

# Modification of timber database

## Assignment

Program: Truss 2D

File: FineTrial.trrs

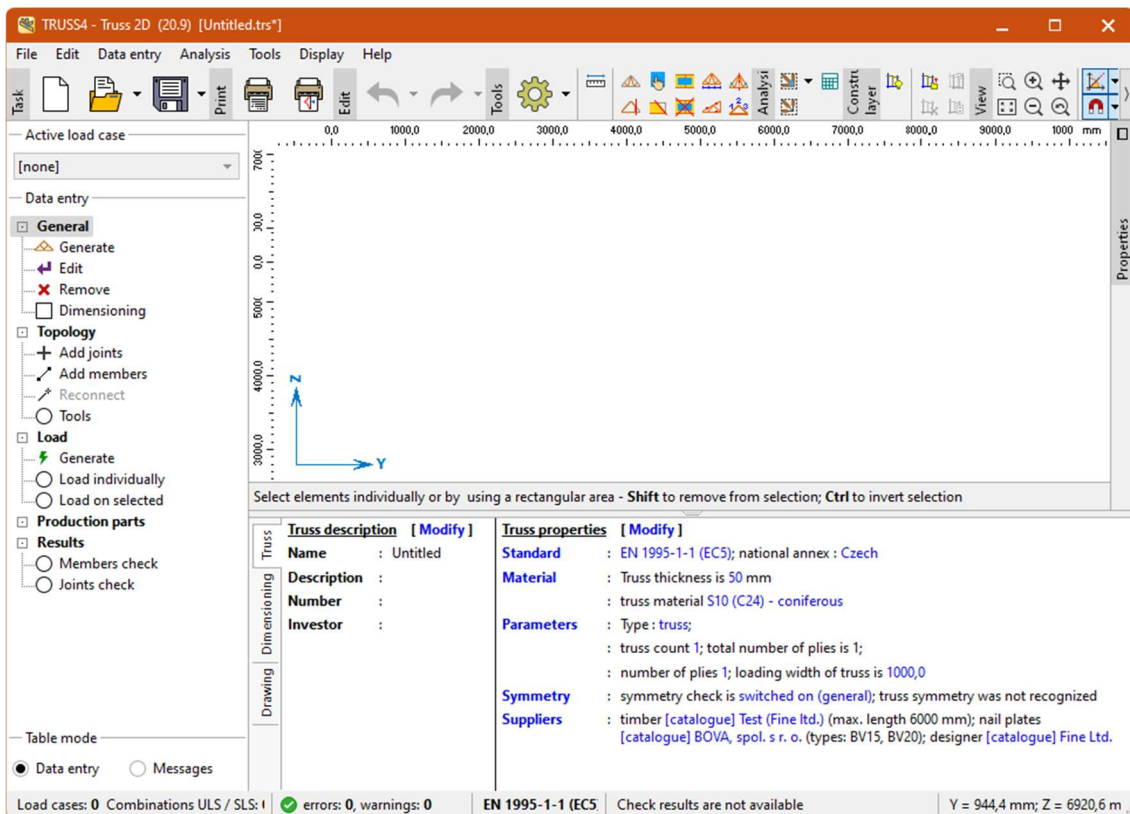
In this manual, we will show you how to specify a custom range of timber sizes and then design a simple duo-pitched truss in the "Truss 2D". The timber database will have the following properties:

- the available timber widths will be 36mm and 45mm
- timber depths will be 73mm, 111mm, 149mm and 225mm
- timber lengths will be from 600mm to 4500mm in 300mm increments

The truss will be designed as a duo-pitched truss with a span of 8m and a slope of 25°. It will be made of 36mm timber, the distance between the trusses will be 760mm. South African design standard SANS 10163-1 will be used in the design.

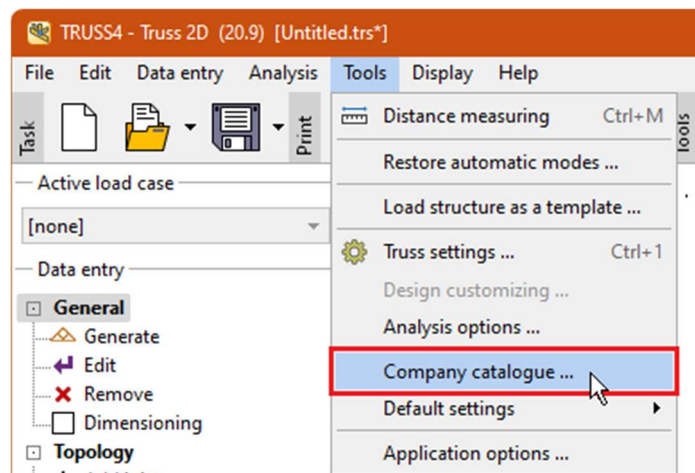
## Input of timber database

The timber range can be edited in "Truss 2D" or "Truss 3D". The database is shared between these programs. In our manual we will use "Truss 2D", however the procedure in "Truss 3D" would be identical. We start by running "Truss 2D".



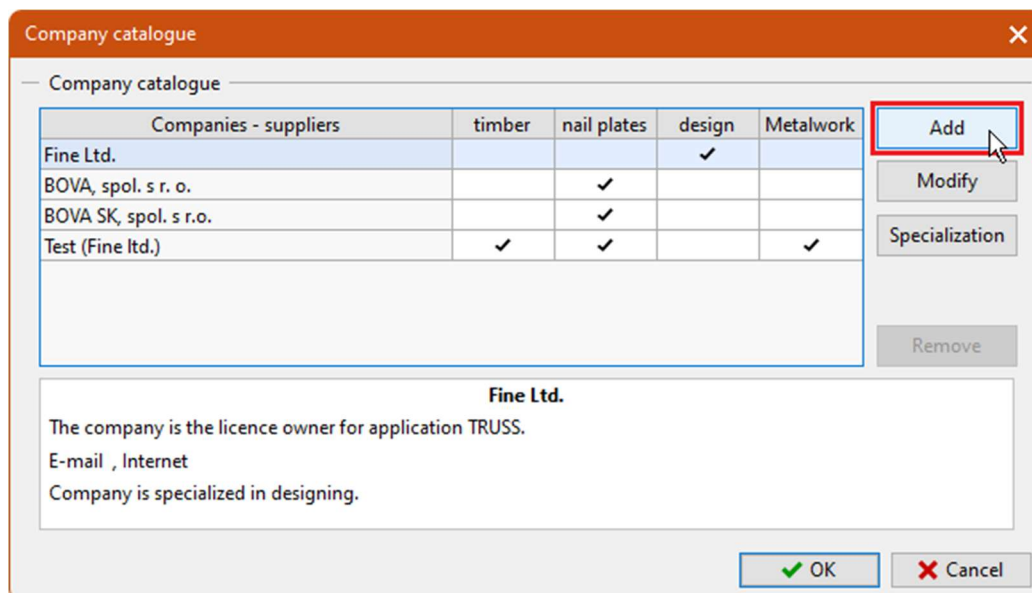
Main window of the "Truss 2D" program

Select the "Company catalogue" item in the "Tools" section of the main menu.



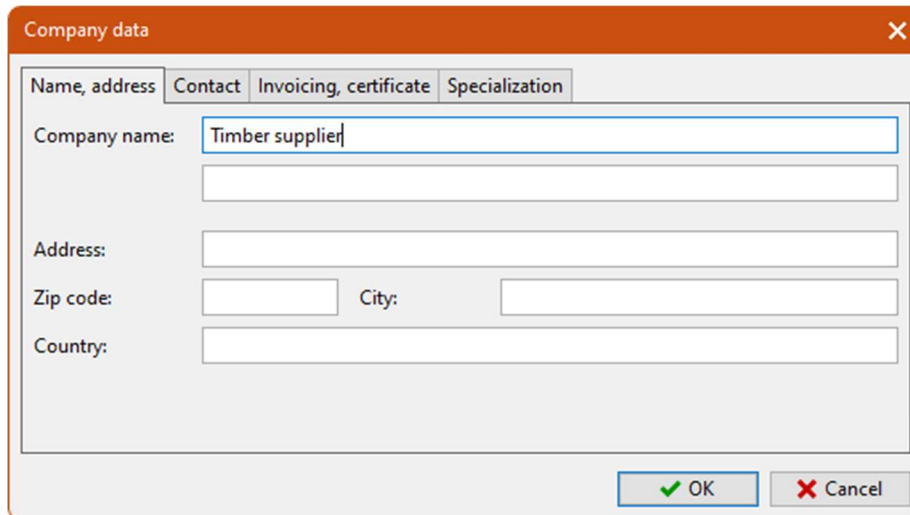
*Launch of the "Company Catalogue"*

The "Company catalogue" window will open, in which we can enter our own timber sizes. Enter a new supplier by clicking "Add".



