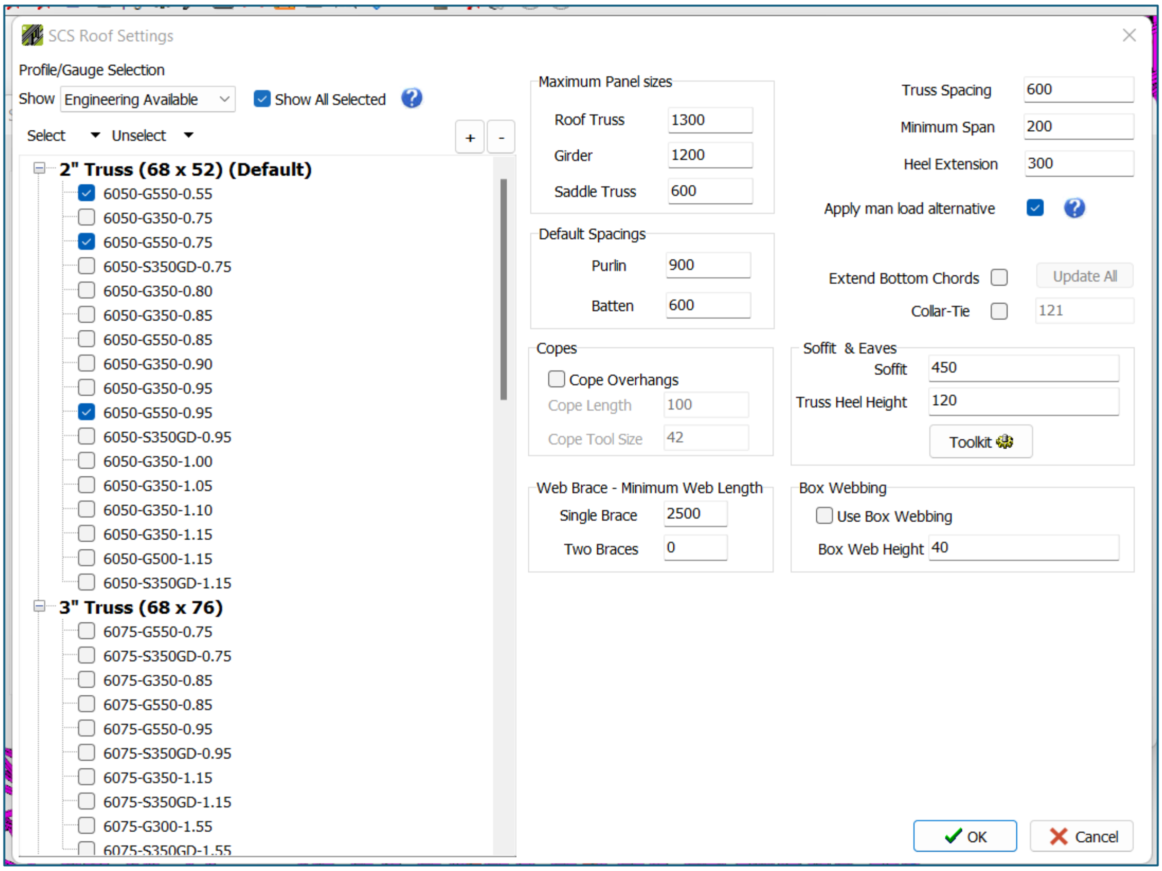


Figure 9 - Scottsdale sections from the project properties

The selected sections appear under the truss profile as shown in Figure 21 below:

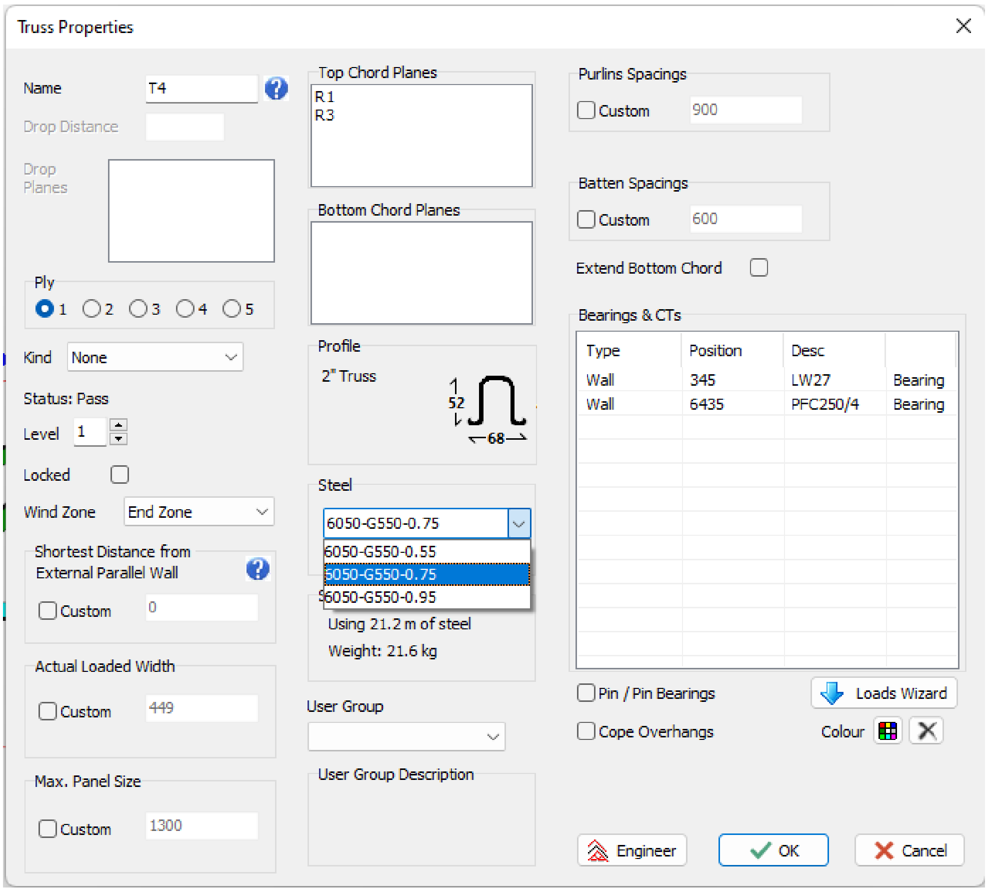


Figure 10 - Scottsdale truss properties

The software first analyses and conducts the design check from the thinnest/weakest section. It is then stepped up to the next stronger section if the first one fails. The whole truss is then analysed and checked for the second section.

E.g., For the truss, it will analyse and check for 0.55 mm thick steel first. If it fails, the whole truss is automatically changed to 0.75 mm thick steel and then analysed and designed for 0.75 mm steel. If it passes, the software displays the results; otherwise, will move to the next thickness.

If the user wants to select only one section, they can select the section and lock it as shown in Figure 22. This will apply only to the selected truss/trusses.

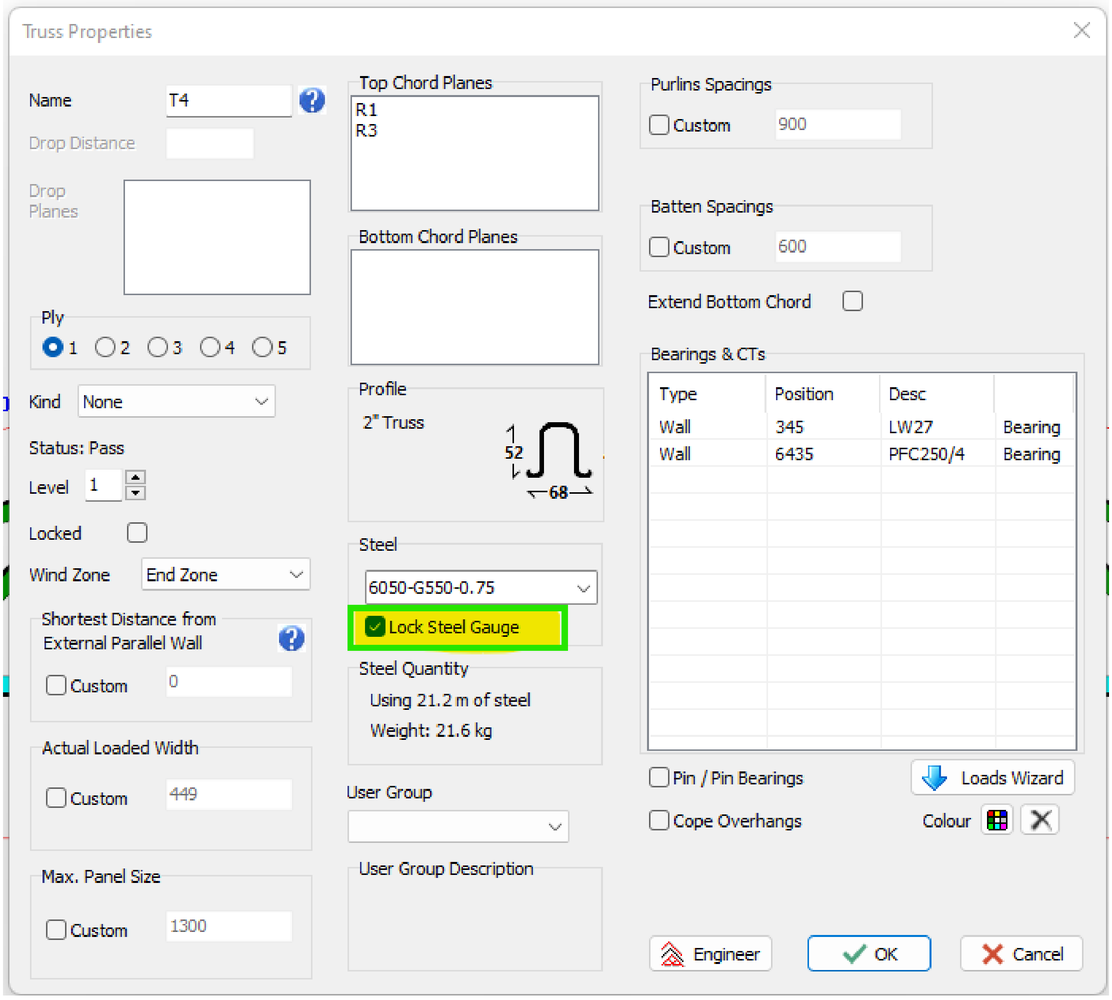


Figure 11 - Truss properties with locked section

Once it completes the analyses and design, the software will show a brief summary (pass or fail) and change the colour based on the truss status, as shown in Figures 23 and 24.

