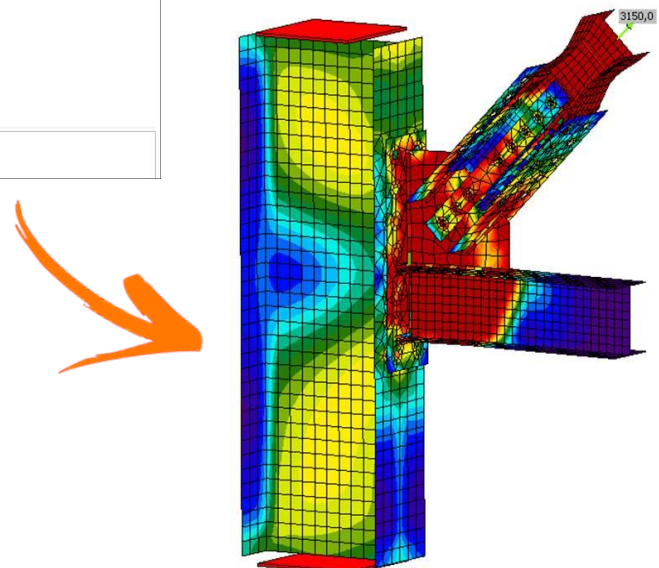
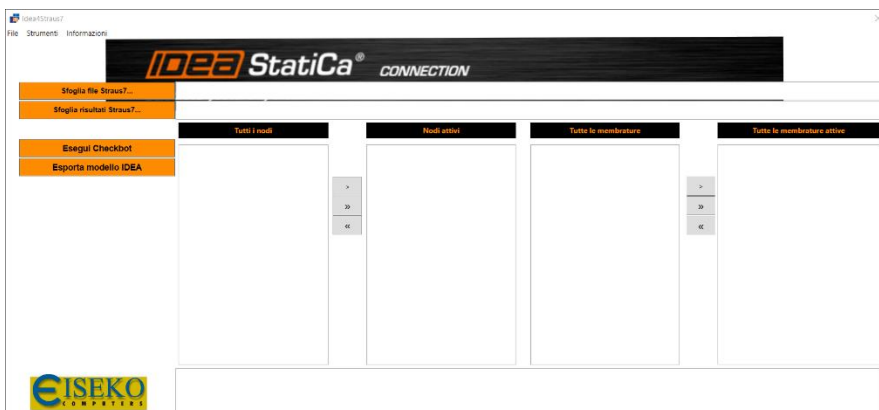
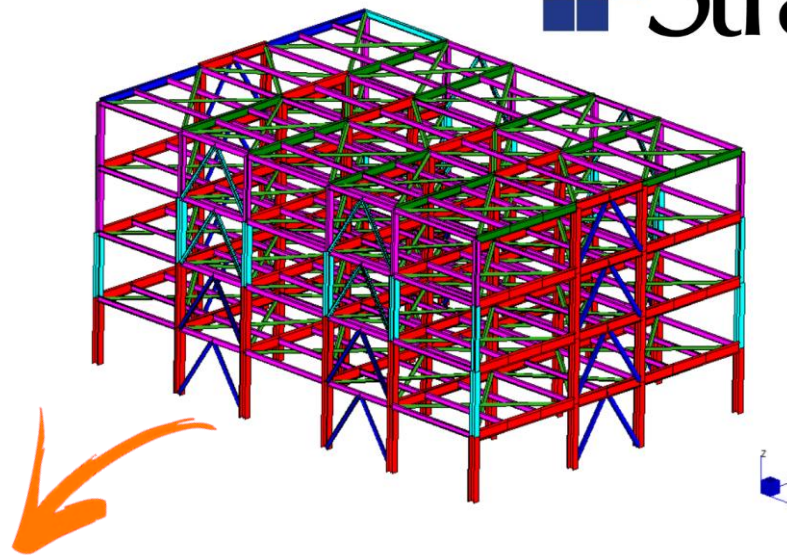


# Idea4Straus7 v2.2.0.1

## User's Manual



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## 1. INTRODUCTION

This is the user manual which describes the main controls and procedures to get started with the software. Additionally refer to IDEA StatiCa support for the [Checkbot](https://www.ideastatica.com/support-center/checkbot-bulk-bim-workflows) available at <https://www.ideastatica.com/support-center/checkbot-bulk-bim-workflows>.

**Idea4Straus7** is a BIM tool to manage and synchronize structural details (connections and members) imported to IDEA Statica directly from Straus7 using an automatic link. This software automatically import the geometry, the forces and moments for several load cases from the global model to IdeaStatica.

This version of the Software is able to manager connections and members from Straus7:

*Connection* → imports selected node to application IDEA StatiCa Connection.

*Member* → imports selected beam to application IDEA StatiCa Member.



The screenshot shows the IDEA StatiCa software interface. The top navigation bar includes 'ACCIAIO', 'CALCESTRUZZO', 'BIM', and 'Support Center'. A sidebar menu on the left lists several options: 'Connection', 'Member', 'Checkbot', 'Connection Lite', and 'Viewer'. The 'Connection' and 'Member' options are highlighted with a blue box. Below the sidebar, there is a section titled 'Progetto della connessioni in acciaio – reinventato' (Steel connection design – reinvented), which describes an innovative way to design and verify all connections and structural unions according to the norm, in a few minutes. This section features three sub-panels: 'Telai 2D & travature reticolari' (2D frames & truss structures), 'Fondazioni, ancoraggi' (Foundations, anchors), and 'Telai 3D & travature reticolari' (3D frames & truss structures). At the bottom of the interface, there is a footer with the text 'Vuoi ottenere la certificazione?' (Do you want to get the certification?) and 'Resta in contatto' (Stay in contact) with social media icons for LinkedIn, Facebook, and YouTube.

This version of the software work with:

- Version 21.1. of IDEA StatiCa
- Version R3.1.1 of Straus7

## **2. TERMS OF USE**

### **2.1 COPYRIGHTS**

You may not sell, redistribute, or reproduce the Software, nor may you decompile, reverse-engineer, disassemble, or otherwise convert the Software to a human-perceivable form. All trademarks and logos are owned by Eiseko Computers S.r.l. and you may not copy or use them in any manner.

### **2.2 USE THE SOFTWARE**

The program has been carefully tested and used before release it, some benchmarks are shown in the following. In using the software, however, the user accepts and understands that is only a tool and no warranty is expressed or implied by the developers or the distributors on the accuracy or the reliability of the program. The user must explicitly understand the assumptions of the program and must independently verify the results.

### 3. CONVENTIONS AND THEORETICAL BACKGROUND

#### 3.1 IDEA CONNECTION INTERNAL FORCES APPLICATION

#### 3.2 GLOBAL COORDINATE SYSTEM

All coordinate systems used are right-handed:

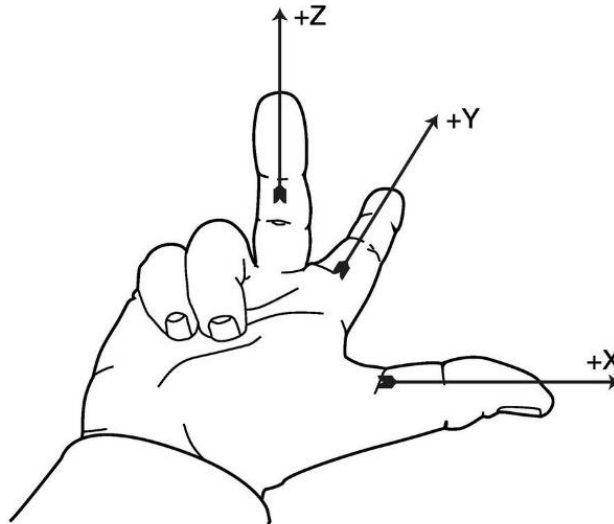


Fig. 1 Right hand rule.

X-axis of global coordinate system is horizontal and leads from left to right. Y-axis of global coordinate system is horizontal and leads backward. Z-axis of global coordinate system is vertical and leads upwards.