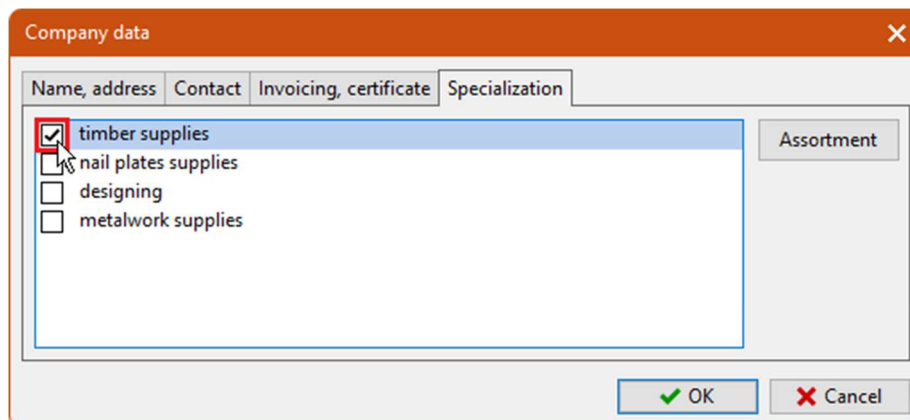
*Adding a new supplier in the "Company catalogue" window*

In the following window "Company data" enter the name of the new timber catalogue in the first tab "Name, address". The name is entered in the "Company name" field. The other data are not required.



Entering the name of a new supplier

Then switch to the last tab "**Specialization**". Here we tick the item "**Timber supplies**".

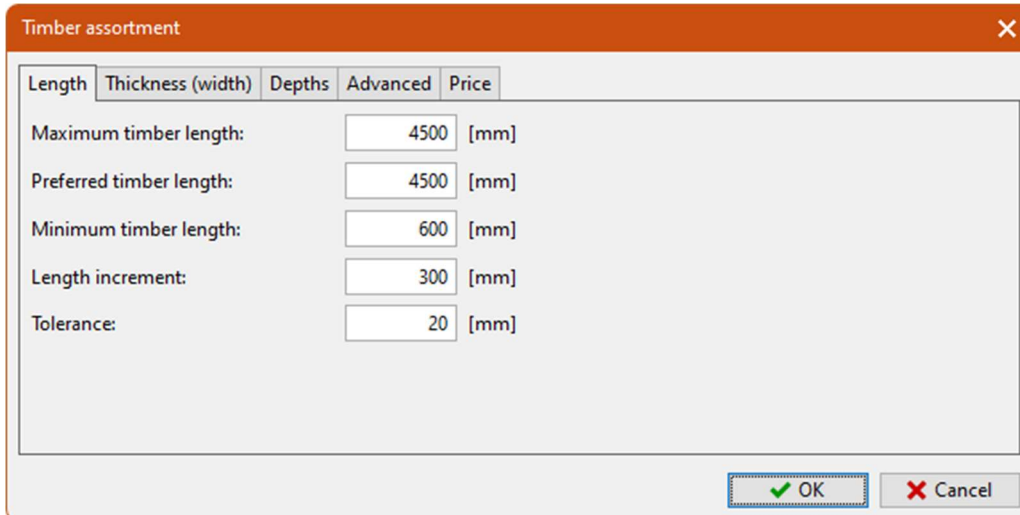


The "Specialization" tab in the "Company data" window

After checking the box, the "**Timber supplies**" window will pop up automatically. If this does not happen, it can be called up with the "**Assortment**" button. The first tab "**Lengths**" contains parameters related to the length of the timber

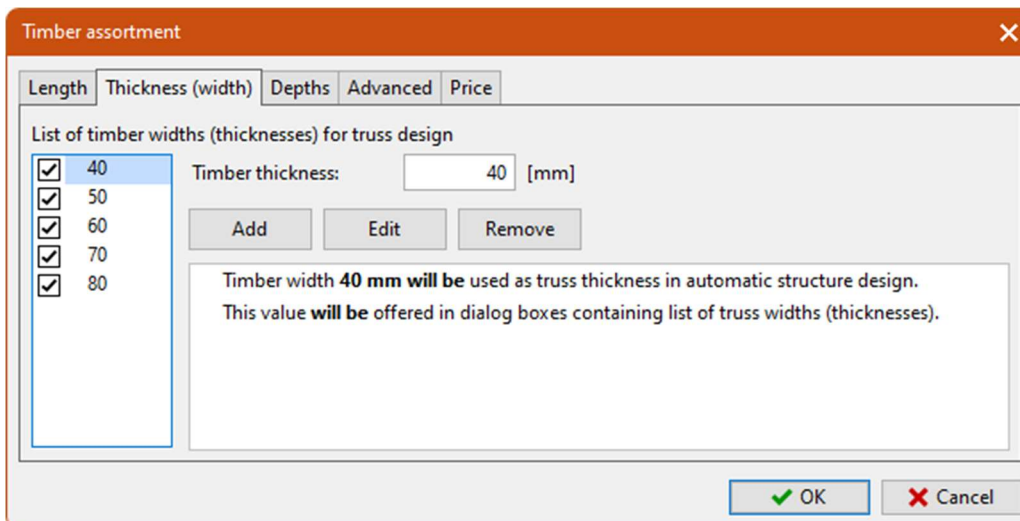
- **Maximum timber length** - the maximum length of timber that is available. This value can then be limited for individual cross-sections in the "Advanced" tab.
- **Preferred timber length** - this is the preferred length that the program selects when it has more than one option to choose from. In most cases it is worth using the maximum length.
- **Minimum timber length** - the smallest timber length available.
- **Length increment** - the difference between the stock lengths.
- **Tolerance** - an input that allows for possible inaccuracies in the actual lengths of the timber to be taken into account. The value is subtracted from the stock length and the program checks if the member length does not exceed the resulting value. For example, a member longer than 3950mm will not be inserted into a stock length of 4000mm with a specified tolerance of 50mm.

Set the values in the tab according to the following figure:



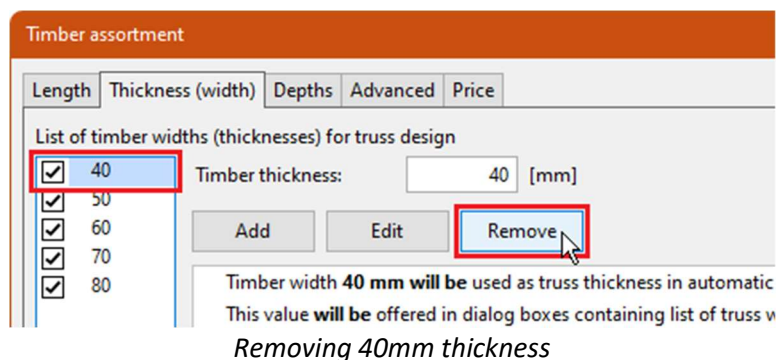
*Tab "Length" in the "Timber assortment" window*

Switch the window to the second tab "**Thickness (width)**", which contains a list of timber widths.

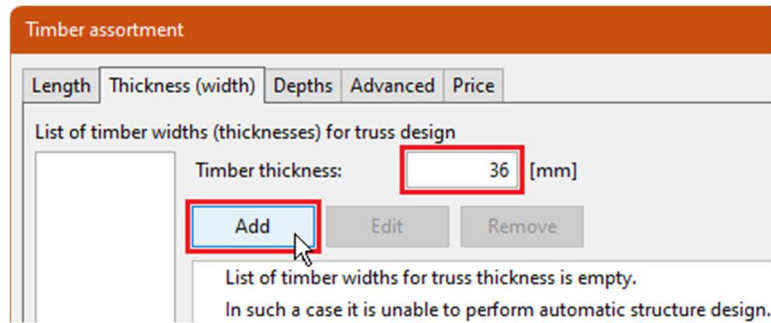


*Tab "Thickness (width)"*

First, we remove the default entries as they do not match our range. Delete by selecting an item in the list and then pressing the "**Remove**" button.

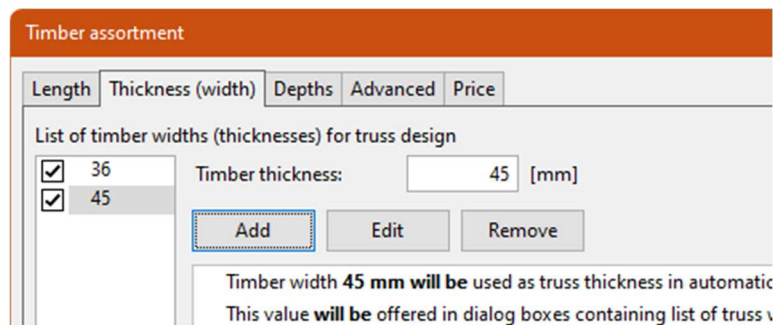


If the width list is empty, we can start adding new values. Enter the value 36 in the input line "**Timber thickness:**" and confirm with the "**Add**" button.



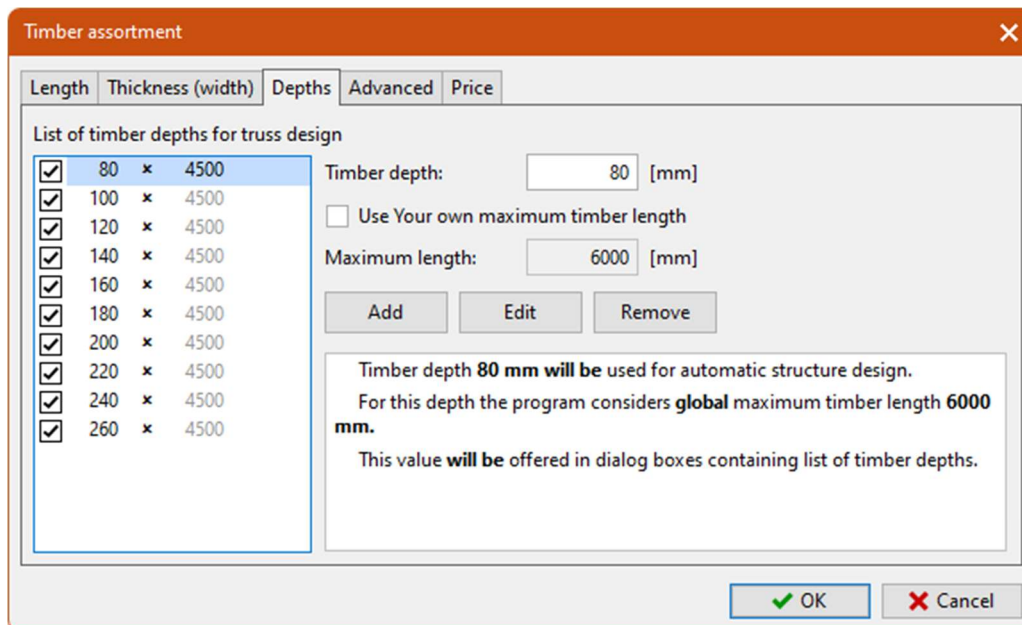
*Entering the 36mm thickness*

Add a value of 45mm in the same way.