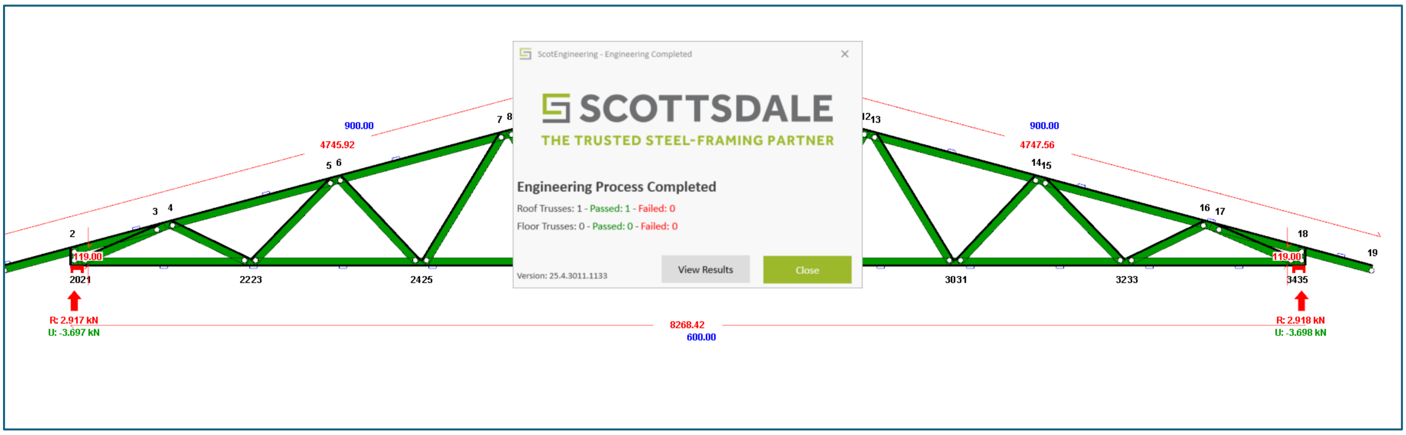


Figure 12 - Green – Pass

Figure 13 - Red - Fail

The user can see the colour coding of the truss to see where the failure is, as given in Figure 25 below.

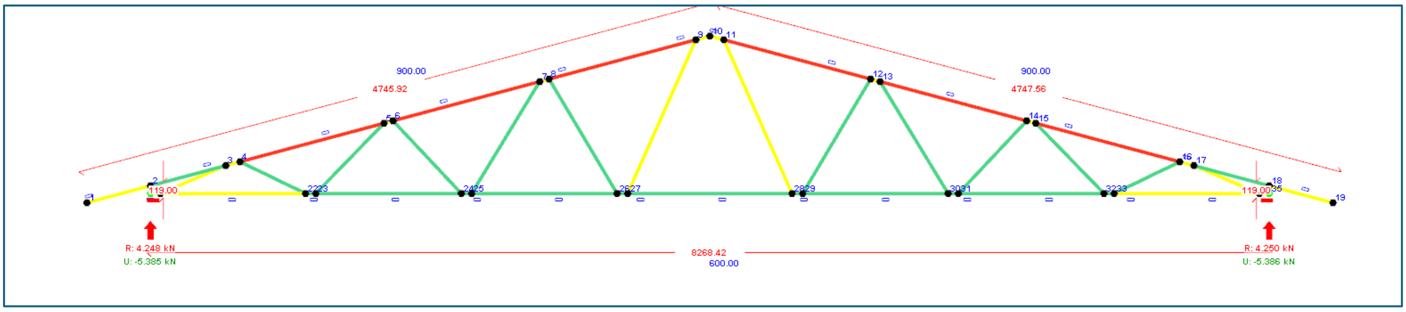


Figure 14 – Truss Colour Coding

The colour coding is based on the critical ratio of the member as shown in Figure 26 below.

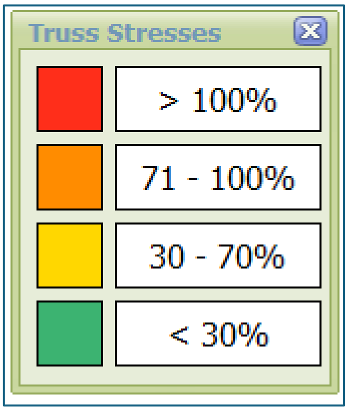


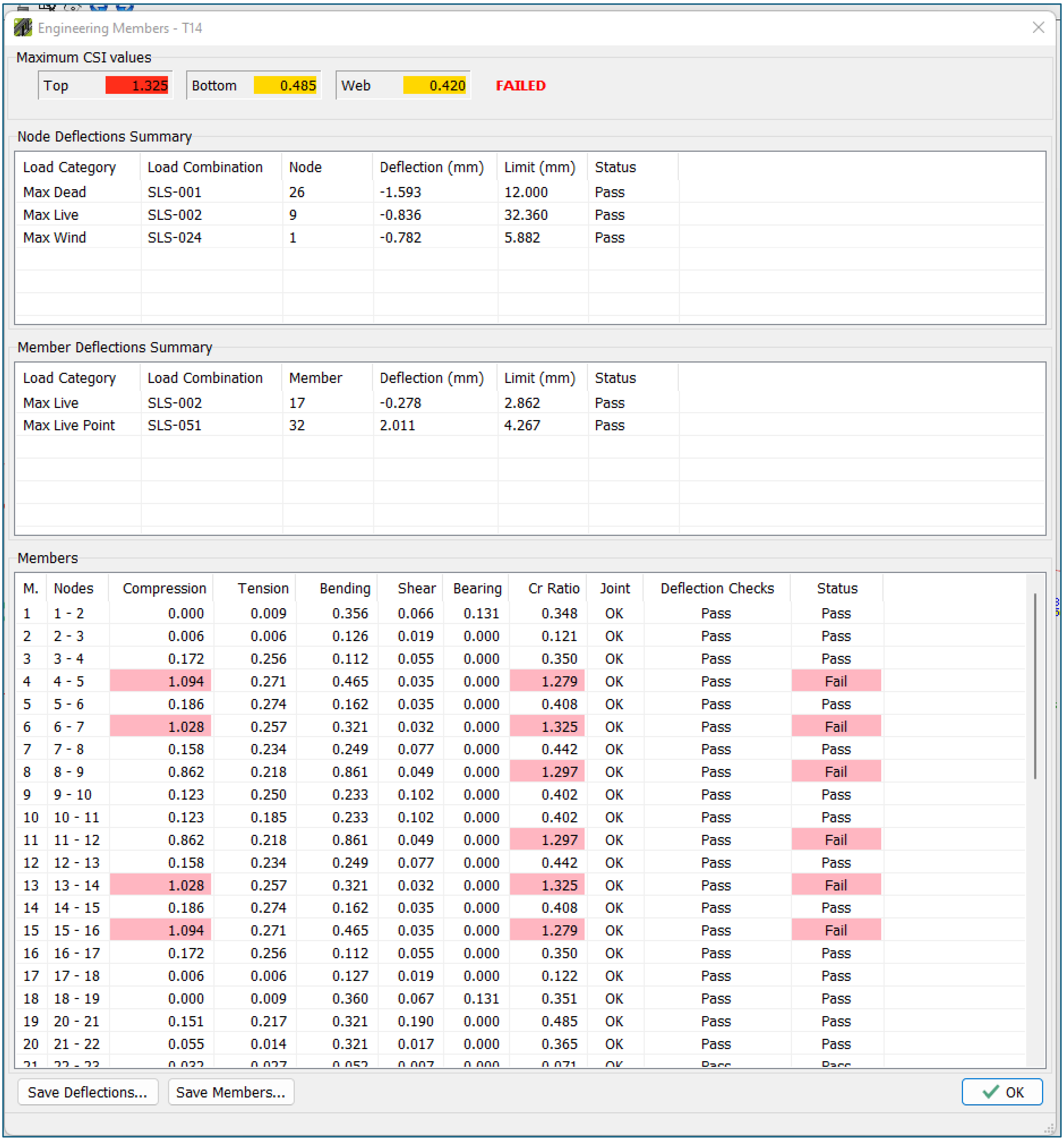
Figure 15 - Truss stress ratios

Green, yellow, and orange – the member is stronger than the applied forces.

- Green – the induced forces are less than 30% of the capacity of the member.
- Yellow – the induced forces are higher than 30% and less than 70% of the capacity of the member.
- Orange – the induced forces are higher than 70% and less than 100% of the capacity of the member.

- Red – the member is weak and needs to be redesigned.

The software will then show the truss summary, with member-by-member critical ratios. It shows whether the trusses pass or fail. It shows the maximum ratio for the top chord, bottom chord, and web member. It also displays the maximum deflection with the allowable limits as shown in Figure 27 below.