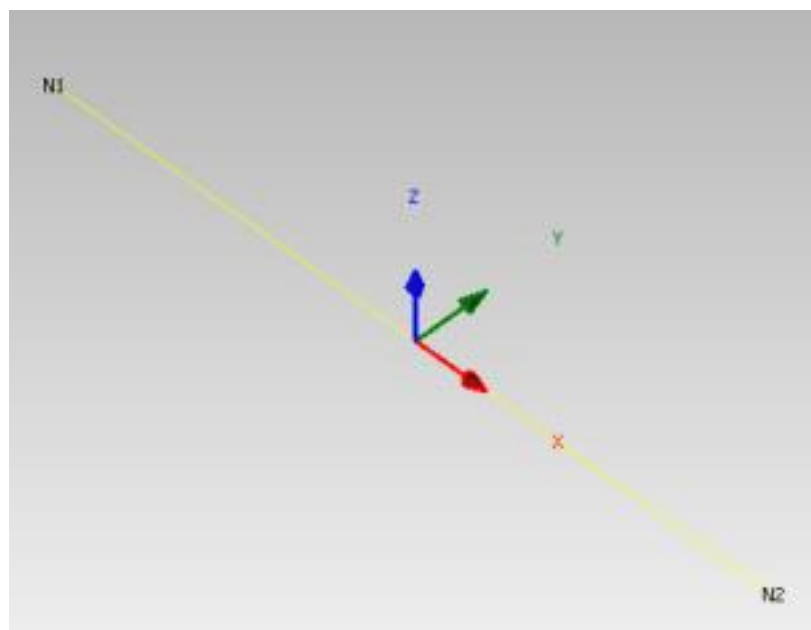
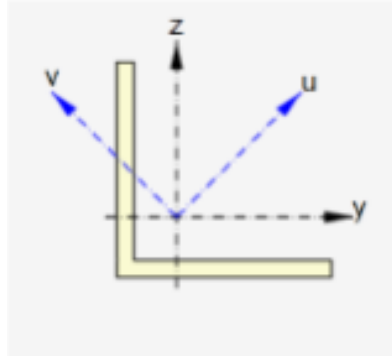


Fig. 2 Idea coordinate system of the a beam element - Local coordinate system of 1D member.

Each 1D member is defined with begin and end node. Each 1D member has local coordinate system, which origin is in begin node of member. Local x axis of 1D member is identical with member axis and is oriented from begin to end node of 1D member. Local Y axis of member is horizontal in general and local z axis leads upwards.

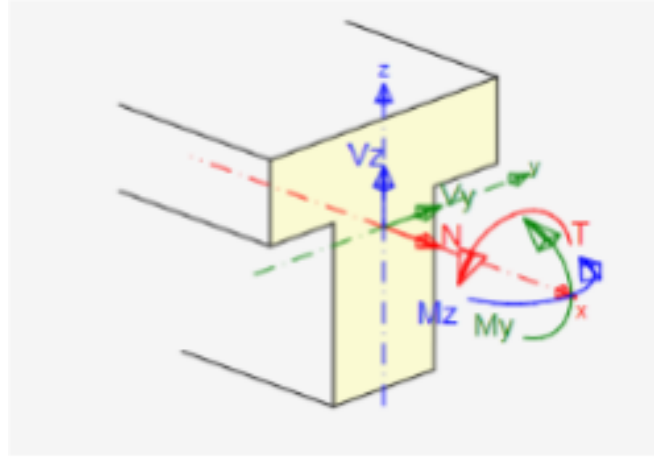
Coordinate system of cross-sections



Cross-section has reference axes y (horizontal) and z (vertical). Principal axes of cross-section are marked with u and v. If reference axes are identical with main central axes of cross-section, only reference axes are drawn.

### 3.3 CONVENTION OF INTERNAL FORCES ON 1D MEMBERS

#### 3.3.1 IDEA CONNECTION FORCES AND MOMENTS CONVENTIONS



Internal forces on 1D members perform following actions:

- positive bending moment  $M_y$  causes tension in cross-section fibers with negative  $z$ -coordinate.
- positive bending moment  $M_z$  causes tension in fibers with negative  $y$ -coordinate
- positive torsional moment  $M_x$  acts about  $x$ -axis of 1D member.
- positive axial force  $N$  acts in direction of  $x$ -axis of member and causes tension in cross-section fibers.
- positive shear force  $V_z$  acts in direction of  $z$ -axis of cross-section.
- positive shear force  $V_y$  acts in direction of  $y$ -axis of cross-section.

#### 3.3.2 STRAUS7 INTERNAL FORCES AND MOMENTS CONVENTIONS

- In each plane, a positive shear force shears the N1 side of the beam towards the positive side of the axis.
- In each plane, a positive bending moment generates compressive fibre stress on the positive side of the axis.
- Positive Axial Force: Tension
- Negative Axial Force: Compression
- The convention for torque is a right hand moment about the 3 axis.