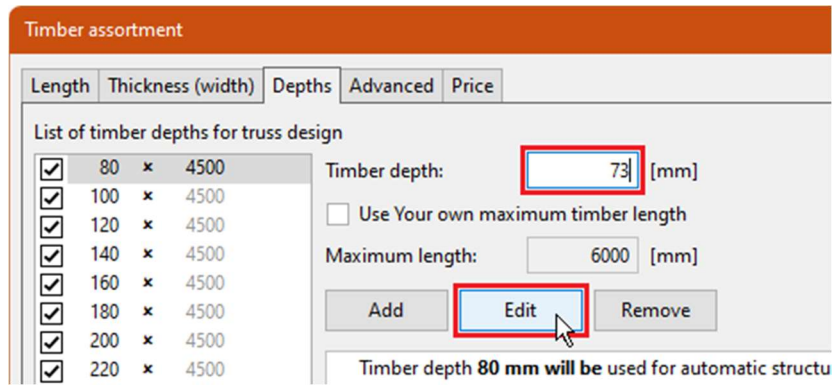
*New list of timber widths*

We can then move on to the next tab "Depths".



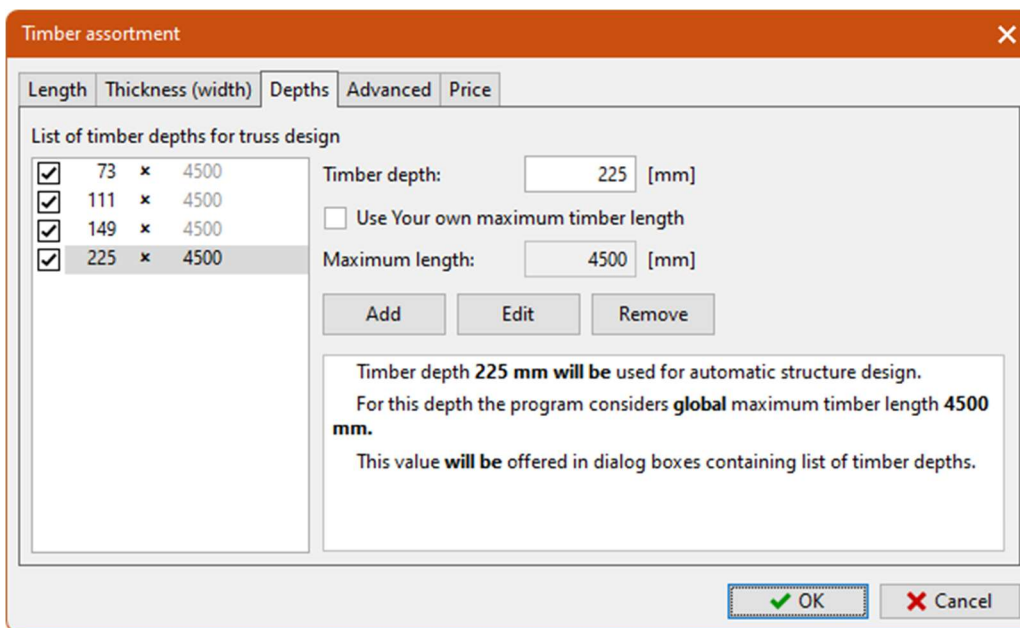
*Tab "Depths" with default values*

We can use the same procedure to change the range of available heights as we did for the widths. That is, we first remove all items and then add new ones according to our specifications. An alternative procedure can be to overwrite the values for the existing items and then use the "Edit" button.



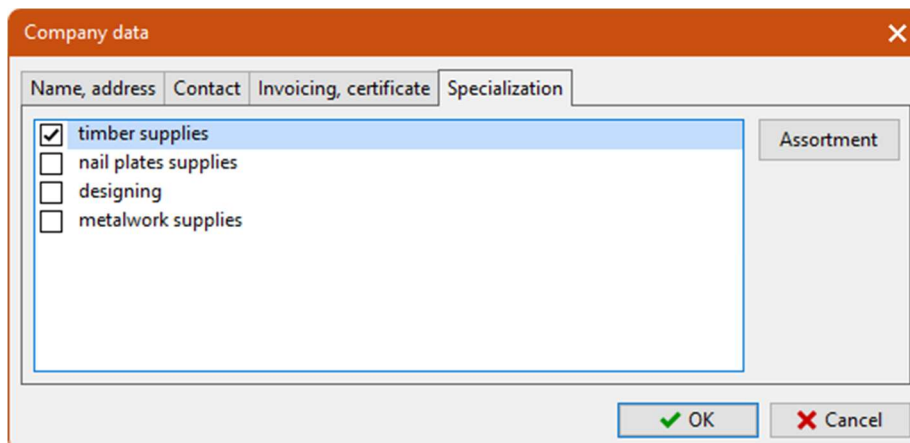
*Change of depth from 80mm to 73mm*

Our resulting list will contain four items:



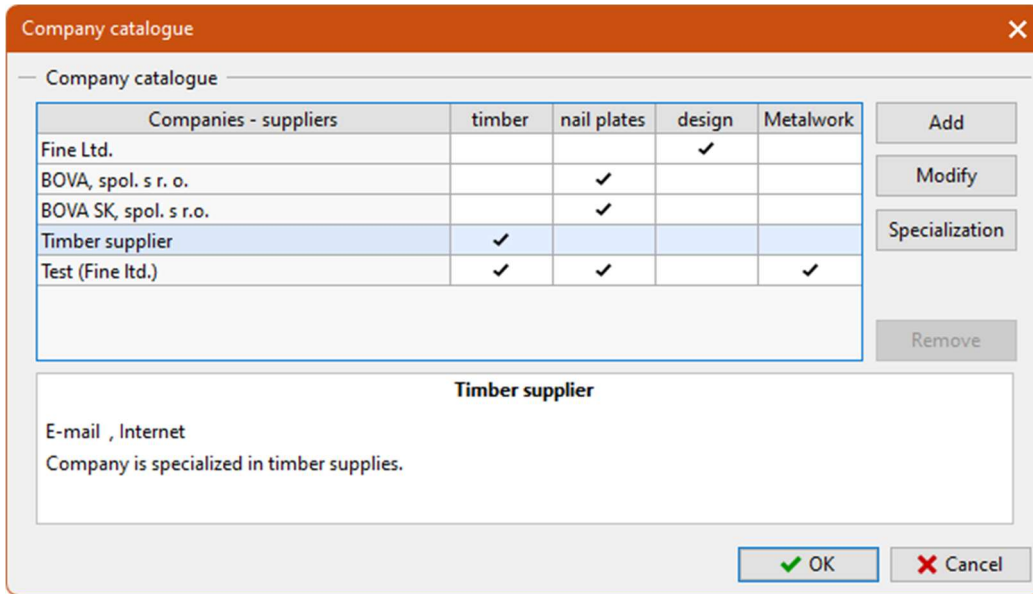
*List of depths in the "Timber assortment" window.*

After entering the depths, we can exit the window with the "OK" button and return to the "Company data" window.



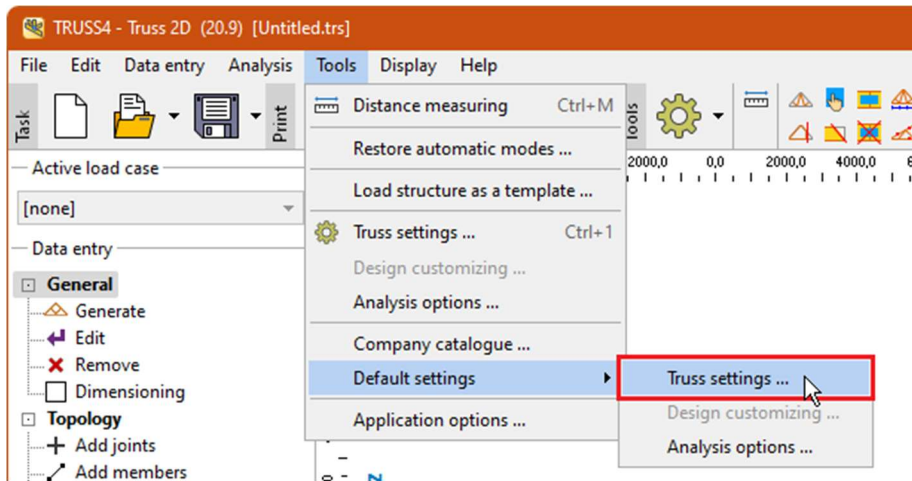
*The "Company data" window*

Close this window with the "OK" button. In the "Company catalogue" a new company "Timber supplier" has been added.