Engineering Members - T14

Maximum CSI values

Top	Bottom	Web	
1.325	0.485	0.420	FAILED

Node Deflections Summary

Load Category	Load Combination	Node	Deflection (mm)	Limit (mm)	Status
Max Dead	SLS-001	26	-1.593	12.000	Pass
Max Live	SLS-002	9	-0.836	32.360	Pass
Max Wind	SLS-024	1	-0.782	5.882	Pass

Member Deflections Summary

Load Category	Load Combination	Member	Deflection (mm)	Limit (mm)	Status
Max Live	SLS-002	17	-0.278	2.862	Pass
Max Live Point	SLS-051	32	2.011	4.267	Pass

Members

M.	Nodes	Compression	Tension	Bending	Shear	Bearing	Cr Ratio	Joint	Deflection Checks	Status
1	1 - 2	0.000	0.009	0.356	0.066	0.131	0.348	OK	Pass	Pass
2	2 - 3	0.006	0.006	0.126	0.019	0.000	0.121	OK	Pass	Pass
3	3 - 4	0.172	0.256	0.112	0.055	0.000	0.350	OK	Pass	Pass
4	4 - 5	1.094	0.271	0.465	0.035	0.000	1.279	OK	Pass	Fail
5	5 - 6	0.186	0.274	0.162	0.035	0.000	0.408	OK	Pass	Pass
6	6 - 7	1.028	0.257	0.321	0.032	0.000	1.325	OK	Pass	Fail
7	7 - 8	0.158	0.234	0.249	0.077	0.000	0.442	OK	Pass	Pass
8	8 - 9	0.862	0.218	0.861	0.049	0.000	1.297	OK	Pass	Fail
9	9 - 10	0.123	0.250	0.233	0.102	0.000	0.402	OK	Pass	Pass
10	10 - 11	0.123	0.185	0.233	0.102	0.000	0.402	OK	Pass	Pass
11	11 - 12	0.862	0.218	0.861	0.049	0.000	1.297	OK	Pass	Fail
12	12 - 13	0.158	0.234	0.249	0.077	0.000	0.442	OK	Pass	Pass
13	13 - 14	1.028	0.257	0.321	0.032	0.000	1.325	OK	Pass	Fail
14	14 - 15	0.186	0.274	0.162	0.035	0.000	0.408	OK	Pass	Pass
15	15 - 16	1.094	0.271	0.465	0.035	0.000	1.279	OK	Pass	Fail
16	16 - 17	0.172	0.256	0.112	0.055	0.000	0.350	OK	Pass	Pass
17	17 - 18	0.006	0.006	0.127	0.019	0.000	0.122	OK	Pass	Pass
18	18 - 19	0.000	0.009	0.360	0.067	0.131	0.351	OK	Pass	Pass
19	20 - 21	0.151	0.217	0.321	0.190	0.000	0.485	OK	Pass	Pass
20	21 - 22	0.055	0.014	0.321	0.017	0.000	0.365	OK	Pass	Pass
21	22 - 23	0.032	0.027	0.052	0.007	0.000	0.071	OK	Pass	Pass

Save Deflections... Save Members... OK

Figure 16 - Truss status with CR ratios

Figure 28 shows the colour coding of the members. The user can identify which members are failed, as shown in red, and can then modify the truss to make it pass. Once modified, the truss becomes un-engineered, and the user will need to re-engineer it.

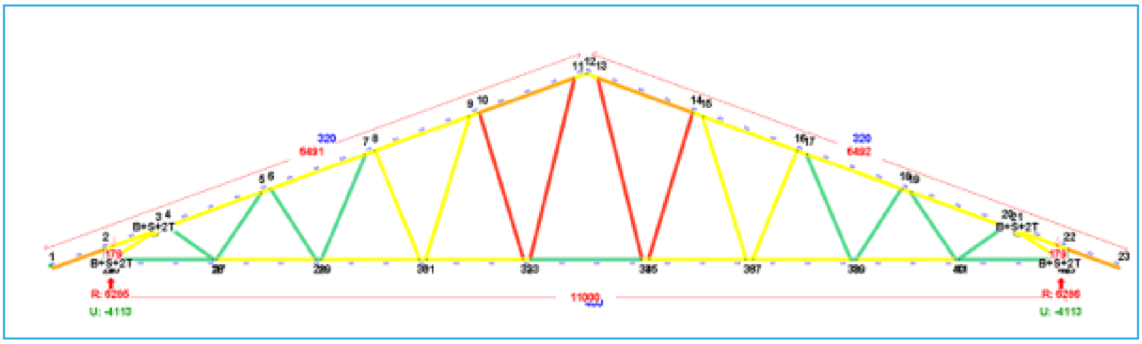


Figure 28 - Colour coding of a failure truss

Web members are failing in this truss. So the user can change the thickness, change the webbing configuration, or add a web brace as shown in Figure 29 and re-engineer it. Truss now passes.

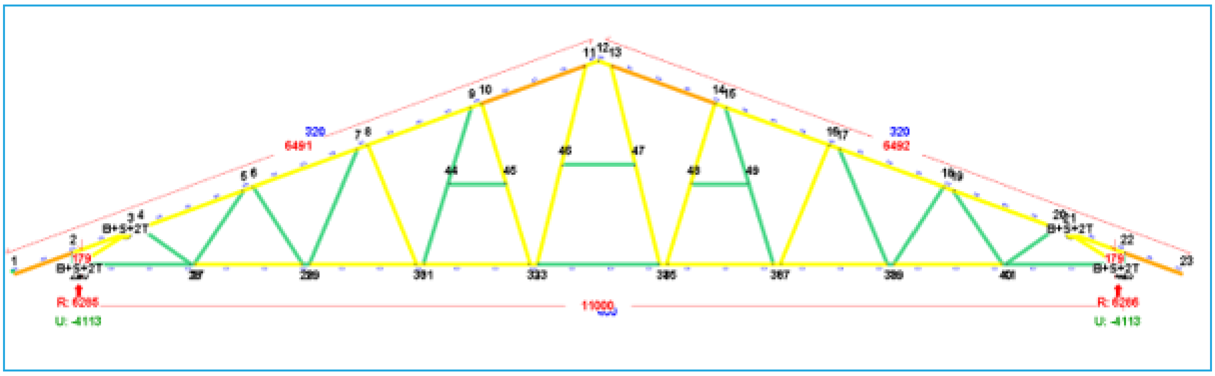


Figure 29 - Colour coding with a truss pass

Connections – The connection capacities are calculated based on the test results. Two different connection types are used, as shown below for the selected section type.

- C-section trusses
    - 2 Rivets
    - 2 Rivets + 2 TEKs
    - 2 Rivets + 4 TEKs
- Top hat trusses
    - Bolt
    - Bolt + Spacer
    - Bolt + Spacer + 2 TEKs
    - Bolt + Spacer + 4 TEKs
- Rivet is 4.8 mm diameter standard rivet

- TEK is 4.8 mm TEK screw
- Bolt is 9.5 mm diameter bolt

Connections are checked and designed for the critical induced axial force at the connection. The checking starts with the strongest connection and progresses to the weakest one until failure has occurred. Once it has failed, it is automatically moved to the previous stronger connection to display the results. As an example, for top hat trusses, it will always start with Bolt + Spacer + 4 TEKs. If it passes only, it moves to Bolt + Spacer + 2TEKs and then to the Bolt + Spacer. If the Bolt + Spacer fails, the design connection will be Bolt + Spacer + 2 TEKs.

Outputs

Description of the information that will be provided for regulatory approval:

The documents below shall be submitted for approval

1) Architectural plans including dimensions (By customer)
2) Environmental output (generated from SCS software)
3) Project layouts (generated by the user from SCS software)
4) Truss PDF output (generated by SCS software)
5) Tie down documentation (generated from SCS software)
6) Scottsdale Certification (generated from SCS software)

The following section describes the Environmental output generated by the software.

SCOTTSDALE

SCOTTSDALE THE TRUSTED STEEL-FRAMING PARTNER Version 25.4.3011.2113	Project Name	MODEL 1	Project No.	MOD 1
	Address			
	Company	SCS		
	Detailer	Ashley	Certificate No.	123456
	Reference	Model 1 - Unified Environments (Self Certification)		

Disclaimer

Disclaimer

Scottsdale Truss Self-Certification (Scottsdale Certification) assists skilled building design professionals certify truss designs created using ScottSteel. Scottsdale Certification is not a substitute for professional judgement or independent enquiry, analysis, review, testing, calculations or other activities a skilled building design professional would be expected to make in the circumstances.

To the maximum extent permitted by law, Scottsdale disclaims any and all liability and is released from any claims in connection with Scottsdale Certification where there has been an over reliance on ScottSteel by the designer, including where the designer has failed to take a professional level of diligence and care with the design of any trusses or checking of relevant engineering calculations.

SELF CERTIFIED FOR TRUSSES ONLY

BUILDING DATA	
country code	AU
wind code	AS/NZS 1170.2-2021 and AS 4055
building use (code)	A
importance level	2
annual prob. of exceedence - wind, (1/x)	500
annual prob. of exceedence - snow, (1/x)	150
annual prob. of exceedence - EQ, (1/x)	500
building length, (mm)	25480
building width, (mm)	8270
roof type	Hip
max. roof pitch, (deg)	15.00
min roof pitch, (deg)	15.00
roof height, (mm)	6500
modular build	False
number of stories	2
is building enclosed	Partly Enclosed
roof material	Metal Sheet

SITE DATA	
elevation above sea level, (m)	180
wind region	N3

GRAVITY LOADS			
	dead load, (kPa)	live load, (kPa)	point load, (kN)
roof	0.25	0.25	1.1
ceiling under roof	0.2	0	1.1
floor	0.9	1.5	1.8
ceiling under floor	0.2	0	1.1

WIND CALCULATION	
service design wind speed (m/s)	32
ultimate design wind speed (m/s)	50
service dynamic pressure (kPa)	0.614
ultimate dynamic pressure (kPa)	1.5

SNOW CALCULATION	
region	N/A
elevatation above sea level, (m)	180
ground snow load, (kPa)	0
Exposure Reduction Coefficient	1
service snow load, (kPa)	0
ultimate snow load, (kPa)	0