### 3.4 INTERNAL FORCES AND MOMENT

### 3.5 DEFAULT LOCAL AXIS

#### 3.5.1 "H" MEMBERS

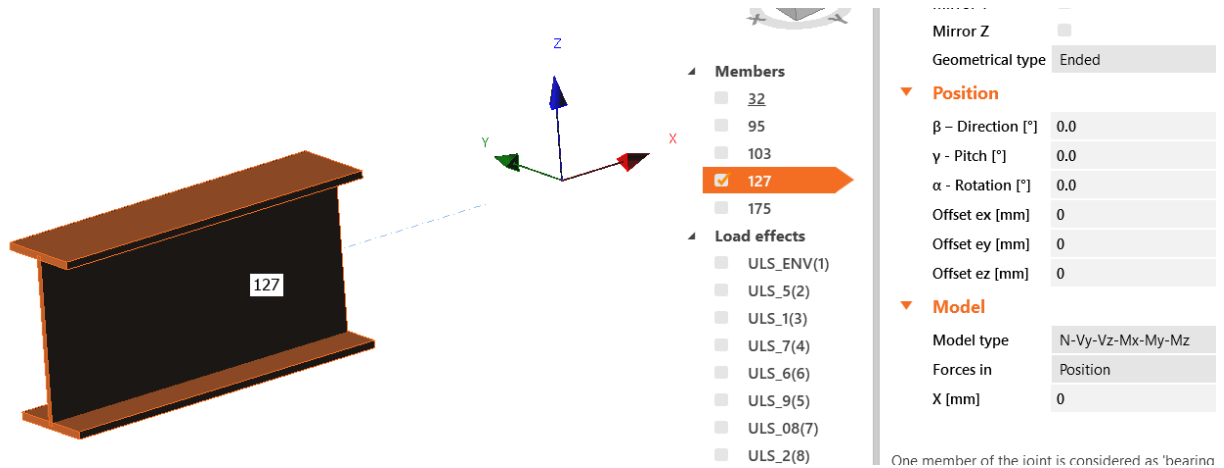


Fig. 3 IDEA StatiCa

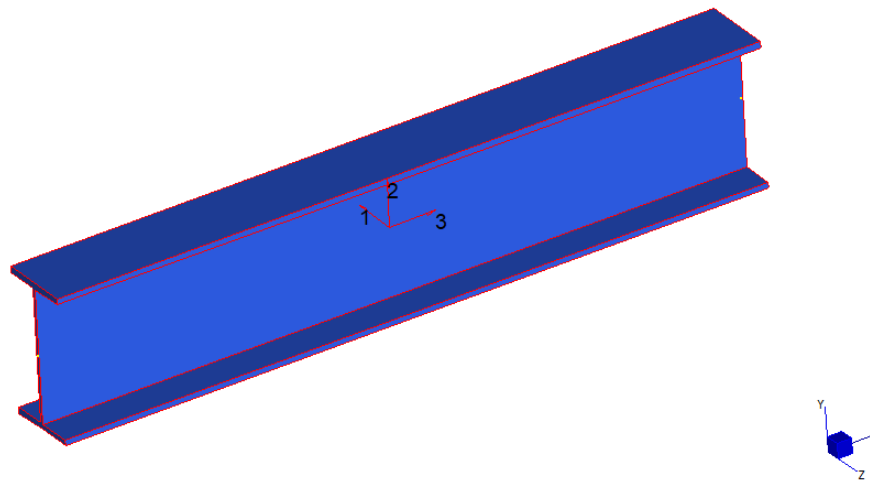


Fig. 4 Straus7



3.5.2 "C" MEMBERS

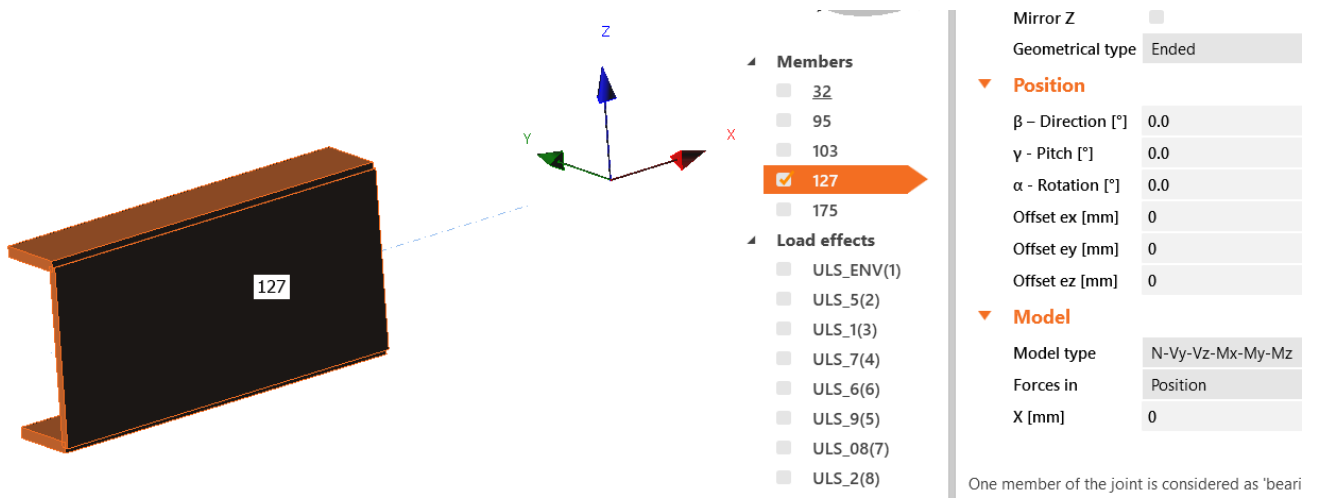


Fig. 5 IDEA StatiCa

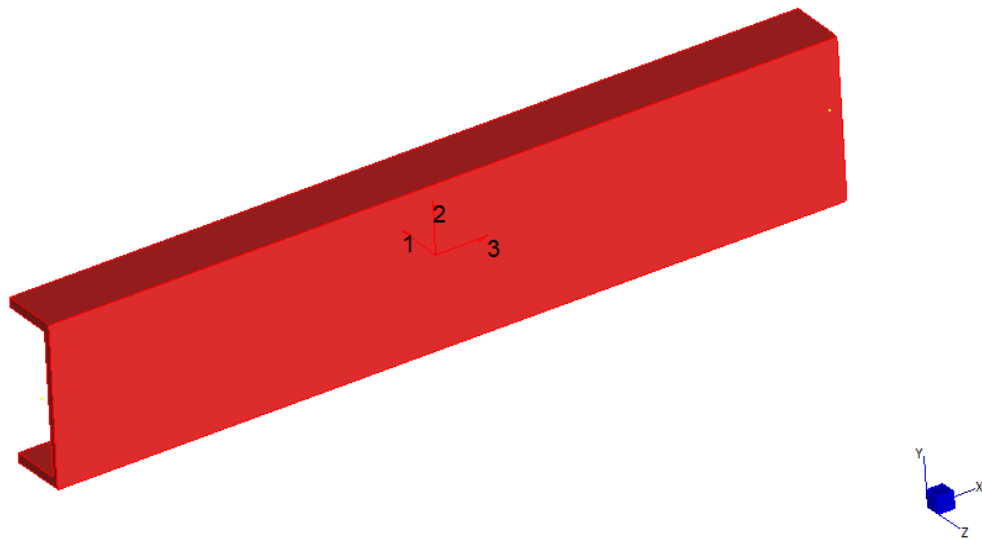


Fig. 6 Straus7

3.5.3 "L" MEMBERS WITH NON EQUAL LEGS

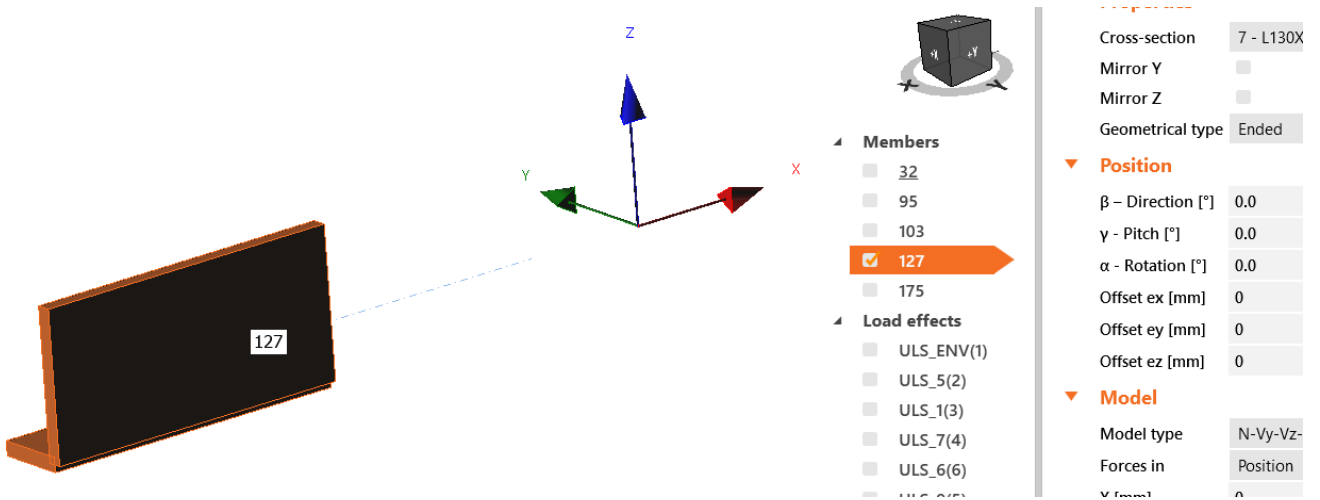


Fig. 7 IDEA StatiCa

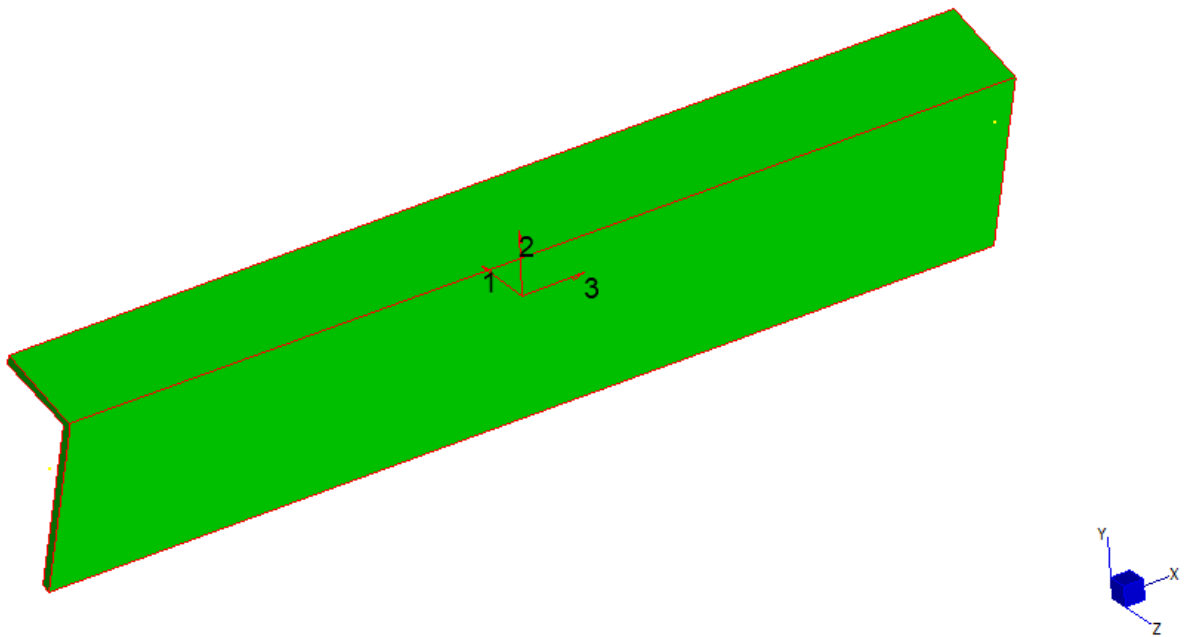


Fig. 8 Straus7

3.5.4 "L" MEMBERS WITH EQUAL LEGS

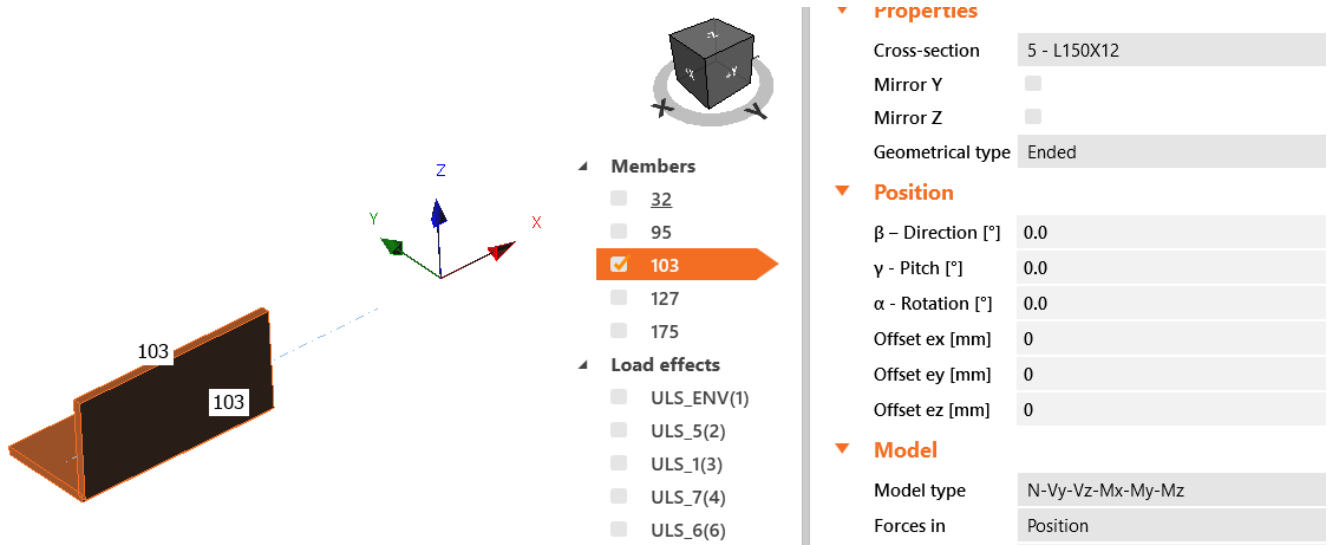


Fig. 9 IDEA StatiCa