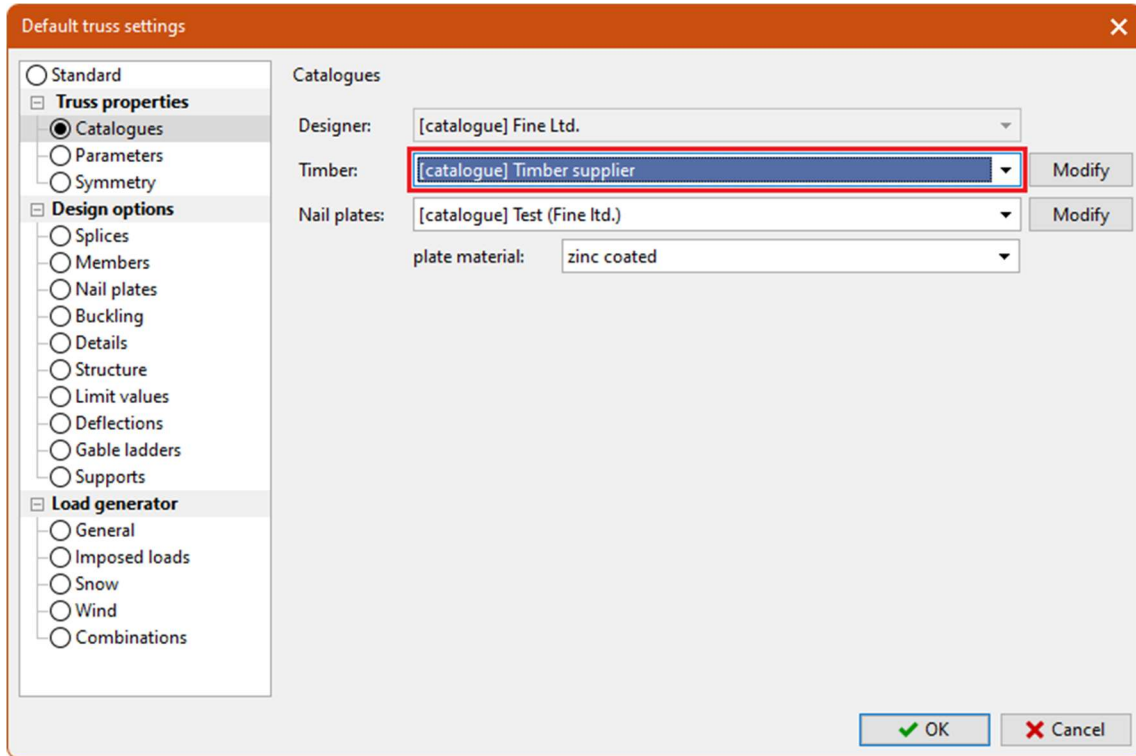
*Company catalogue with added timber supplier*

We have entered a new range of timber dimensions using this procedure. Now we just need to select this assortment as the default for further work. Exit the "Company catalogue" window with the "OK" button and return to the program's main screen. In the main menu, select "Tools" - "Default settings" - "Truss settings" to launch the program's default settings window.



*Opening the default settings*

We can change any default design parameters (standard, assessment limits, design rules, etc.) in the "Default truss settings" window, which can be useful when adapting the program to local conditions. In this example, we will only modify the default timber database. We select the "Catalogues" node in the tree menu on the left side of the window, and in this section we select the newly entered timber range.

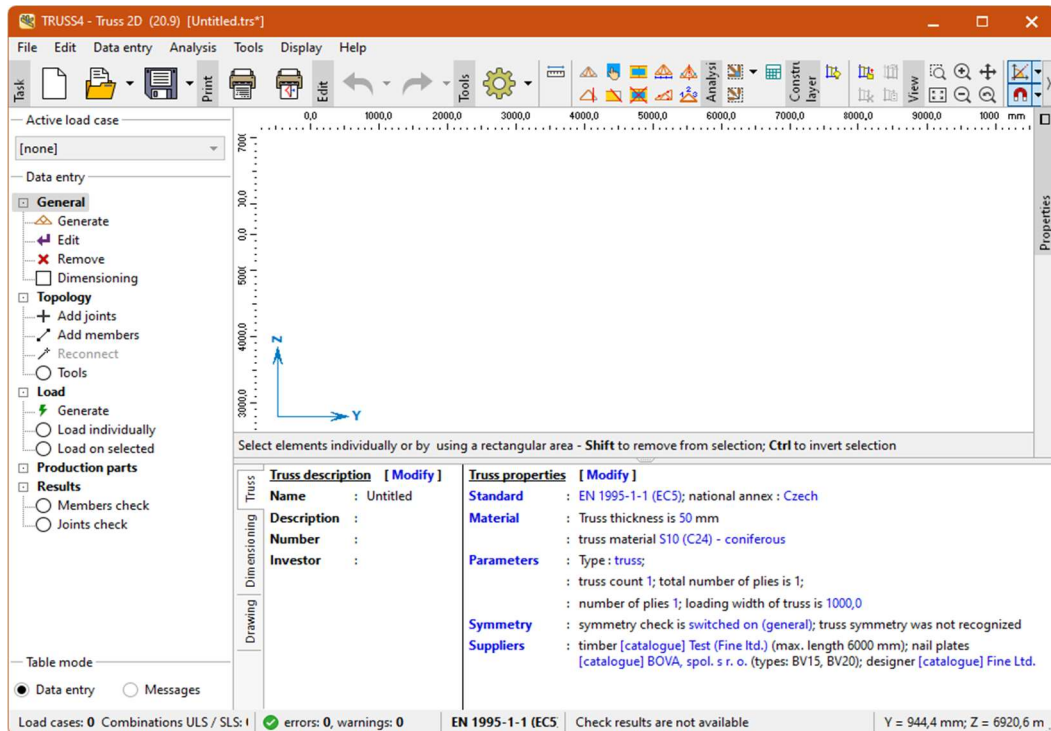


Selecting the default timber assortment

Close the window with the "OK" button. To set this supplier as the default for new designs, it is necessary to close and restart the program, which we will now do.

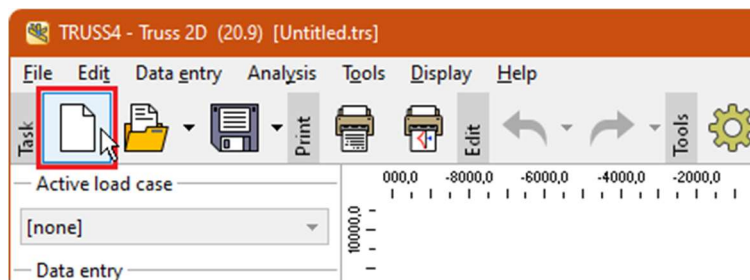
## Input of a simple truss

After restarting "Truss 2D", we start again in the main window.



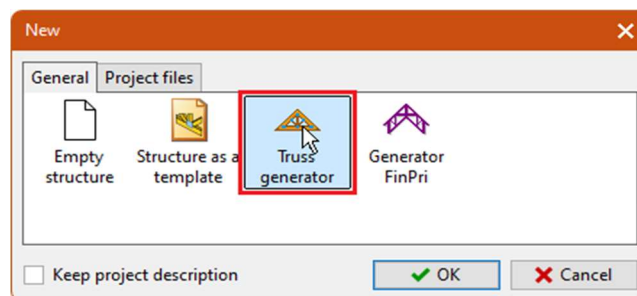
The main window of "Truss 2D"

Use the button "New" in the upper left corner of the window to create a new truss.



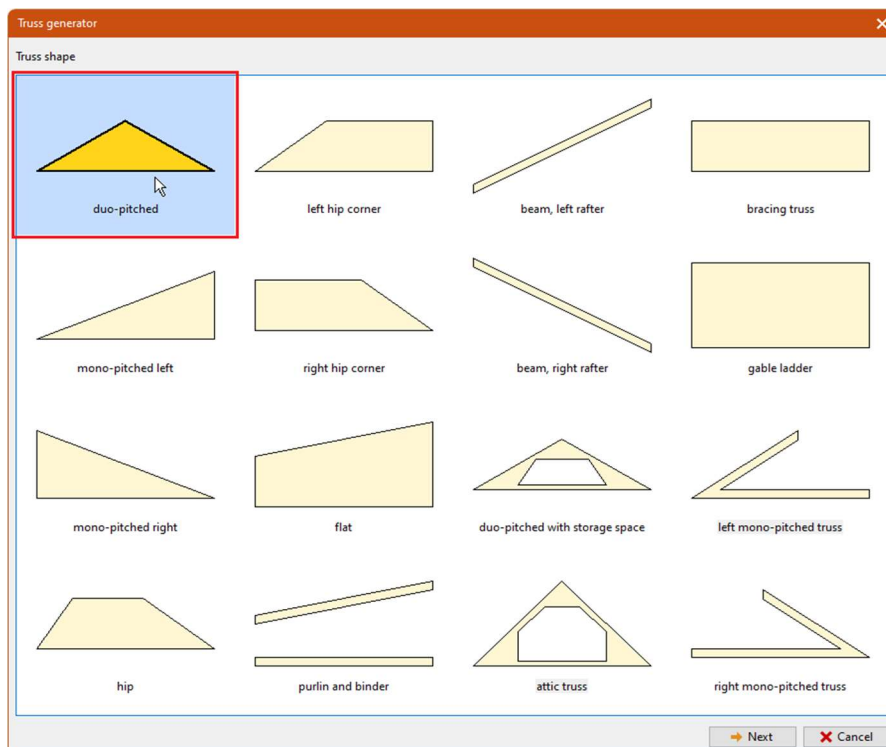
"New" button in the main toolbar

After pressing the button, the "New" window pops up, where we can select one of the ways to create a new truss. Select the "Truss generator" option and confirm the window with the "OK" button.