LOAD SUMMARY	
wind uplift service (roof), (kPa)	-0.869
wind uplift service (canopy), (kPa)	-0.829
wind uplift ultimate (roof), (kPa)	-2.122
wind uplift ultimate (canopy), (kPa)	-2.025
wind pressure service (roof), (kPa)	0.356
wind pressure service (canopy), (kPa)	0.442
wind pressure utimate (roof), (kPa)	0.869
wind pressure ultimate (canopy), (kPa)	1.08
roof dead load, (kPa)	0.25
roof imposed load, (kPa)	0.25
roof point load, (kN)	1.1
service snow load, (kPa)	0
ultimate snow load, (kPa)	0
roof ceiling dead load, (kPa)	0.2
roof ceiling live load, (kPa)	0
roof ceiling point load, (kN)	1.1
floor dead load, (kPa)	0.9
floor live load, (kPa)	1.5
floor point load, (kN)	1.8
floor ceiling dead load, (kPa)	0.2
floor ceiling live load, (kPa)	0
floor ceiling point load, (kN)	1.1
wind face load service (walls), (kPa)	0.746
wind face load ultimate (walls), (kPa)	1.823
wall dead load (hardcoded), (kPa)	n/a
wind internal wall face load service, (kPa)	-0.184
wind internal wall face load ultimate, (kPa)	-0.45

SOFTWARE CHECKLIST

Self-Certification (AU Trusses) version number	1.0
Software version number	25.4.3011.2113
Have input sources been checked?	Yes
Do the inputs to the software match the design documentation?	Yes
Have critical components been checked?	Yes
Has documentation of any additional checks deemed to be warranted been included?	Yes
Certifier Name	Ashley
Certifier Number	123456
List any major assumptions and provide comments on them (e.g. internal walls as supports, special hold down requirements, top chord restraints, overhang support, special loads, etc	-

Figure 17 - Engineering Environmental output

The software generates two main outputs. The first one, called environment details, displays the project details and whether it is for self-certification or not. It further describes the building information, site details and the applied loads. The figures below (Figures 31to 36) show screenshots of the Environment output.

SCOTTSDALE THE TRUSTED STEEL-FRAMING PARTNER Version 25.4.3011.2113	Project Name	MODEL 1	Project No.	MOD 1
	Address			
	Company	SCS		
	Detailer	Ashley	Certificate No.	123456
	Reference	Model 1 - Unified Environments (Self Certification)		

Disclaimer
Disclaimer Scottsdale Truss Self-Certification (Scottsdale Certification) assists skilled building design professionals certify truss designs created using ScottSteel. Scottsdale Certification is not a substitute for professional judgement or independent enquiry, analysis, review, testing, calculations or other activities a skilled building design professional would be expected to make in the circumstances. To the maximum extent permitted by law, Scottsdale disclaims any and all liability and is released from any claims in connection with Scottsdale Certification where there has been an over reliance on ScottSteel by the designer, including where the designer has failed to take a professional level of diligence and care with the design of any trusses or checking of relevant engineering calculations.

SELF CERTIFIED FOR TRUSSES ONLY

Figure 18 - The project details

BUILDING DATA	
country code	AU
wind code	AS/NZS 1170.2-2021 and AS 4055
building use (code)	A
importance level	2
annual prob. of exceedence - wind, (1/x)	500
annual prob. of exceedence - snow, (1/x)	150
annual prob. of exceedence - EQ, (1/x)	500
building length, (mm)	25480
building width, (mm)	8270
roof type	Hip
max. roof pitch, (deg)	15.00
min roof pitch, (deg)	15.00
roof height, (mm)	6500
modular build	False
number of stories	2
is building enclosed	Partly Enclosed
roof material	Metal Sheet

Figure 19 - Building information

SITE DATA	
elevation above sea level, (m)	180
wind region	N3

Figure 20 - Site details

Corresponding loads:

GRAVITY LOADS			
	dead load, (kPa)	live load, (kPa)	point load, (kN)
roof	0.25	0.25	1.1
ceiling under roof	0.2	0	1.1
floor	0.9	1.5	1.8
ceiling under floor	0.2	0	1.1

Figure 21 - Gravity Loads

WIND CALCULATION	
service design wind speed (m/s)	32
ultimate design wind speed (m/s)	50
service dynamic pressure (kPa)	0.614
ultimate dynamic pressure (kPa)	1.5

Figure 22 - Wind loads

SNOW CALCULATION	
region	N/A
elevatation above sea level, (m)	180
ground snow load, (kPa)	0
Exposure Reduction Coefficient	1
service snow load, (kPa)	0
ultimate snow load, (kPa)	0

Figure 23 - Snow loads

The full report is attached below:

PDF

Model 1 - Unified
Environments (Self Ce

SCOTTSDALE

The section below describes the truss PDF output generated by the software

Truss passes the engineering

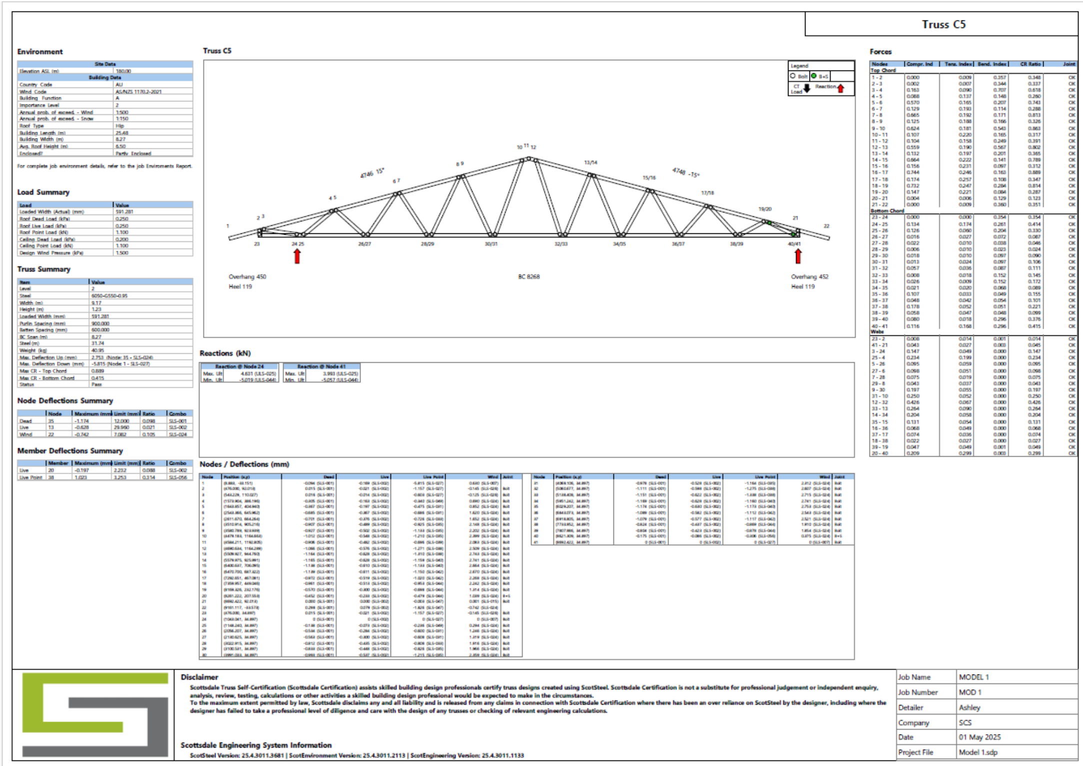


Figure 24 - Truss Passes

Truss fails the engineering – It displays the warning message.

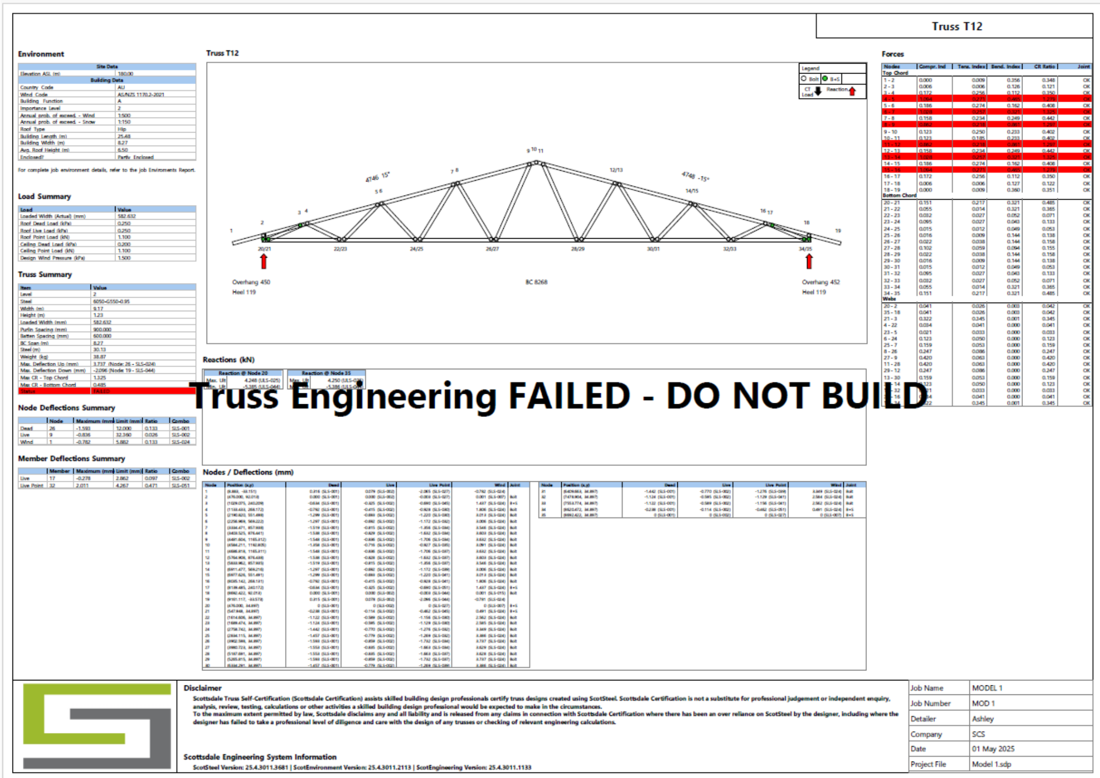


Figure 38 - Truss Fails

Once the truss analysis is complete, it generates the truss output report for each truss separately. This report gives both input and output details, showing the truss status as pass or fail. Refer to Figures 39 to 49 below.

The truss number is displayed, and number of plies as shown below.

Truss T25 (3 ply)

Figure 39 - Truss designation

The truss is displayed with node numbers, relevant spans, and support positions.

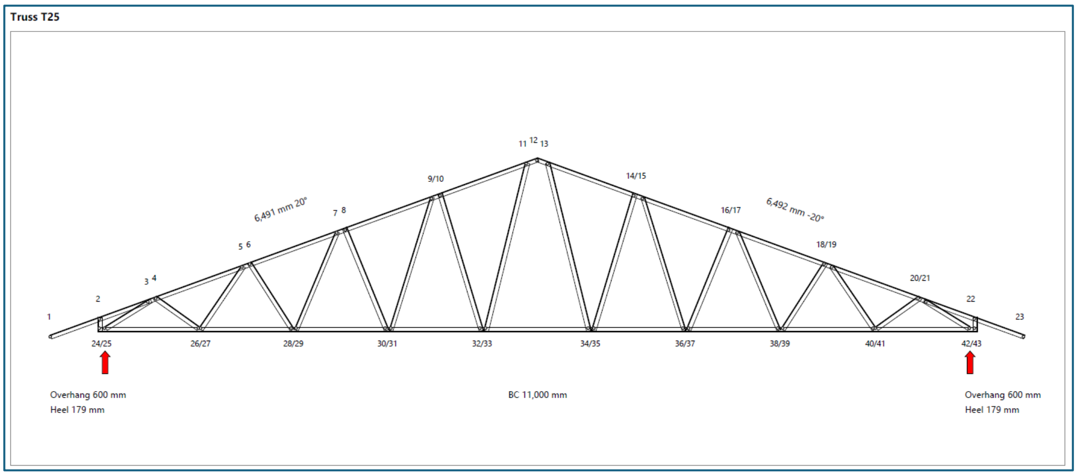


Figure 25 - Truss details

Environment displays the building and site details:

Environment

Site Data	
Elevation ASL (m)	180.00
Building Data	
Country Code	AU
Wind Code	AS/NZS 1170.2-2021
Building Function	A
Importance Level	2
Annual prob. of exceed. - Wind	1:500
Annual prob. of exceed. - Snow	1:150
Roof Type	Hip
Building Length (m)	25.48
Building Width (m)	8.27
Avg. Roof Height (m)	6.50
Enclosed?	Partly Enclosed

For complete job environment details, refer to the job Enviroments Report.

Figure 26 - Building details

Load Summary displays the basic applied loads:

Load Summary

Load	Value
Loaded Width (Actual) (mm)	591.281
Roof Dead Load (kPa)	0.250
Roof Live Load (kPa)	0.250
Roof Point Load (kN)	1.100
Ceiling Dead Load (kPa)	0.200
Ceiling Point Load (kN)	1.100
Design Wind Pressure (kPa)	1.500

Figure 27 - Basic loads

The Truss Summary displays the truss details, including the pass/fail status, and shows the critical failure ratio and maximum deflection:

Truss Summary

Item	Value
Level	2
Steel	6050-G550-0.95
Width (m)	9.17
Height (m)	1.23
Loaded Width (mm)	591.281
Purlin Spacing (mm)	900.000
Batten Spacing (mm)	600.000
BC Span (m)	8.27
Steel (m)	31.74
Weight (kg)	40.95
Max. Deflection Up (mm)	2.753 (Node: 35 - SLS-024)
Max. Deflection Down (mm)	-5.815 (Node: 1 - SLS-027)
Max CR - Top Chord	0.889
Max CR - Bottom Chord	0.415
Status	Pass

Figure 28 - Truss Summary (Pass)

Truss Summary

Item	Value
Level	2
Steel	6050-G550-0.95
Width (m)	9.17
Height (m)	1.23
Loaded Width (mm)	582.632
Purlin Spacing (mm)	900.000
Batten Spacing (mm)	600.000
BC Span (m)	8.27
Steel (m)	30.13
Weight (kg)	38.87
Max. Deflection Up (mm)	3.737 (Node: 26 - SLS-024)
Max. Deflection Down (mm)	-2.096 (Node: 19 - SLS-044)
Max CR - Top Chord	1.325
Max CR - Bottom Chord	0.485
Status	FAILED

Figure 29 - Truss Summary (Fail)

If the truss fails, it displays the warning message in the middle of the report as shown below:

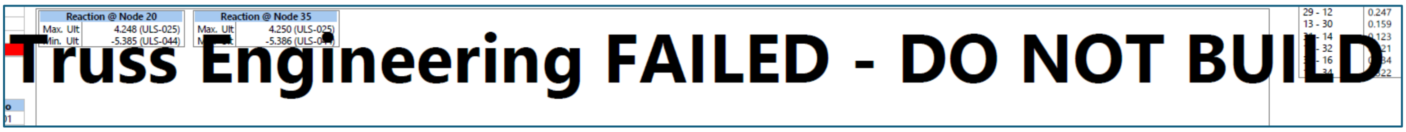


Figure 30 - Truss status

The user can see the maximum deflection and deflection limits due to different basic loads and the critical ratio:

Node Deflections Summary

	Node	Maximum (mm)	Limit (mm)	Ratio	Combo
Dead	35	-1.174	12.000	0.098	SLS-001
Live	13	-0.628	29.960	0.021	SLS-002
Wind	22	-0.742	7.082	0.105	SLS-024

Member Deflections Summary

	Member	Maximum (mm)	Limit (mm)	Ratio	Combo
Live	20	-0.197	2.232	0.088	SLS-002
Live Point	38	1.023	3.253	0.314	SLS-056

Figure 31 - Critical deflection

It also shows the deflection at each node due to different basic loads and displays the connection details of each joint. If the connection requires a bolt, bolt + spacer or screws, it will display as shown below.

Nodes / Deflections (mm)

Node	Position (x,y)	Dead	Live	Live Point	Wind	Joint
1	(8.883, -33.151)	-0.094 (SLS-001)	-0.169 (SLS-002)	-5.815 (SLS-027)	0.630 (SLS-007)	
2	(476.000, 92.013)	0.015 (SLS-001)	-0.021 (SLS-002)	-1.157 (SLS-027)	-0.145 (SLS-026)	Bolt
3	(543.229, 110.027)	0.016 (SLS-001)	-0.014 (SLS-002)	-0.603 (SLS-027)	-0.125 (SLS-026)	Bolt
4	(1573.904, 386.196)	-0.305 (SLS-001)	-0.163 (SLS-002)	-0.340 (SLS-049)	0.690 (SLS-024)	Bolt
5	(1643.857, 404.940)	-0.367 (SLS-001)	-0.197 (SLS-002)	-0.475 (SLS-031)	0.852 (SLS-024)	Bolt
6	(2543.366, 645.962)	-0.685 (SLS-001)	-0.367 (SLS-002)	-0.686 (SLS-031)	1.620 (SLS-024)	Bolt
7	(2611.670, 664.264)	-0.701 (SLS-001)	-0.376 (SLS-002)	-0.726 (SLS-033)	1.652 (SLS-024)	Bolt
8	(3510.914, 905.216)	-0.907 (SLS-001)	-0.489 (SLS-002)	-0.925 (SLS-035)	2.148 (SLS-024)	Bolt
9	(3580.789, 923.939)	-0.927 (SLS-001)	-0.502 (SLS-002)	-1.133 (SLS-035)	2.202 (SLS-024)	Bolt
10	(4479.183, 1164.663)	-1.012 (SLS-001)	-0.548 (SLS-002)	-1.210 (SLS-035)	2.399 (SLS-024)	Bolt
11	(4584.211, 1192.805)	-0.906 (SLS-001)	-0.482 (SLS-002)	-0.696 (SLS-039)	2.083 (SLS-024)	Bolt
12	(4690.634, 1164.289)	-1.066 (SLS-001)	-0.576 (SLS-002)	-1.271 (SLS-038)	2.509 (SLS-024)	Bolt
13	(5509.927, 944.760)	-1.164 (SLS-001)	-0.628 (SLS-002)	-1.310 (SLS-038)	2.743 (SLS-024)	Bolt
14	(5579.975, 925.991)	-1.165 (SLS-001)	-0.628 (SLS-002)	-1.159 (SLS-040)	2.741 (SLS-024)	Bolt
15	(6400.637, 706.095)	-1.138 (SLS-001)	-0.610 (SLS-002)	-1.133 (SLS-040)	2.664 (SLS-024)	Bolt
16	(6470.700, 687.322)	-1.139 (SLS-001)	-0.611 (SLS-002)	-1.150 (SLS-042)	2.670 (SLS-024)	Bolt
17	(7292.651, 467.081)	-0.972 (SLS-001)	-0.519 (SLS-002)	-1.020 (SLS-042)	2.268 (SLS-024)	Bolt
18	(7359.957, 449.046)	-0.961 (SLS-001)	-0.513 (SLS-002)	-0.953 (SLS-044)	2.242 (SLS-024)	Bolt
19	(8169.326, 232.176)	-0.570 (SLS-001)	-0.300 (SLS-002)	-0.698 (SLS-044)	1.314 (SLS-024)	Bolt
20	(8261.222, 207.553)	-0.452 (SLS-001)	-0.233 (SLS-002)	-0.479 (SLS-044)	1.039 (SLS-024)	B+S
21	(8692.422, 92.013)	0.000 (SLS-001)	0.000 (SLS-002)	-0.003 (SLS-047)	0.001 (SLS-015)	Bolt
22	(9161.117, -33.573)	0.298 (SLS-001)	0.079 (SLS-002)	-1.826 (SLS-047)	-0.742 (SLS-024)	
23	(476.000, 34.897)	0.015 (SLS-001)	-0.021 (SLS-002)	-1.157 (SLS-027)	-0.145 (SLS-026)	Bolt
24	(1043.041, 34.897)	0 (SLS-001)	0 (SLS-002)	0 (SLS-027)	0 (SLS-007)	Bolt
25	(1148.240, 34.897)	-0.138 (SLS-001)	-0.073 (SLS-002)	-0.236 (SLS-049)	0.294 (SLS-024)	Bolt
26	(2056.207, 34.897)	-0.534 (SLS-001)	-0.284 (SLS-002)	-0.600 (SLS-031)	1.246 (SLS-024)	Bolt
27	(2130.625, 34.897)	-0.563 (SLS-001)	-0.300 (SLS-002)	-0.608 (SLS-031)	1.319 (SLS-024)	Bolt
28	(3022.915, 34.897)	-0.812 (SLS-001)	-0.435 (SLS-002)	-0.808 (SLS-033)	1.916 (SLS-024)	Bolt
29	(3100.531, 34.897)	-0.833 (SLS-001)	-0.448 (SLS-002)	-0.826 (SLS-035)	1.966 (SLS-024)	Bolt
30	(3991.033, 34.897)	-0.993 (SLS-001)	-0.537 (SLS-002)	-1.215 (SLS-035)	2.359 (SLS-024)	Bolt