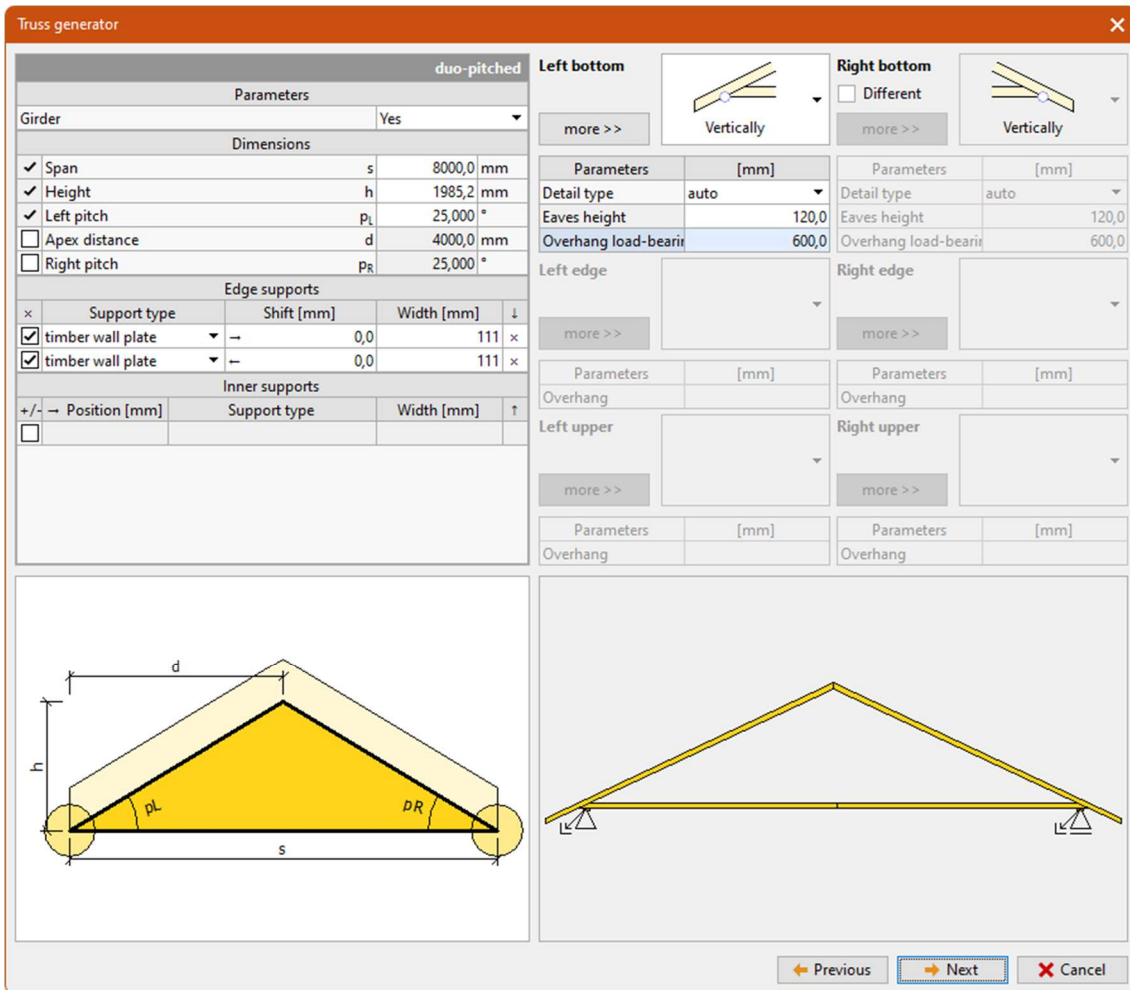
Choosing the truss creation method in the "New" window

The first part of the truss generator contains the selection of the truss shape. Select the gable truss and click "OK" to move to the next section



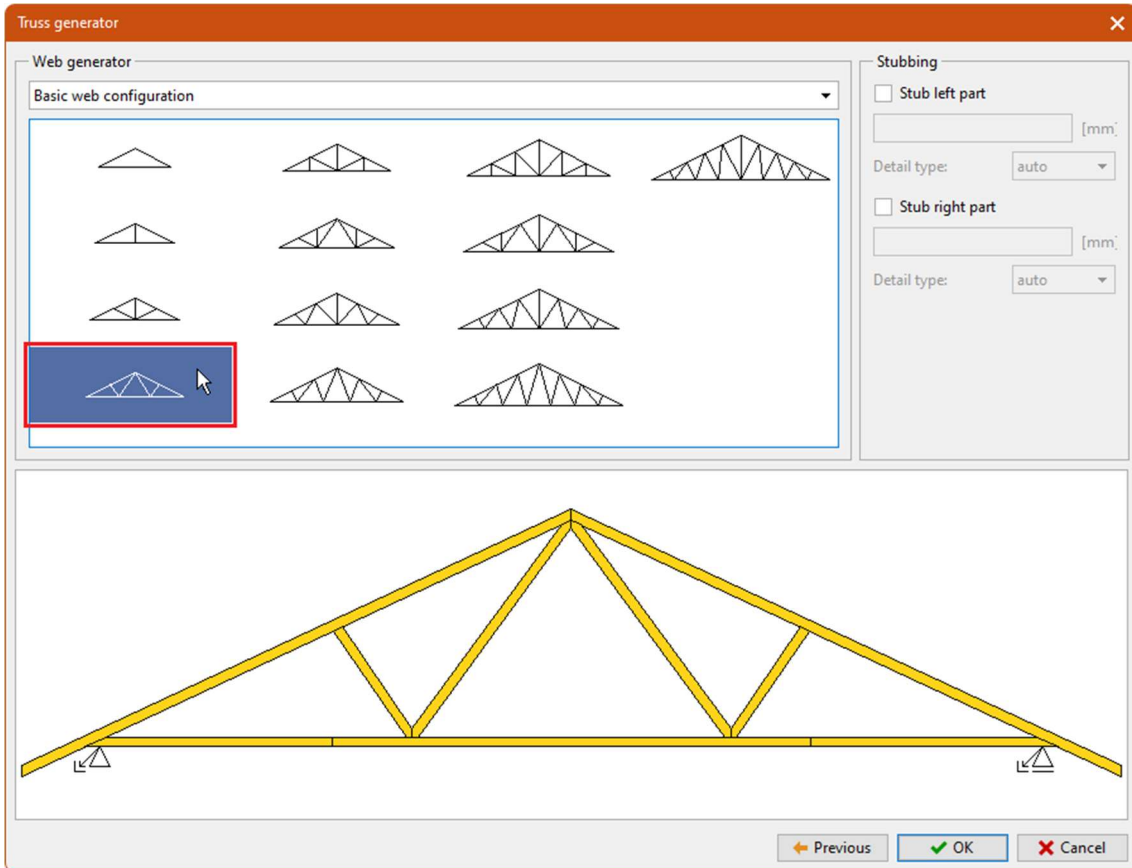
Selecting the truss shape

In the next step, the dimensions of the truss are entered. The **"Span"** (8000mm), the **"Left pitch"** (25°), the support width (111mm), the shape of the left bottom detail (option **"Vertical"**), the **"Eaves height"** (120mm) and the **"Overhang"** (600mm) are entered one by one. The specification of the dimensions can be seen in the following figure. Press the **"Next"** button to select the webbing.



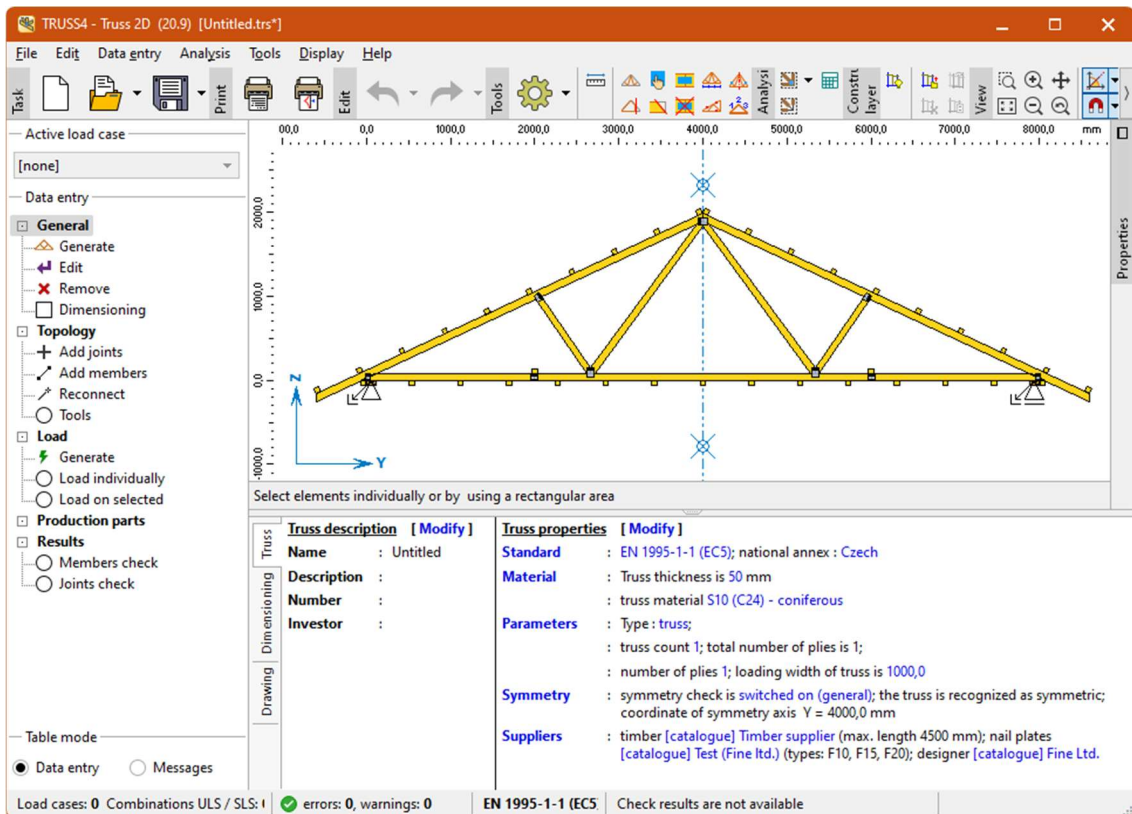
Entering truss dimensions

Select a webbing with four webs and exit the truss generator with the **"OK"** button.