Figure 32 - Node deflection and connections

The report gives the maximum reaction and the maximum uplift at the support points:

Reactions (kN)

Reaction @ Node 24		Reaction @ Node 41	
Max. Ult	4.631 (ULS-025)	Max. Ult	3.993 (ULS-025)
Min. Ult	-5.019 (ULS-044)	Min. Ult	-5.057 (ULS-044)

Figure 48 - Reactions

The user can see the critical ratio of compression, tension, bending and combined bending and axial for each truss member as shown below:

Forces

Nodes	Compr. Ind	Tens. Index	Bend. Index	CR Ratio	Joint
Top Chord					
1 - 2	0.000	0.009	0.357	0.348	OK
2 - 3	0.002	0.007	0.344	0.337	OK
3 - 4	0.163	0.090	0.707	0.618	OK
4 - 5	0.088	0.137	0.148	0.260	OK
5 - 6	0.570	0.165	0.207	0.743	OK
6 - 7	0.129	0.193	0.114	0.288	OK
7 - 8	0.665	0.192	0.171	0.813	OK
8 - 9	0.125	0.188	0.166	0.326	OK
9 - 10	0.624	0.181	0.543	0.863	OK
10 - 11	0.107	0.220	0.165	0.317	OK
11 - 12	0.104	0.158	0.249	0.391	OK
12 - 13	0.559	0.190	0.567	0.802	OK
13 - 14	0.132	0.197	0.201	0.365	OK
14 - 15	0.664	0.222	0.141	0.789	OK
15 - 16	0.156	0.231	0.097	0.312	OK
16 - 17	0.744	0.246	0.163	0.889	OK
17 - 18	0.174	0.257	0.108	0.347	OK
18 - 19	0.732	0.247	0.284	0.814	OK
19 - 20	0.147	0.221	0.084	0.287	OK
20 - 21	0.004	0.006	0.129	0.123	OK
21 - 22	0.000	0.009	0.360	0.351	OK
Bottom Chord					
23 - 24	0.000	0.000	0.354	0.354	OK
24 - 25	0.134	0.174	0.261	0.414	OK
25 - 26	0.126	0.060	0.204	0.330	OK
26 - 27	0.016	0.027	0.072	0.087	OK
27 - 28	0.022	0.010	0.038	0.046	OK
28 - 29	0.006	0.010	0.023	0.024	OK
29 - 30	0.018	0.010	0.097	0.090	OK
30 - 31	0.013	0.024	0.097	0.106	OK
31 - 32	0.057	0.036	0.087	0.111	OK
32 - 33	0.008	0.018	0.152	0.145	OK
33 - 34	0.026	0.009	0.152	0.172	OK
34 - 35	0.021	0.020	0.068	0.089	OK
35 - 36	0.107	0.033	0.049	0.155	OK
36 - 37	0.048	0.042	0.054	0.101	OK
37 - 38	0.178	0.052	0.051	0.221	OK
38 - 39	0.058	0.047	0.048	0.099	OK
39 - 40	0.080	0.018	0.296	0.376	OK
40 - 41	0.116	0.168	0.296	0.415	OK
Webs					
23 - 2	0.008	0.014	0.001	0.014	OK
41 - 21	0.043	0.027	0.003	0.045	OK
3 - 24	0.147	0.049	0.000	0.147	OK
25 - 4	0.234	0.199	0.000	0.234	OK
5 - 26	0.095	0.059	0.000	0.095	OK
27 - 6	0.098	0.051	0.000	0.098	OK
7 - 28	0.075	0.019	0.000	0.075	OK
29 - 8	0.043	0.037	0.000	0.043	OK
9 - 30	0.197	0.055	0.000	0.197	OK
31 - 10	0.250	0.052	0.000	0.250	OK
12 - 32	0.426	0.067	0.000	0.426	OK
33 - 13	0.264	0.090	0.000	0.264	OK
14 - 34	0.204	0.058	0.000	0.204	OK
35 - 15	0.131	0.054	0.000	0.131	OK
16 - 36	0.068	0.049	0.000	0.068	OK
37 - 17	0.074	0.036	0.000	0.074	OK
18 - 38	0.022	0.027	0.000	0.027	OK
39 - 19	0.047	0.049	0.001	0.049	OK
20 - 40	0.209	0.299	0.003	0.299	OK

Figure 49 - Induced forces

If the truss fails, the failure ratios are highlighted as shown below:

Forces

Nodes	Compr. Ind	Tens. Index	Bend. Index	CR Ratio	Joint
Top Chord					
1 - 2	0.000	0.009	0.356	0.348	OK
2 - 3	0.006	0.006	0.126	0.121	OK
3 - 4	0.172	0.256	0.112	0.350	OK
4 - 5	1.094	0.271	0.465	1.279	OK
5 - 6	0.186	0.274	0.162	0.408	OK
6 - 7	1.028	0.257	0.321	1.325	OK
7 - 8	0.158	0.234	0.249	0.442	OK
8 - 9	0.862	0.218	0.861	1.297	OK
9 - 10	0.123	0.250	0.233	0.402	OK
10 - 11	0.123	0.185	0.233	0.402	OK
11 - 12	0.862	0.218	0.861	1.297	OK
12 - 13	0.158	0.234	0.249	0.442	OK
13 - 14	1.028	0.257	0.321	1.325	OK
14 - 15	0.186	0.274	0.162	0.408	OK
15 - 16	1.094	0.271	0.465	1.279	OK
16 - 17	0.172	0.256	0.112	0.350	OK
17 - 18	0.006	0.006	0.127	0.122	OK
18 - 19	0.000	0.009	0.360	0.351	OK
Bottom Chord					
20 - 21	0.151	0.217	0.321	0.485	OK
21 - 22	0.055	0.014	0.321	0.365	OK
22 - 23	0.032	0.027	0.052	0.071	OK
23 - 24	0.095	0.027	0.043	0.133	OK
24 - 25	0.015	0.012	0.049	0.053	OK
25 - 26	0.016	0.009	0.144	0.138	OK
26 - 27	0.022	0.038	0.144	0.158	OK
27 - 28	0.102	0.059	0.094	0.155	OK
28 - 29	0.022	0.038	0.144	0.158	OK
29 - 30	0.016	0.009	0.144	0.138	OK
30 - 31	0.015	0.012	0.049	0.053	OK
31 - 32	0.095	0.027	0.043	0.133	OK
32 - 33	0.032	0.027	0.052	0.071	OK
33 - 34	0.055	0.014	0.321	0.365	OK
34 - 35	0.151	0.217	0.321	0.485	OK
Webs					
20 - 2	0.041	0.026	0.003	0.042	OK
35 - 18	0.041	0.026	0.003	0.042	OK
21 - 3	0.322	0.345	0.001	0.345	OK
4 - 22	0.034	0.041	0.000	0.041	OK
23 - 5	0.021	0.033	0.000	0.033	OK
6 - 24	0.123	0.050	0.000	0.123	OK
25 - 7	0.159	0.053	0.000	0.159	OK
8 - 26	0.247	0.086	0.000	0.247	OK
27 - 9	0.420	0.063	0.000	0.420	OK
11 - 28	0.420	0.063	0.000	0.420	OK
29 - 12	0.247	0.086	0.000	0.247	OK
13 - 30	0.159	0.053	0.000	0.159	OK
[illegible] - 14	[illegible]	0.050	0.000	0.123	OK
[illegible] - 32	[illegible]	0.033	0.000	0.033	OK
[illegible] - 16	[illegible]	0.041	0.000	0.041	OK
[illegible]	[illegible]	0.345	0.001	0.345	OK

Figure 33 - Induced forces of failed truss

The attachments below show the truss with a pass and a failed status. This includes the tie-down details, too.

Model 1 - Truss C5.pdf

Model 1 - Truss T12.pdf

Software Quality Assurance

Software QA requirements

Every build of the software is given a distinct version number that is controlled by the source control versioning of each change made. All production releases of the software come with release documentation that lists all changes made in the current version since the previous version. Every change is linked to a software bug or enhancement request in our workflow system.

Engineering QA

Structural analysis is checked using independent Space Gass software.

Space Gass software is used to check the Scottsdale software. The models were created in Space Gass independently and apply all the loads and load combinations. The induced forces (bending, compression, tension, and shear) and deflection results are then compared with Scottsdale Software.

Screenshots of Space Gass analysis and comparison results are shown below. Refer to Figures 51 and 52 and, Table 5 below.