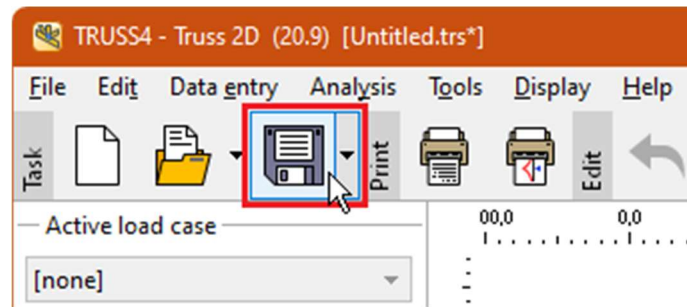
Choice of webbing

After the generator is closed, the truss shape is transferred to the main window of the program.



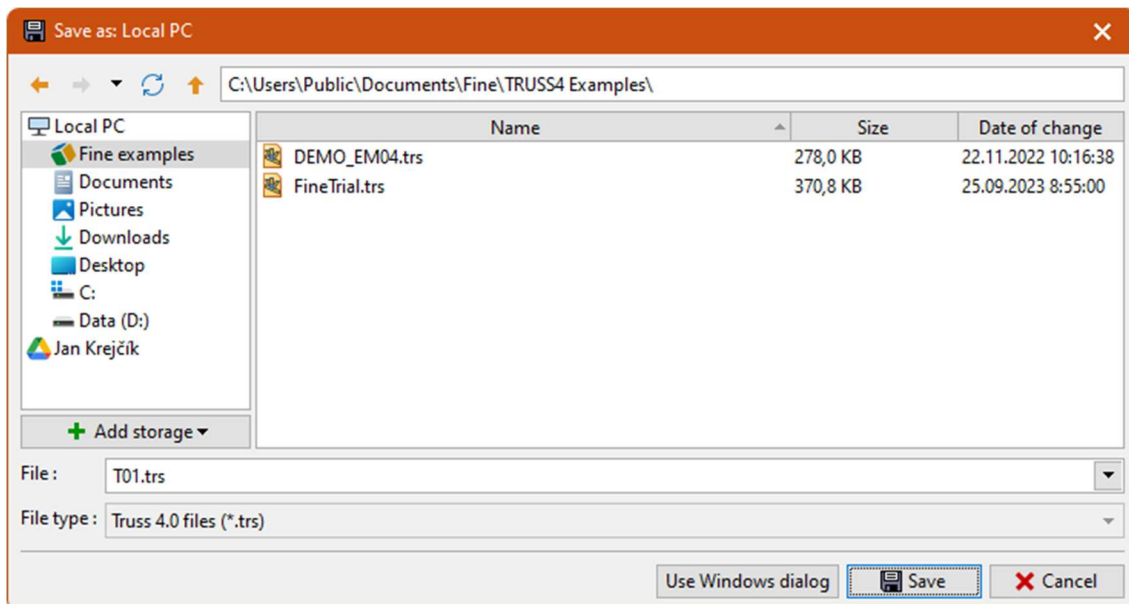
"Truss 2D" program with the created truss

We have not saved our work so far; we will do so now using the "Save" button in the main toolbar.



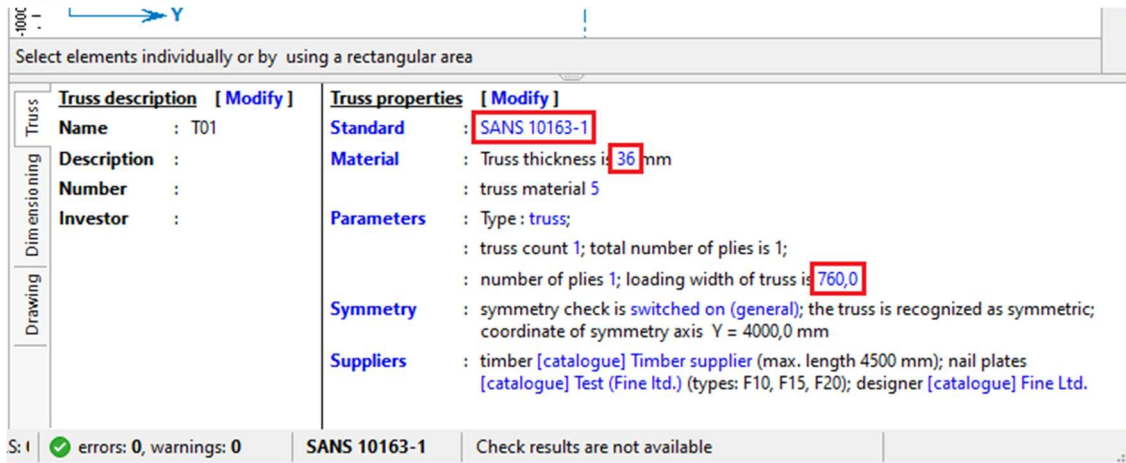
*Saving the file*

Select the folder where you want to save the truss and enter the file name in the file saving window. We selected the folder with the examples for the program and entered the name *T01.trsx*. The window will close with the "Save" button.



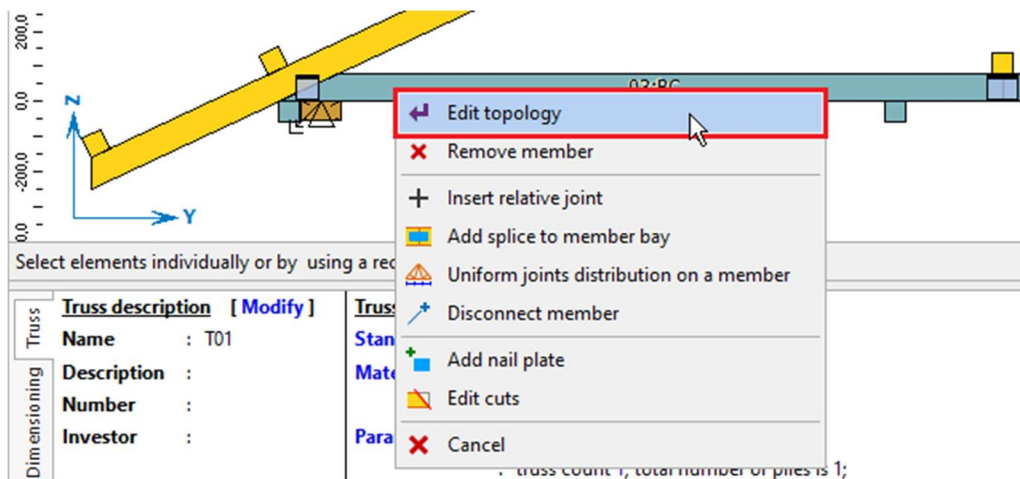
*Saving the file*

In the next step, we edit the basic calculation parameters in the bottom frame of the main program window. We will change the design standard to "**SANS 10163-1**", choose a truss thickness of *36mm* and a loading width of *760mm*.