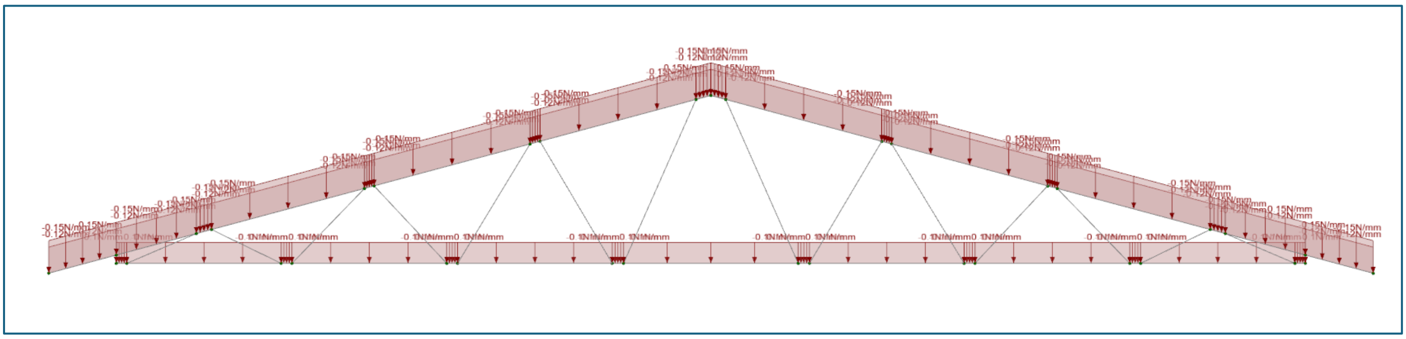


Figure 34 - Applied loads from Space Gass

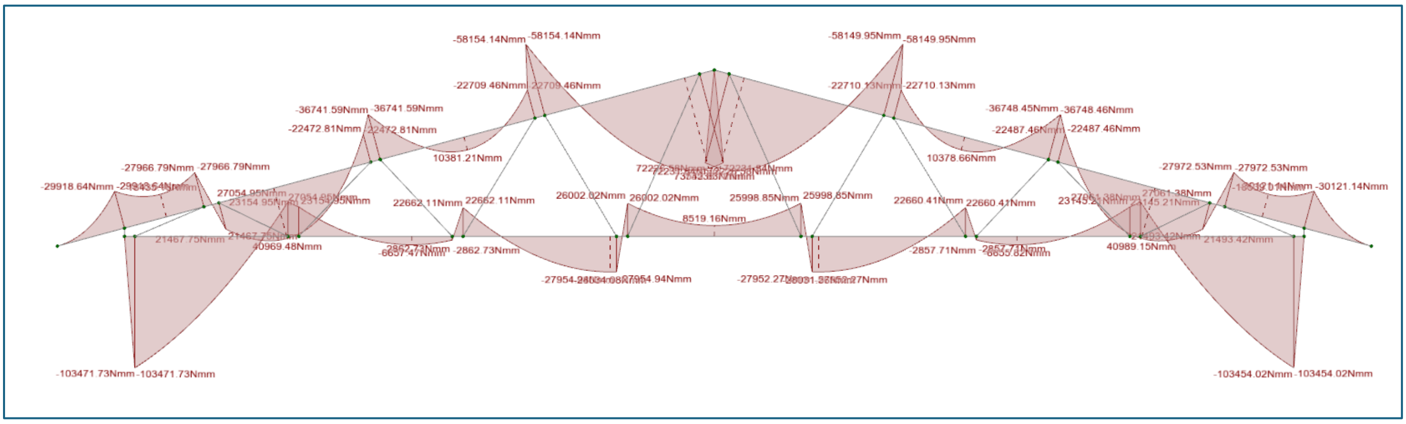


Figure 35 - Induced forces from Space Gass

Load Case/Combination Title	Member number	Station	Location (mm)	SCS Analyser			Space Gass			SCS/Space Gass		
				Axial (N)	Shear (N)	Moment (Nmm)	Axial (N)	Shear (N)	ment (Nm	% Axial	% Shear	% Bending
ULS-002	6	1	0.00	3857.745	155.2882341	-36741.58392	3857.4	155.29	-36741	100.01%	100.00%	100.00%
		2	278.88	3838.626	83.9337	-3384.7180	3838.63	83.93	-3384	100.00%	100.00%	100.02%
		3	557.76	3819.506	12.5791	10072.9255	3819.51	12.58	10072	100.00%	99.99%	100.01%
		4	836.63	3800.387	-58.7755	3631.3467	3800.39	-58.77	3631	100.00%	100.01%	100.01%
		5	1115.51	3781.267	-130.1301	-22709.4545	3781.27	-130.13	-22709	100.00%	100.00%	100.00%
	24	1	0.00	13.162	-98.6600	22662.1065	13.16	-98.66	22662	100.02%	100.00%	100.00%
		2	267.12	13.162	-73.0164	-267.0645	13.16	-73.02	-267	100.02%	100.00%	100.02%
		3	534.24	13.162	-47.3728	-16346.2963	13.16	-47.37	-16346	100.02%	100.01%	100.00%
		4	801.36	13.162	-21.7292	-25575.5889	13.16	-21.73	-25575	100.02%	100.00%	100.00%
		5	1068.48	13.162	3.9144	-27954.9423	13.16	3.91	-27954	100.02%	100.11%	100.00%
	41	1	0.00	794.063	0.0000	0.0000	794.06			100.00%		
		2	244.60	794.063	0.0000	0.0000	794.06			100.00%		
		3	489.20	794.063	0.0000	0.0000	794.06			100.00%		
		4	733.80	794.063	0.0000	0.0000	794.06			100.00%		
		5	978.40	794.063	0.0000	0.0000	794.06			100.00%		

Table 5 - Comparison between Space Gass and Scottsdale Truss Software (Truss T6)

Member Designs

Member designs are checked using independent Cold-steel and CFS software.

The critical ratio given by the SCS software was checked against the Cold-formed steel software (CFS). The results are as shown below.

In the example below, it gives the critical ratios for all the failure types. Refer Figure 53 below.

Member Critical Summary

Compression

Member	4
Section Name	6050-G550-0.95
Unbraced member length restricting distortional buckling (Lm)	1094.688 mm
Unbraced member length about x-axis (Lx)	985.219 mm
Unbraced member length about y-axis (Ly)	900.000 mm
Unbraced member length for twisting (Lt)	900.000 mm
Man load alternative applied	Yes
Load Combination	ULS-025
Station	1
Design axial compression force (N*)	7.256 kN
Member capacity compression check - Sec. 3.4.1 (b)	
Nominal member capacity (Nc)	11.364 kN
Reduction factor (ϕc)	0.850
Factored capacity (ϕNc)	9.659 kN
Efficiency ratio	0.751

Tension

Member	36
Section Name	6050-G550-0.95
Unbraced member length restricting distortional buckling (Lm)	523.103 mm
Unbraced member length about x-axis (Lx)	523.103 mm
Unbraced member length about y-axis (Ly)	523.103 mm
Unbraced member length for twisting (Lt)	470.792 mm
Man load alternative applied	No
Load Combination	ULS-044
Station	1
Design axial tension force (N*)	-9.099 kN
Tension design capacity check - Net Section - Eq. 3.2.1	
Nominal section capacity - net (Nt)	42.649 kN
Reduction factor (ϕt)	0.900
Factored capacity - net (ϕNt)	38.384 kN
Efficiency ratio	0.237

Bending

Member	8
Section Name	6050-G550-0.95
Unbraced member length restricting distortional buckling (Lm)	1116.110 mm
Unbraced member length about x-axis (Lx)	1004.499 mm
Unbraced member length about y-axis (Ly)	900.000 mm
Unbraced member length for twisting (Lt)	900.000 mm
Man load alternative applied	Yes
Load Combination	ULS-044
Station	4
Design bending moment x-axis (Mx)	-199732.156 N-mm
Design bending moment y-axis (My)	0.000 N-mm
Member capacity bending check - Eq. 3.3.1 (2) (x-axis)	
Nominal member capacity (Mb)	375352.967 N-mm
Reduction factor (ϕb)	0.900
Factored capacity (ϕMb)	337817.671 N-mm
Efficiency ratio	0.591

Shear

Member	19
Section Name	6050-G550-0.95
Unbraced member length restricting distortional buckling (Lm)	71.948 mm
Unbraced member length about x-axis (Lx)	64.753 mm
Unbraced member length about y-axis (Ly)	79.142 mm
Unbraced member length for twisting (Lt)	64.753 mm
Man load alternative applied	Yes
Load Combination	ULS-044
Station	5
Design shear force x-axis (Vx)	0.000 kN
Design shear force y-axis (Vy)	3.286 kN
Shear capacity of webs without holes - Sec. 3.3.4.1 (y-axis)	
Nominal shear capacity (Vv)	27.998 kN
Reduction factor (ϕv)	0.900
Factored shear capacity (ϕVv)	25.198 kN
Efficiency ratio	0.130

Bearing

Member	1
Section Name	6050-G550-0.95
Unbraced member length restricting distortional buckling (Lm)	483.595 mm
Unbraced member length about x-axis (Lx)	435.236 mm
Unbraced member length about y-axis (Ly)	531.955 mm
Unbraced member length for twisting (Lt)	435.236 mm
Man load alternative applied	No
Load Combination	ULS-047
Station	4
Concentrated load (R*)	-1.650 kN
Actual bearing length (lb)	19.050 mm
Efficiency ratio	0.131

Combined Forces

Member	13
Section Name	6050-G550-0.95
Unbraced member length restricting distortional buckling (Lm)	1115.526 mm
Unbraced member length about x-axis (Lx)	1003.973 mm
Unbraced member length about y-axis (Ly)	900.000 mm
Unbraced member length for twisting (Lt)	900.000 mm
Man load alternative applied	Yes
Load Combination	ULS-025
Station	5
Design axial force (N)	6.817 kN
Design bending moment x-axis (Mx)	-74354.080 N-mm
Design bending moment y-axis (My)	0.000 N-mm
Design shear force x-axis (Vx)	0.000 kN
Design shear force y-axis (Vy)	-0.325 kN
Design concentrated load/reaction (R)	0.000 kN
Combined compression and bending - nominal member capacity - Eq. 3.5.1(1)	0.904
Combined compression and bending - nominal section capacity - Eq. 3.5.1(2)	0.336

Figure 36 - SCS truss analysis results

The effective lengths, sections and member forces are entered in the CFS software and checked as shown in Figure 54 and 55 below.