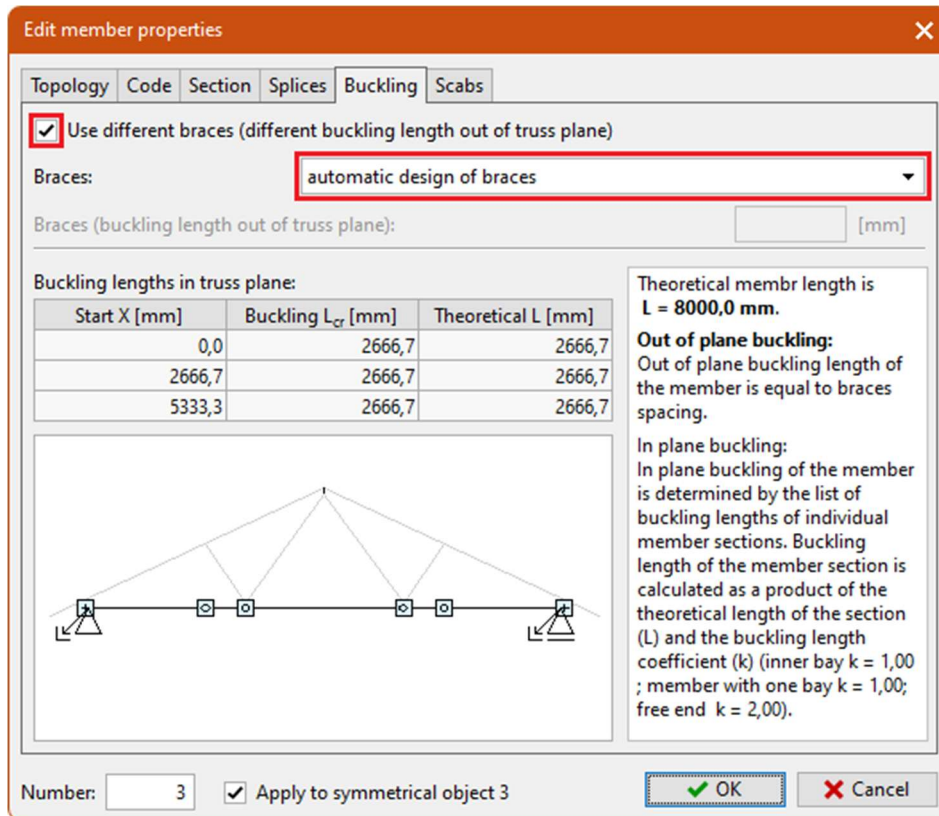
*Modification of basic parameters in the bottom frame*

In the truss preview, we noticed the densely spaced anti-buckling lateral braces on the bottom flange. We decided to change this default arrangement. We right-click on the bottom chord and select **"Edit member"** from the context menu. This command launches the member properties window. We could achieve the same result by double-clicking on the bottom chord with the left mouse button.



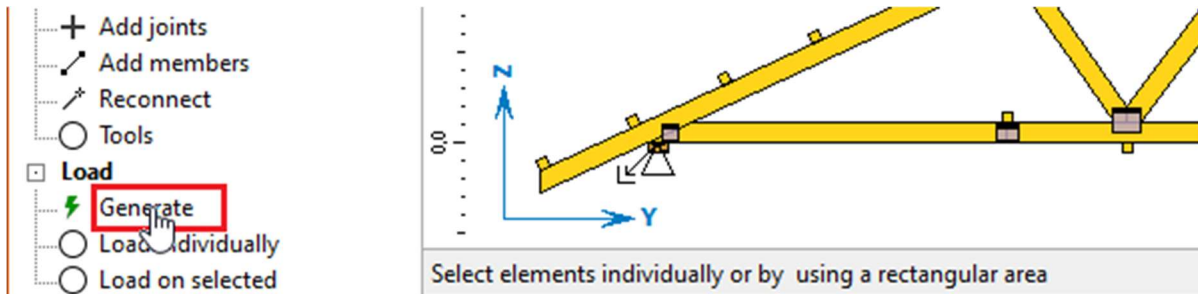
*Launching the "Edit member properties" window*

Click on the **"Buckling"** tab in the **"Edit member properties"** window. First check the **"Use different braces"** box and then select **"Automatic design of braces"**. In this mode, the program will insert a brace into each joint on the bottom chord and possibly into individual bays if the assessment requires it. Close the window with the **"OK"** button.



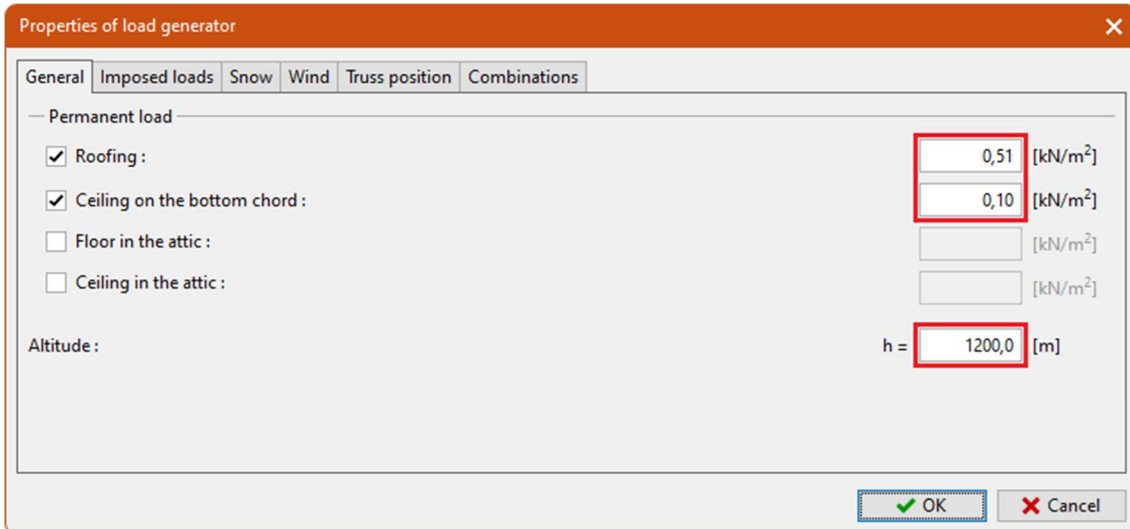
Modifying the buckling properties for the bottom chord

Proceed to the load input. Select "**Generate**" in the "**Load**" section of the control tree.



Starting the load generation window

The "**Properties of load generator**" window opens, which contains the load details. It is possible to enter permanent loads in the first tab "**General**". Enter the roof and ceiling loads, also fill in the field for altitude. The input can be seen in the following figure.



Properties of load generator

General | Imposed loads | Snow | Wind | Truss position | Combinations

— Permanent load —

Roofing : 0,51 [kN/m<sup>2</sup>]

Ceiling on the bottom chord : 0,10 [kN/m<sup>2</sup>]

Floor in the attic : [ ] [kN/m<sup>2</sup>]

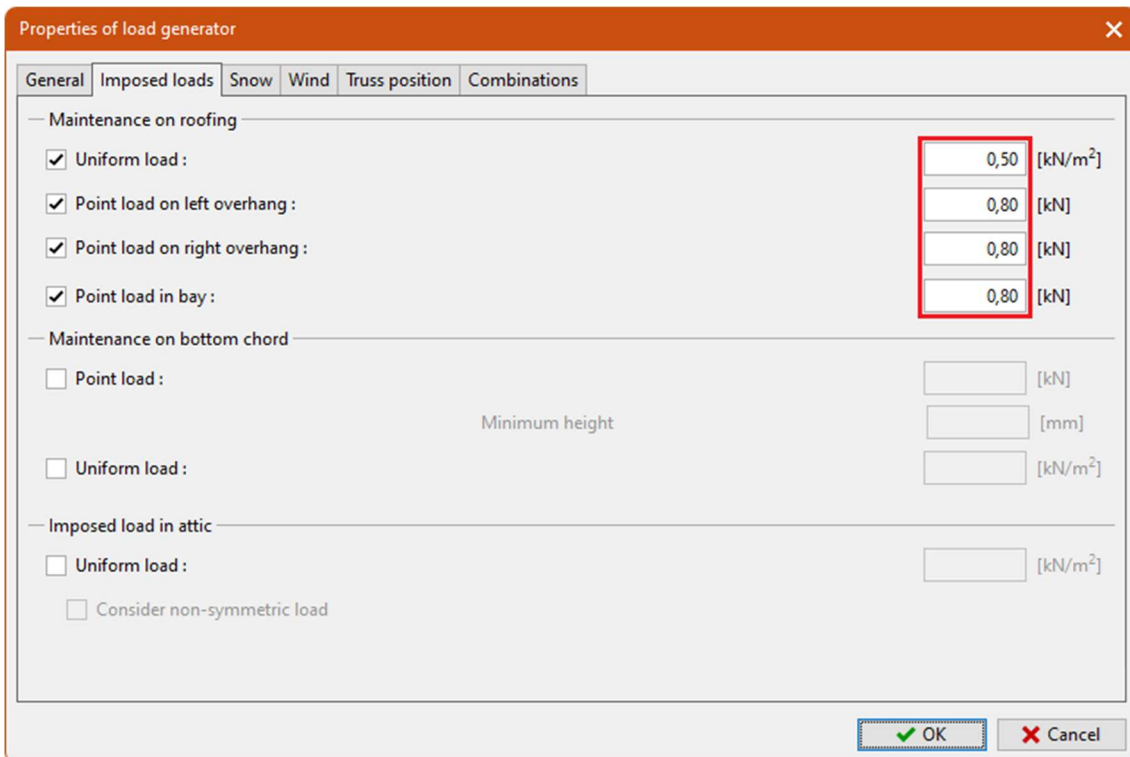
Ceiling in the attic : [ ] [kN/m<sup>2</sup>]

Altitude : h = 1200,0 [m]

OK Cancel

*Entering permanent loads and altitude*

In the second tab "**Imposed loads**", enter the service loads acting on the roofing as shown in the following figure. We enter both uniform and point loads.



Properties of load generator

General | Imposed loads | Snow | Wind | Truss position | Combinations

— Maintenance on roofing —

Uniform load : 0,50 [kN/m<sup>2</sup>]

Point load on left overhang : 0,80 [kN]

Point load on right overhang : 0,80 [kN]

Point load in bay : 0,80 [kN]

— Maintenance on bottom chord —

Point load : [ ] [kN]

Minimum height [ ] [mm]

Uniform load : [ ] [kN/m<sup>2</sup>]

— Imposed load in attic —

Uniform load : [ ] [kN/m<sup>2</sup>]

Consider non-symmetric load

OK Cancel

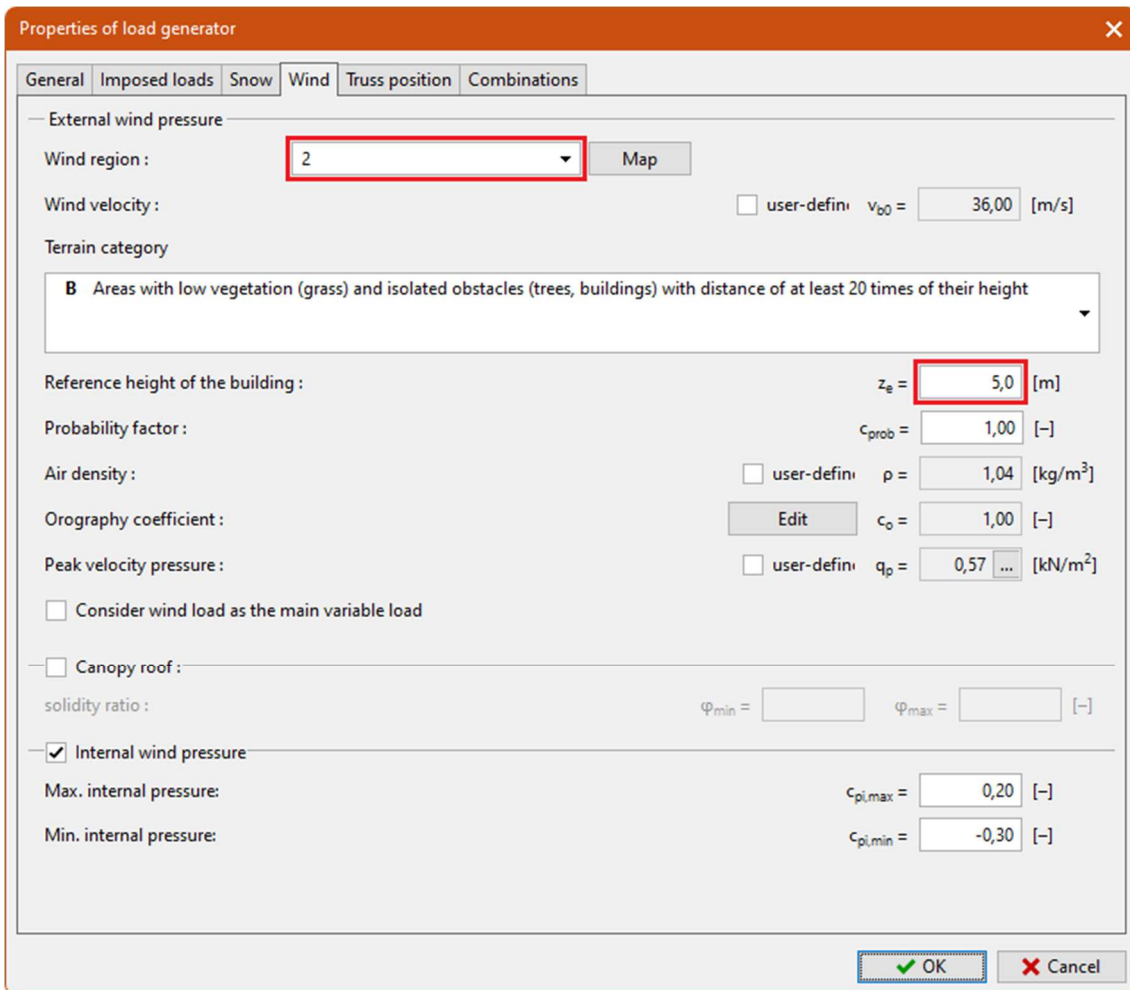
*Input of imposed loads*

On the "**Snow**" tab, just turn off the snow load. This is done by unchecking the "**Consider snow load**" setting.



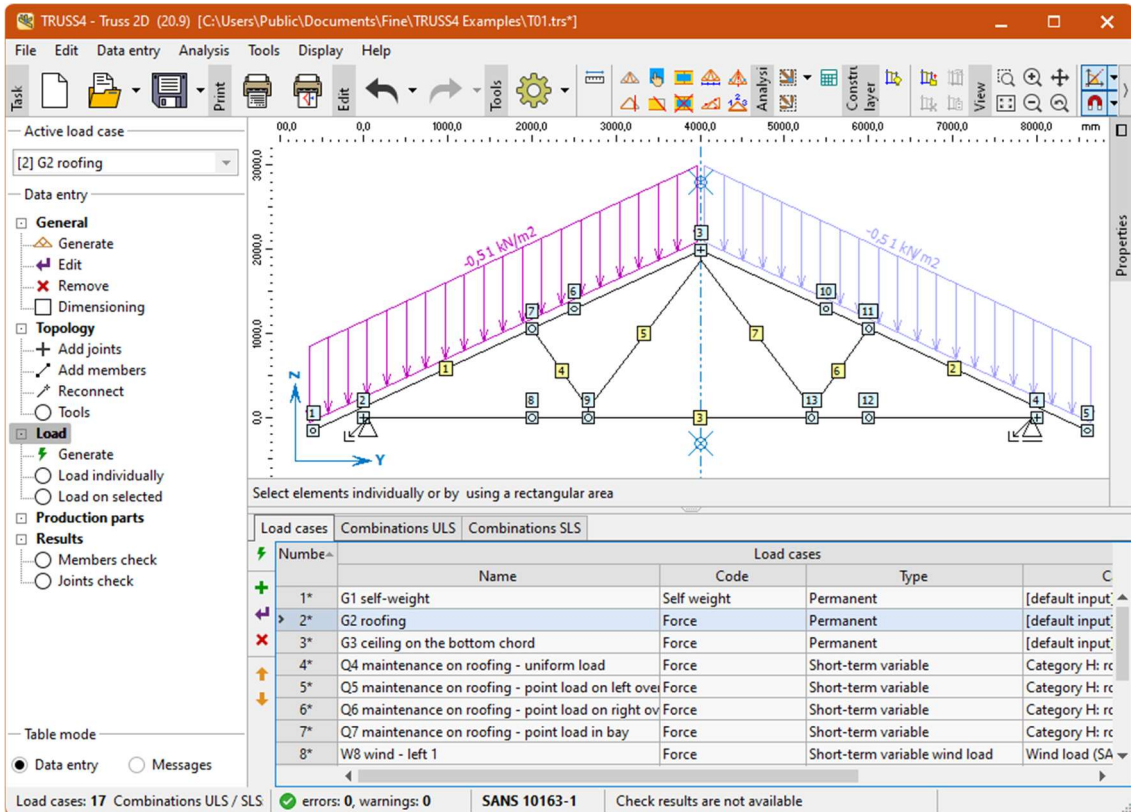
*Switching off snow load*

In the "Wind" section, select wind area 2 and set the "Reference height of the building" to 5m.



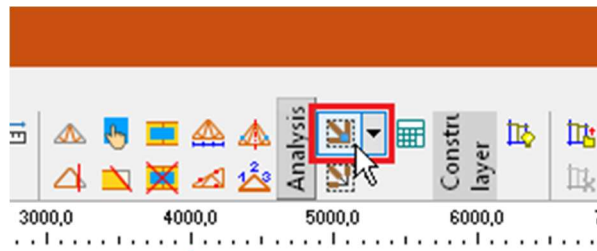
*Wind load properties*

The "Truss position" and "Combinations" tabs contain information about the location of the truss in the structure and how the load combinations are created, respectively. We will not interfere with these parts in this example, so we can exit the load generator with the "OK" button. If we are in the "Load" section of the tree menu, the bottom frame shows us lists of load cases and combinations. If we scroll through the list of load cases, the workspace will always show the considered load for every load case



*Main program window with the list of load cases*

We have entered all the inputs necessary for the calculation, so we can start the automatic design of the structure. This is started with the appropriate icon in the main toolbar (shown in the picture below), the keyboard shortcut "F8" can also be used.



*Starting the automatic design*

When the design is complete, a summary of the results is visible in the status bar. Detailed results can be viewed in the "Results", "Members check" and "Joints check" sections of the control tree.

TRUSS4 - Truss 2D (20.9) [C:\Users\Public\Documents\Fine\TRUSS4 Examples\T01.trss\*]

File Edit Data entry Analysis Tools Display Help

task [2] G2 roofing

Active load case: [2] G2 roofing

Data entry: General

Truss description [Modify]

<b>Name</b>	: T01
<b>Description</b>	:
<b>Number</b>	:
<b>Investor</b>	:

Truss properties [Modify]

<b>Standard</b>	: SANS 10163-1
<b>Material</b>	: Truss thickness is 36 mm
	: truss material 5
<b>Parameters</b>	: Type: truss;
	: truss count 1; total number of plies is 1;
	: number of plies 1; loading width of truss is 760,0
<b>Symmetry</b>	: symmetry check is switched on (general); the truss is recognized as symmetric;
	: coordinate of symmetry axis Y = 4000,0 mm
<b>Suppliers</b>	: timber [catalogue] Timber supplier (max. length 4500 mm); nail plates
	: [catalogue] Test (Fine ltd.) (types: F10, F15, F20); designer [catalogue] Fine Ltd.

Load cases: 17 Combinations ULS / SLS errors: 0, warnings: 0 SANS 10163-1 ULS: members are satisfied, joints are satisfied

Truss assessment in "Truss 2D"

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