Figure 54 displays the critical factor under compression

Compression

Computation Results: H51x39-095-550G

Member Check - AISI S100-16/S3-22, US, LRFD

```
Material Type: [G550>0.9], Fy=550 MPa
Design Parameters:
Lx        985.2 mm     Ly        900.0 mm     Lt        900.0 mm
Kx       1.0000        Ky       1.0000        Kt       1.0000
Cbx      1.0000        Cby      1.0000        ex       0.0000 mm
Cmx      1.0000        Cmy      1.0000        ey       0.0000 mm
Braced Flange: None    kϕ           0 kN
Red. Factor, R: 0      Lm       1094.7 mm

Loads:          P         Mx        Vy        My        Vx
              (kN)      (N-mm)     (kN)      (N-mm)     (kN)
Entered      7.256          0     0.000          0     0.000
Applied      7.256          0     0.000          0     0.000
Strength     9.624    1075987    21.220     836981     9.568

Interaction Equations
Eq. H1.2-1    (P, Mx, My)  0.754 + 0.000 + 0.000 = 0.754 <= 1.0
Eq. H2-1        (Mx, Vy)     Sqrt(0.000 + 0.000)= 0.000 <= 1.0
Eq. H2-1        (My, Vx)     Sqrt(0.000 + 0.000)= 0.000 <= 1.0

Edge stiffener D/w exceeds 0.8.
```

Calculation Details - AISI S100-16/S3-22, US, LRFD

Select OK to create a report. OK Cancel

Figure 374 – Critical ratio for compression

Figure 55 displays the critical factor under bending

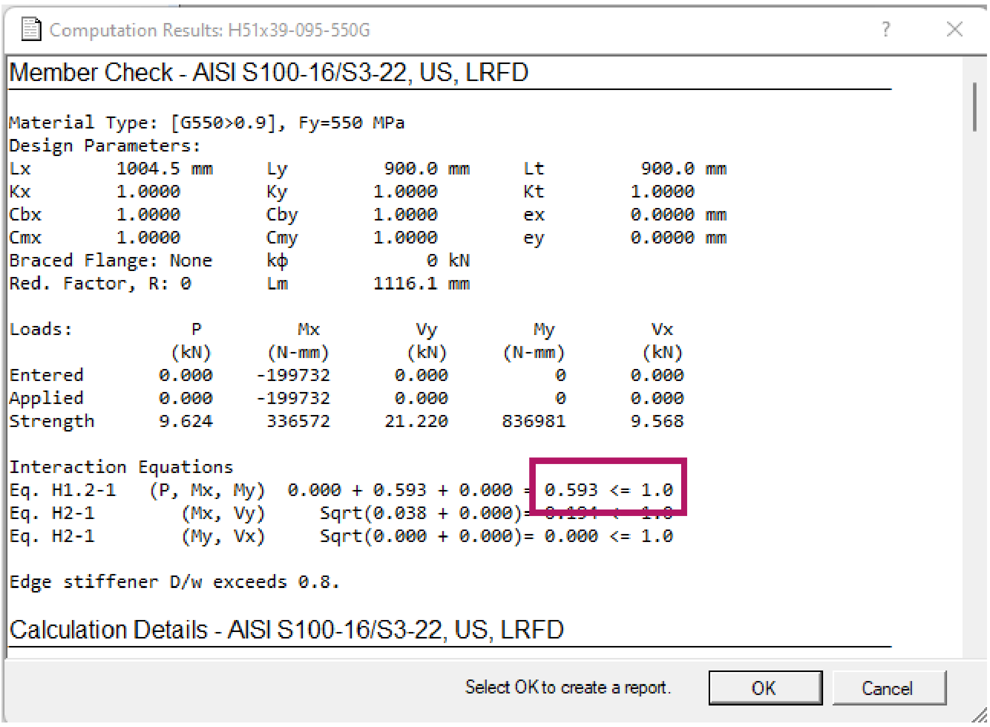


Figure 386 – Critical ratio for bending

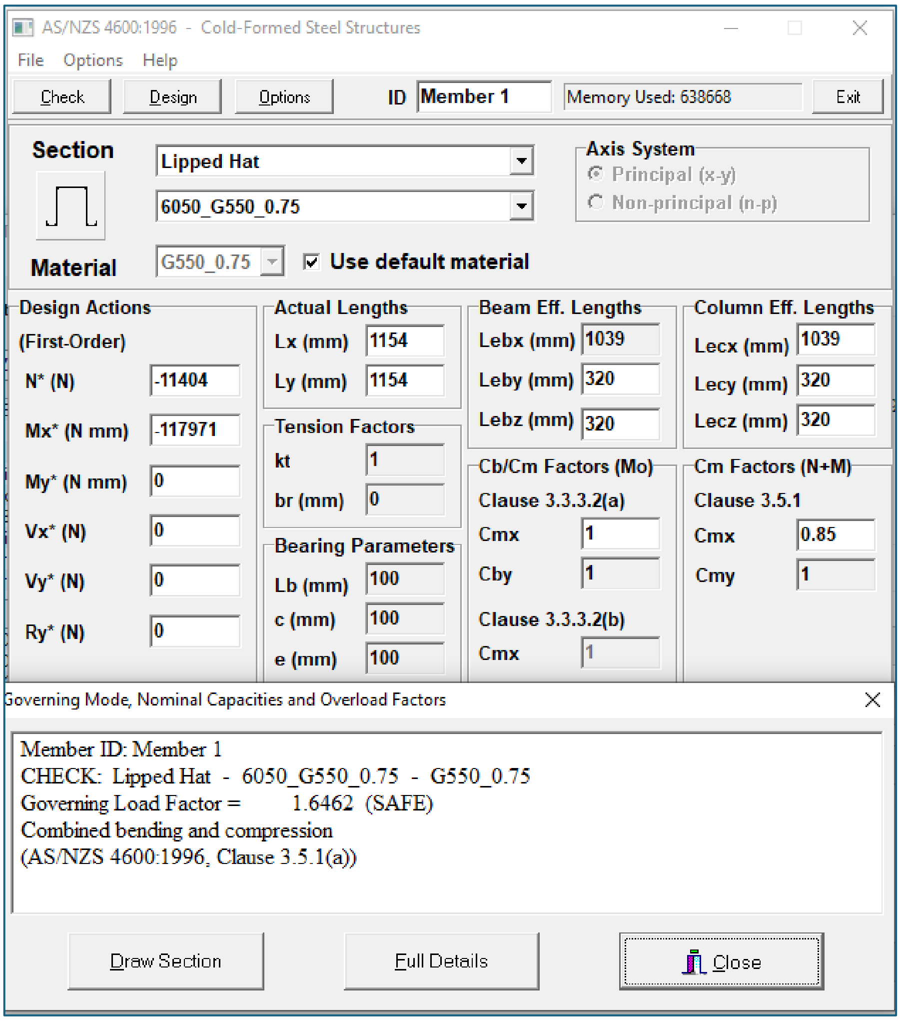


Figure 39 - Screenshot of Cold Steel software

The critical ratio from the ColdSteel software is 1.6462, which in SCS software is 1/1.6462 = 0.607

Both critical ratios calculated from SCS design software and Cold Steel software are the same.

A commercial software package “Beyond Compare 4” was used to compare the results between the new version with the released version. Beyond Compare 4 is a software which can compare the content of two different files. Every time before the new version is released, this software is used to compare the overall loadings and final results between two versions. Figure 57 below shows the screenshot of comparison of two different versions. It can display the same and different results:

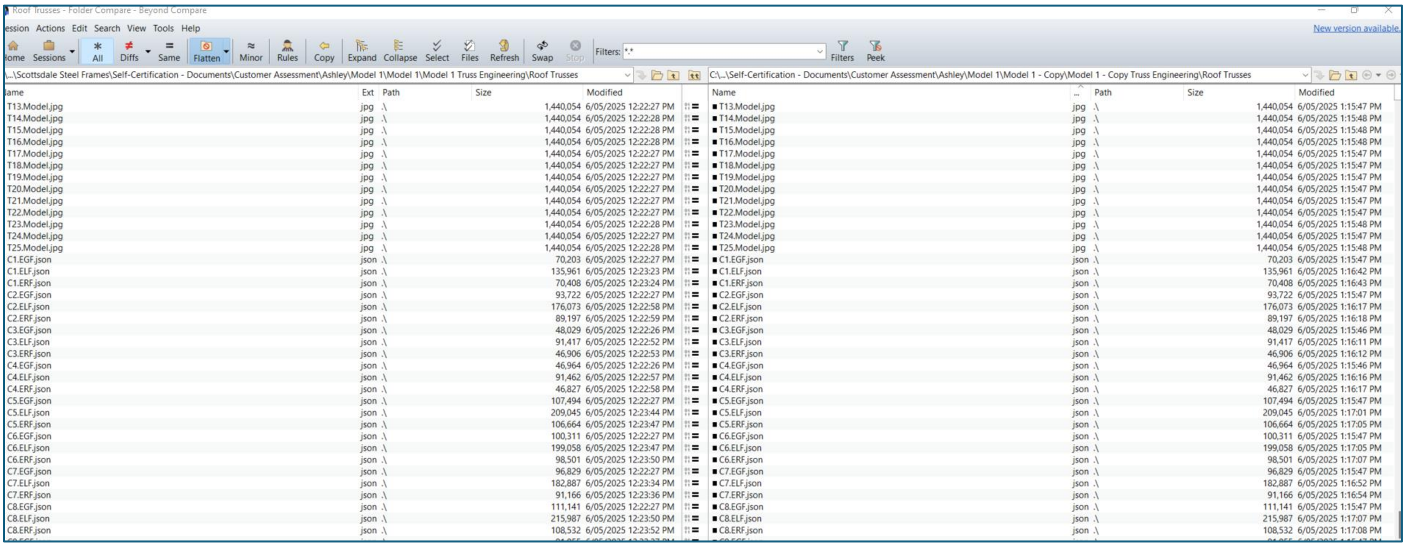


Figure 40 - Screenshot from a Beyond Compare 4

The above screen shows that the geometry, loads and forces of all the trusses are the same in two different versions of the software.