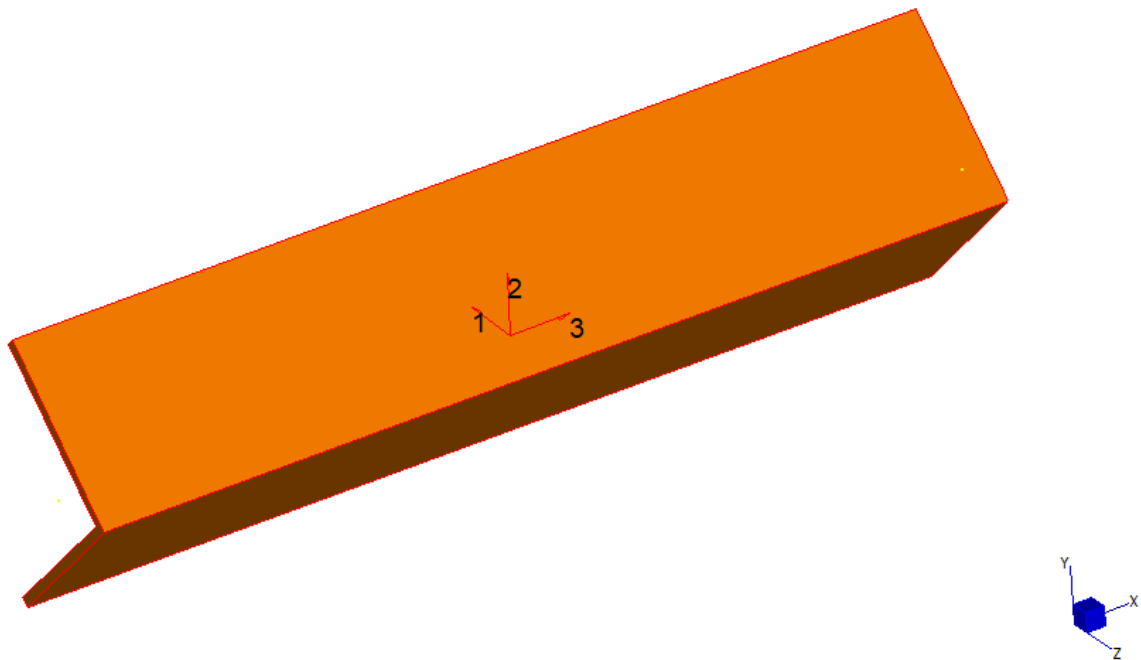


Fig. 10 Straus7

## 4. HOW TO USE THE STRAUS7 BIM LINK

### 4.1 USER INTERFACE

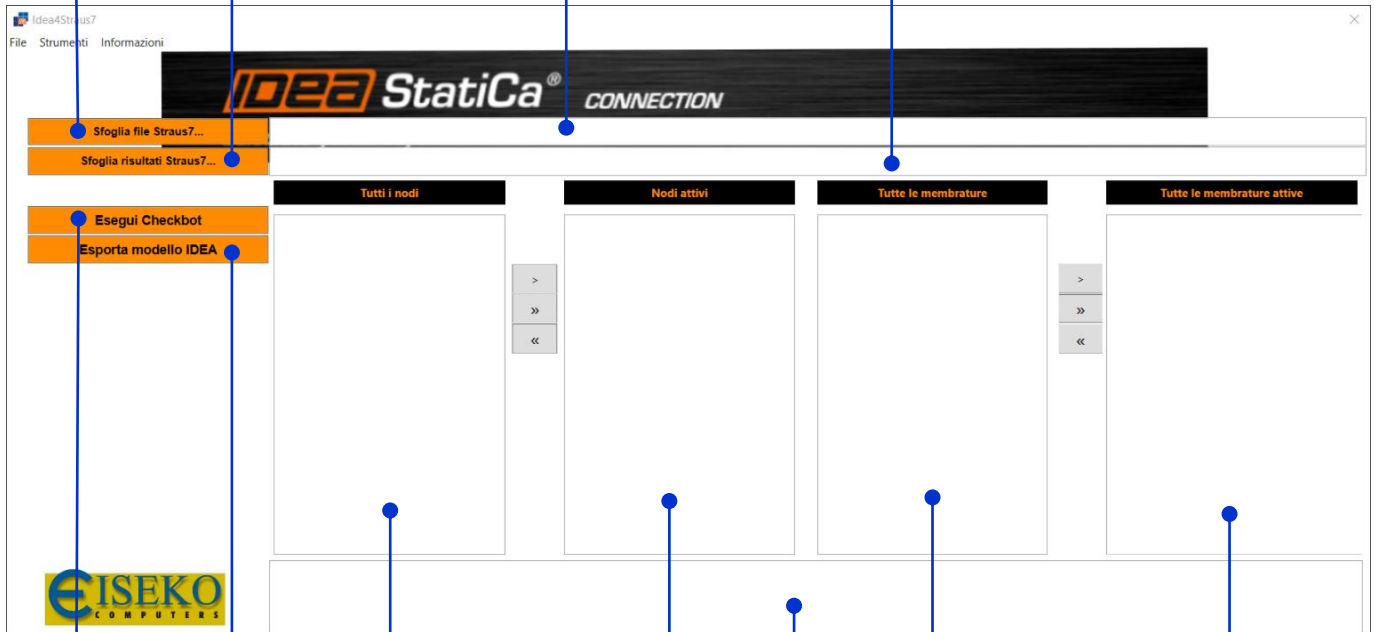
User interface window is shown in the picture below:

Button for Straus7  
model selection

Straus7 model path

Straus7 solution path

Button for Straus7  
solution selection



Run  
Checkbot

All connections  
available in the  
Straus7 model

Active connections  
for Checkbot

All members  
available in the  
Straus7 model

Active members  
for Checkbot

Export model  
for IdeaStatiCa

Log bar

About button, define the version some main information about the Software:

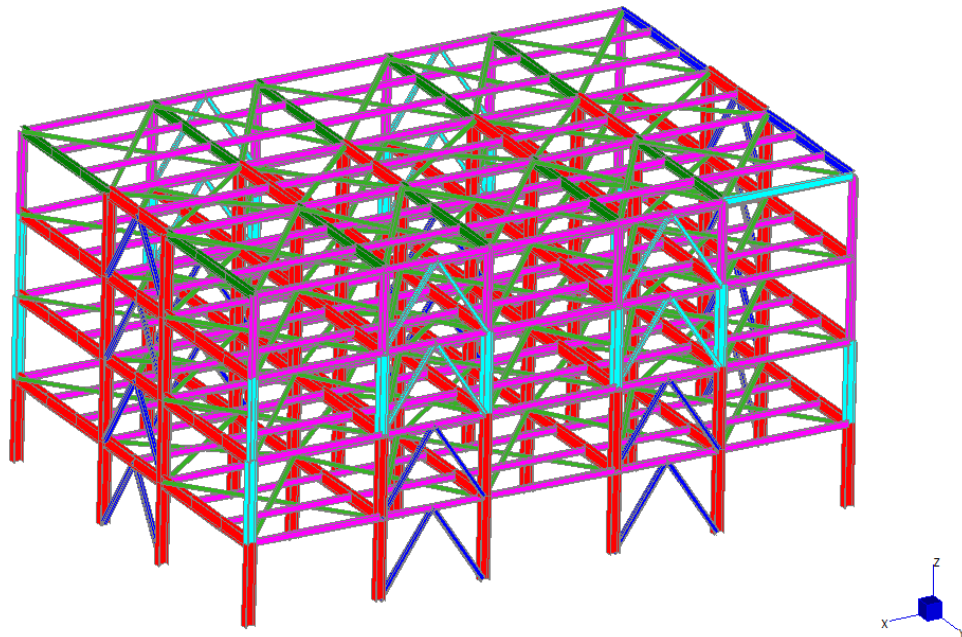


## 4.2 EXPORT CONNECTIONS

### 4.2.1 IDEASTATICA CHECKBOT

In the following the IDEA StatiCa Ceckbot is linked together with Straus7 to export connections and members through the software.

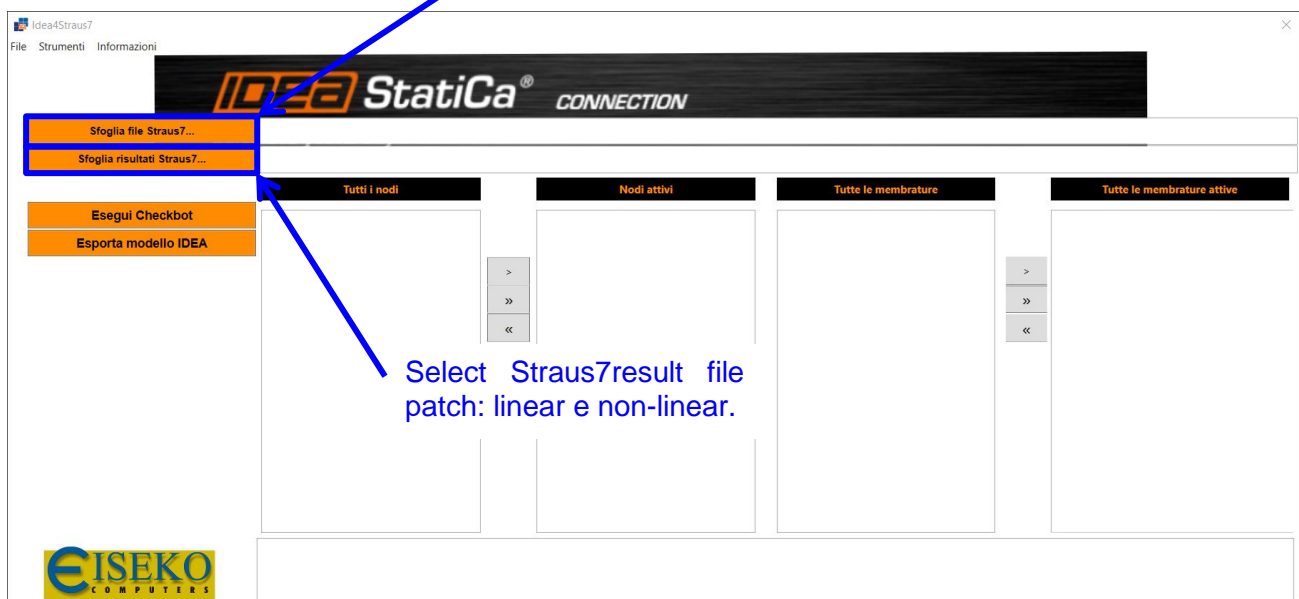
The following Straus7 FE model is used as a reference model:

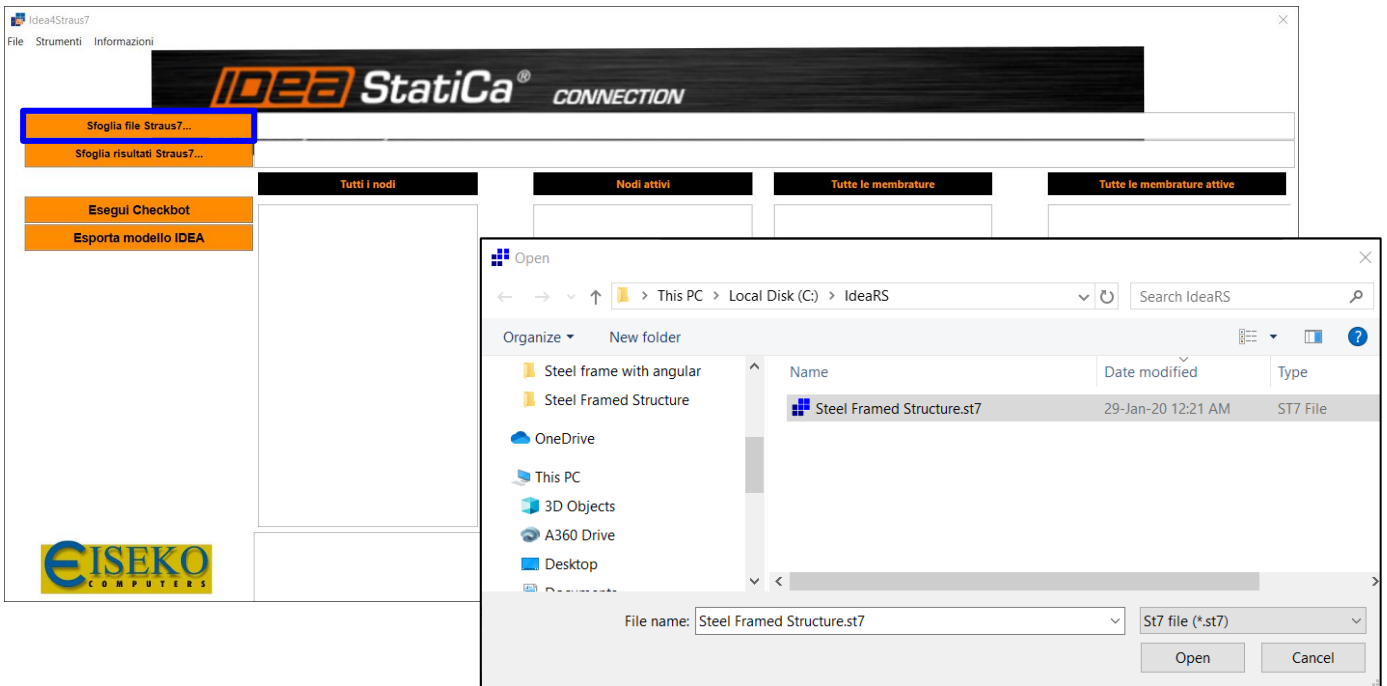


Run the Idea4Straus7 application. A wizard window is opened:

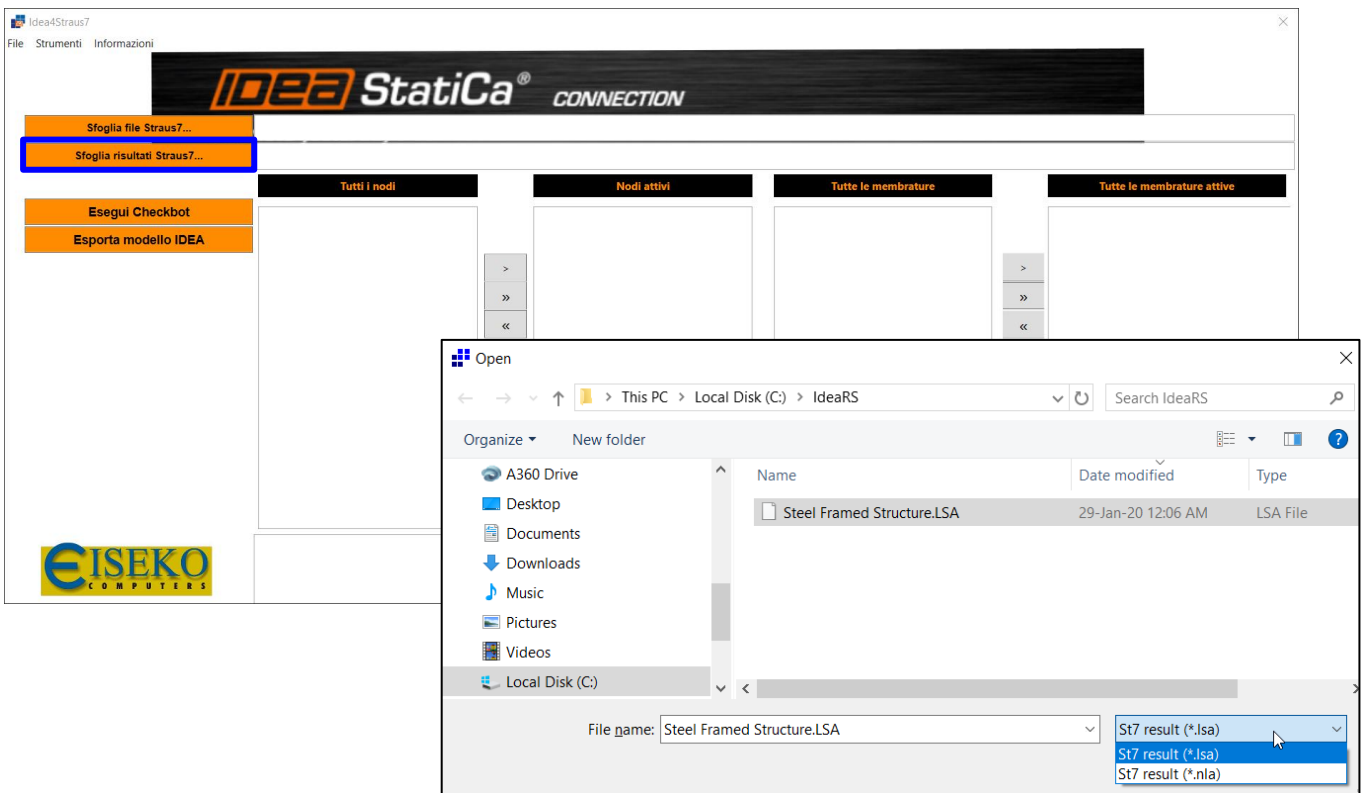
Click on **Sfoggia file Straus7...** and select .st7 FE model file path:

Select Straus7.st7 file  
patch





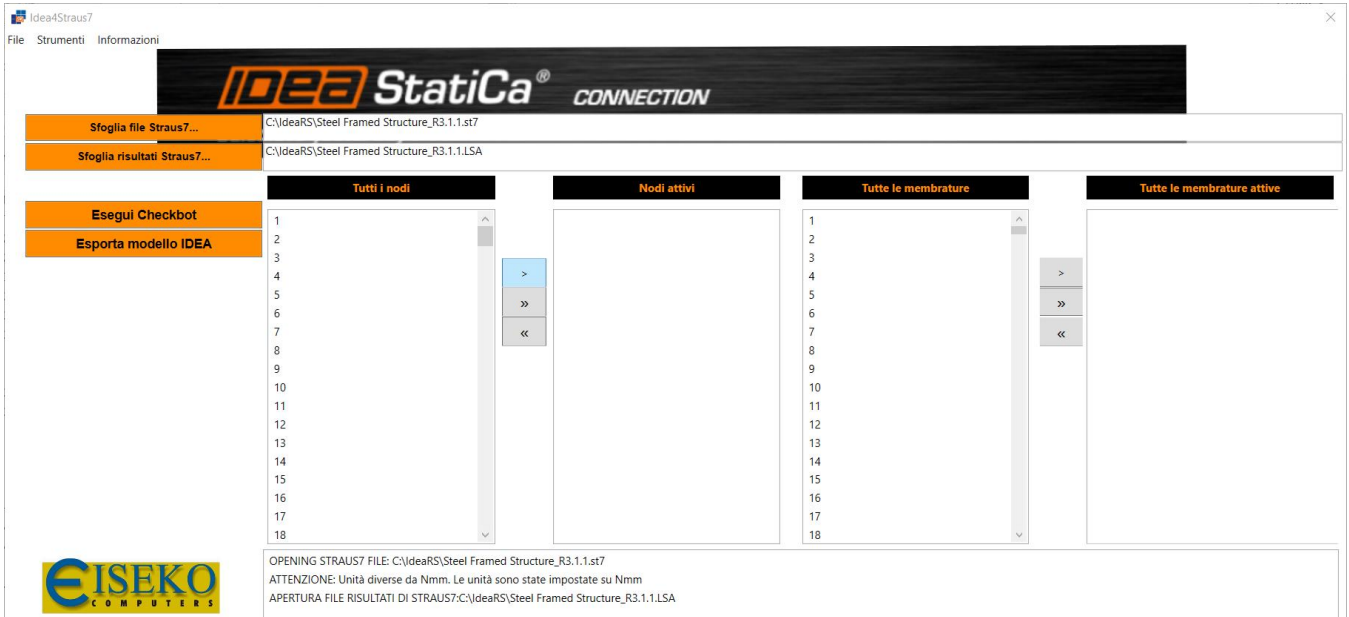
Click on **Sfoglia risultati Straus7...** and select .st7 FE model result file path:



Now the list of FE available connections and members appear:

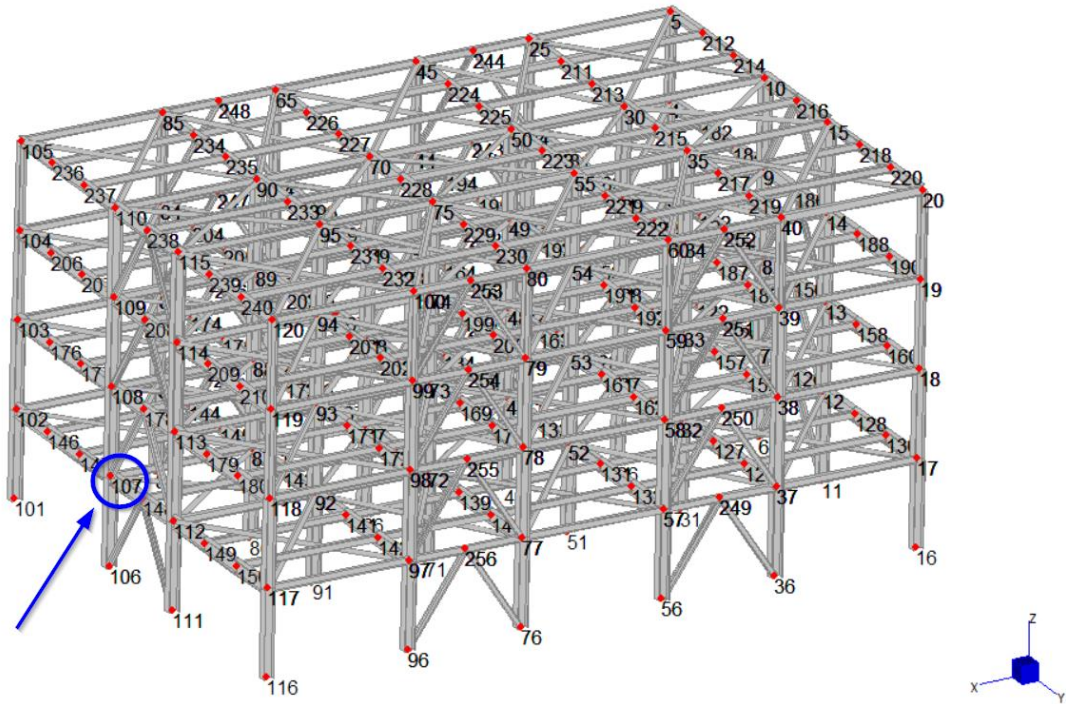
From this menu is possible to choose the members and connection to be exported from Straus7:

Connection 107  
Member 10

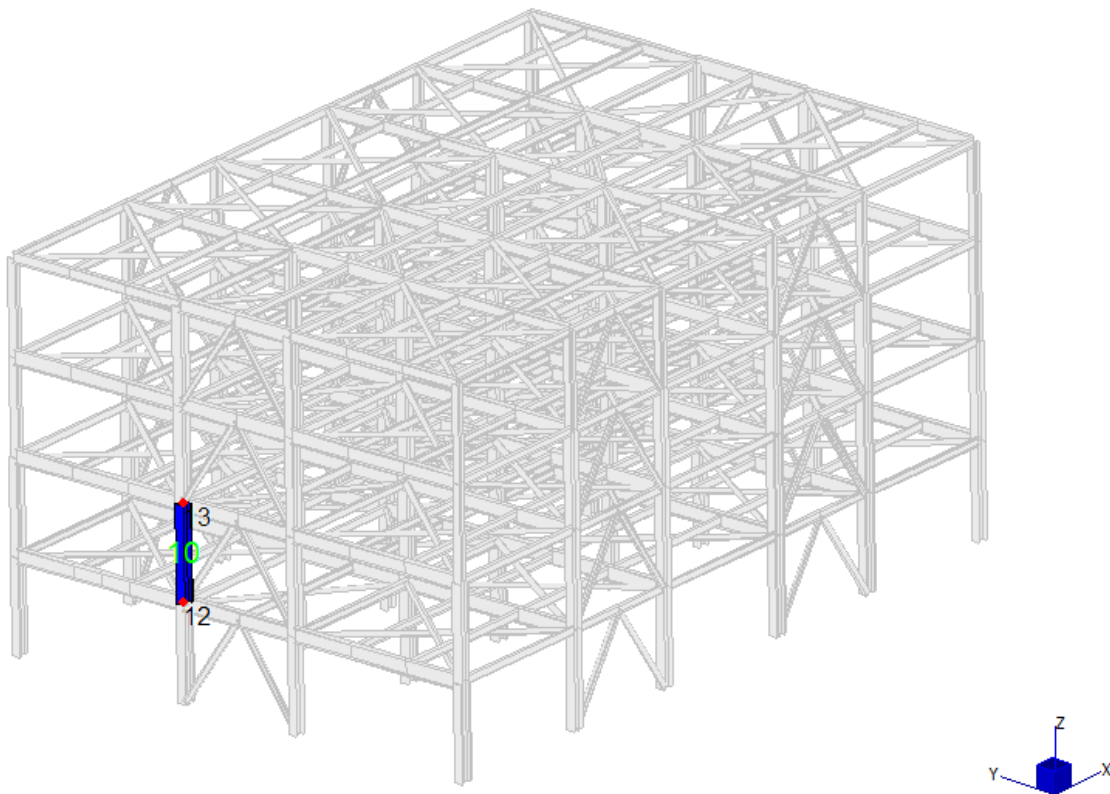




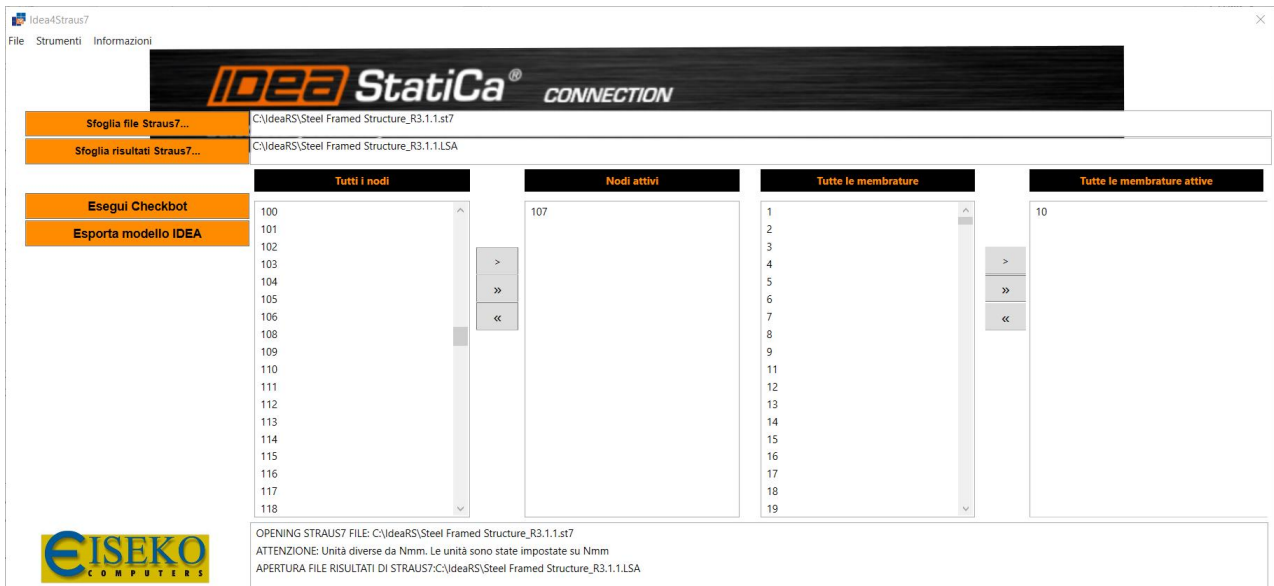
Connection position in the Straus7 model:



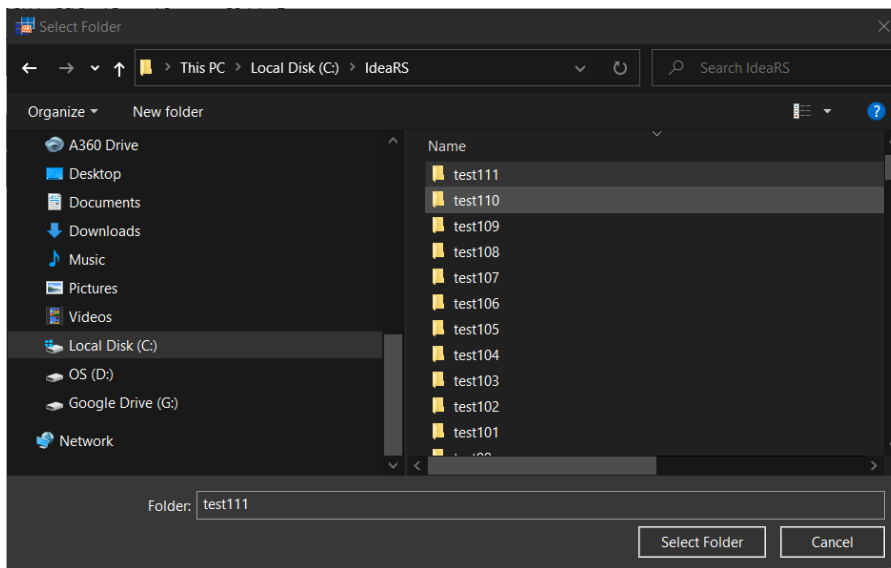
Member position in the Straus7 model:



Now the Ceckbot button will be clicked:



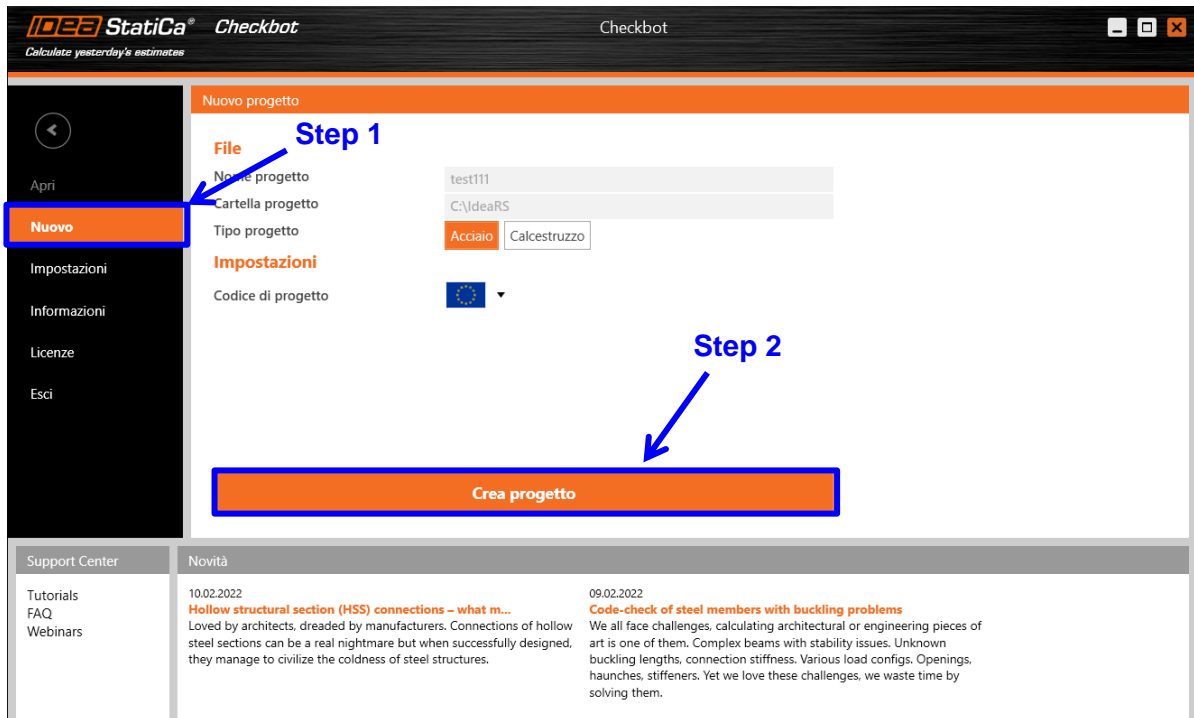
A folder for the Ceckbot resulting file is requested:



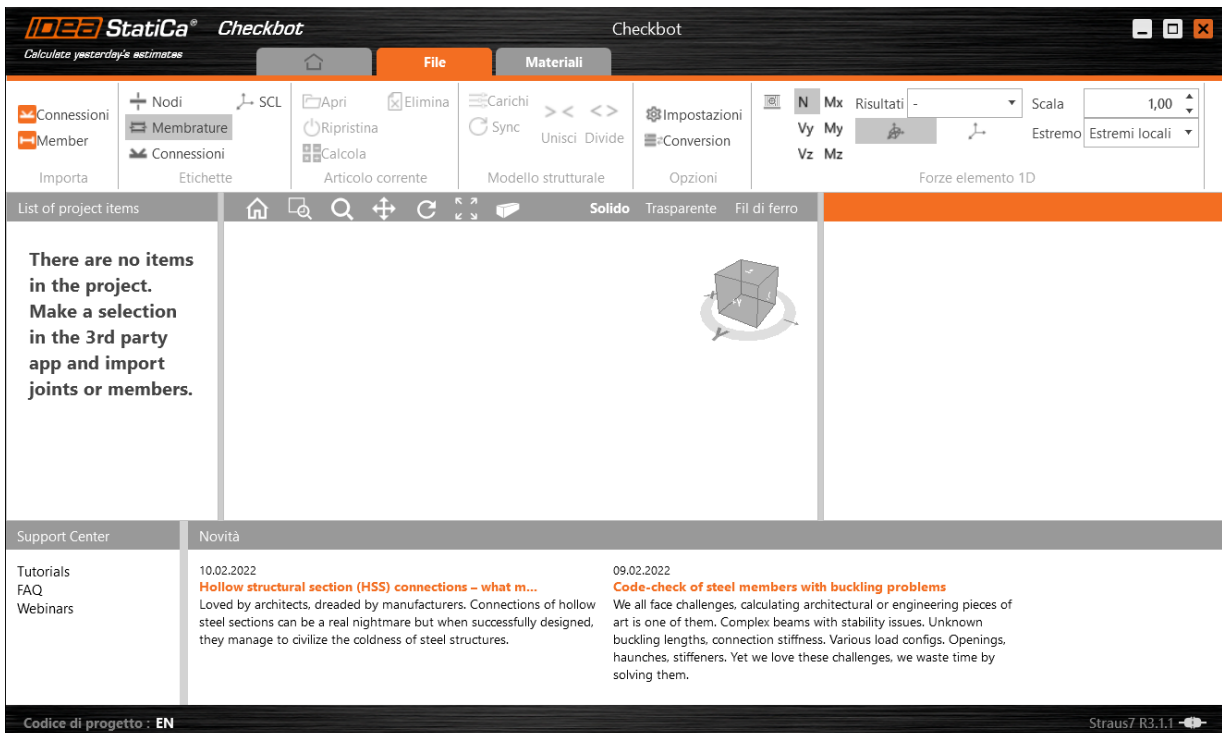
And the IDEA Ceckbot will run:



The Ceckbot windows will start start. Then, the following steps should be followed:

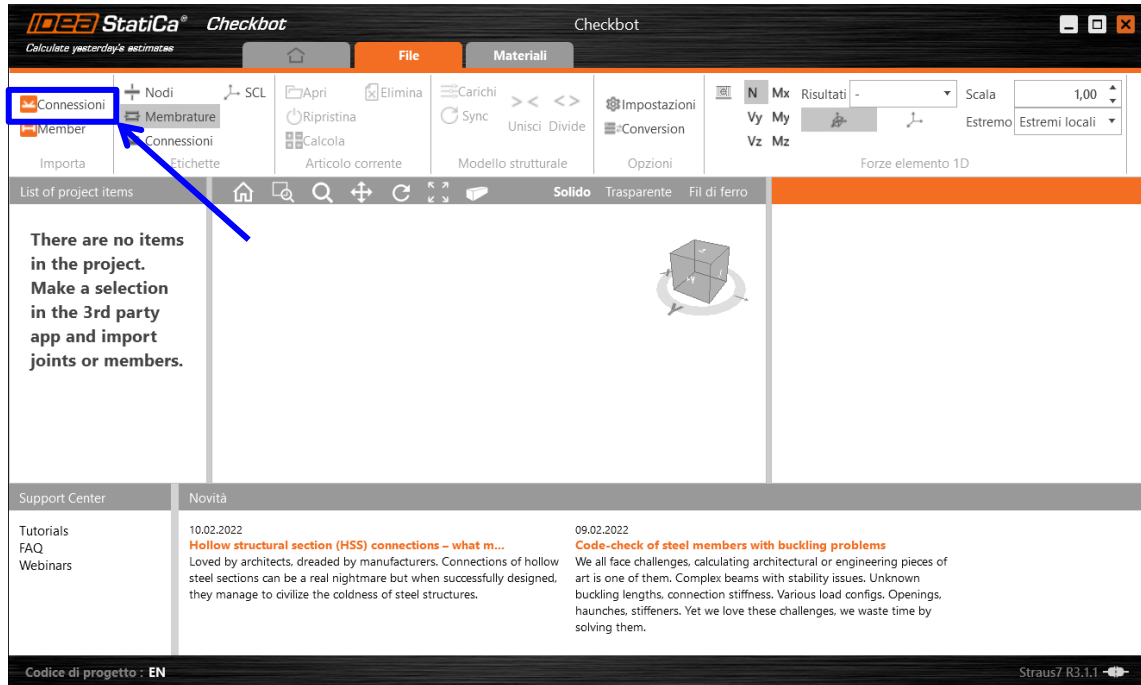


The Ceckbot pops up and you select the desired Design code. Now the windows will change for the next step:

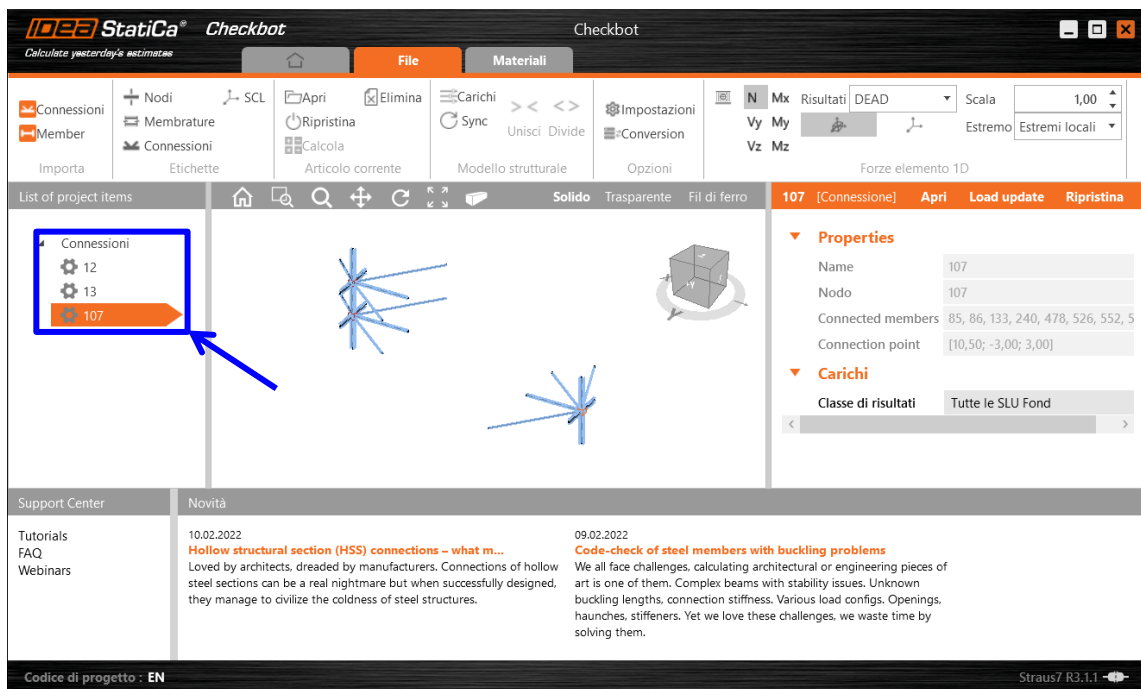


#### 4.2.2 EXPORT CONNECTIONS

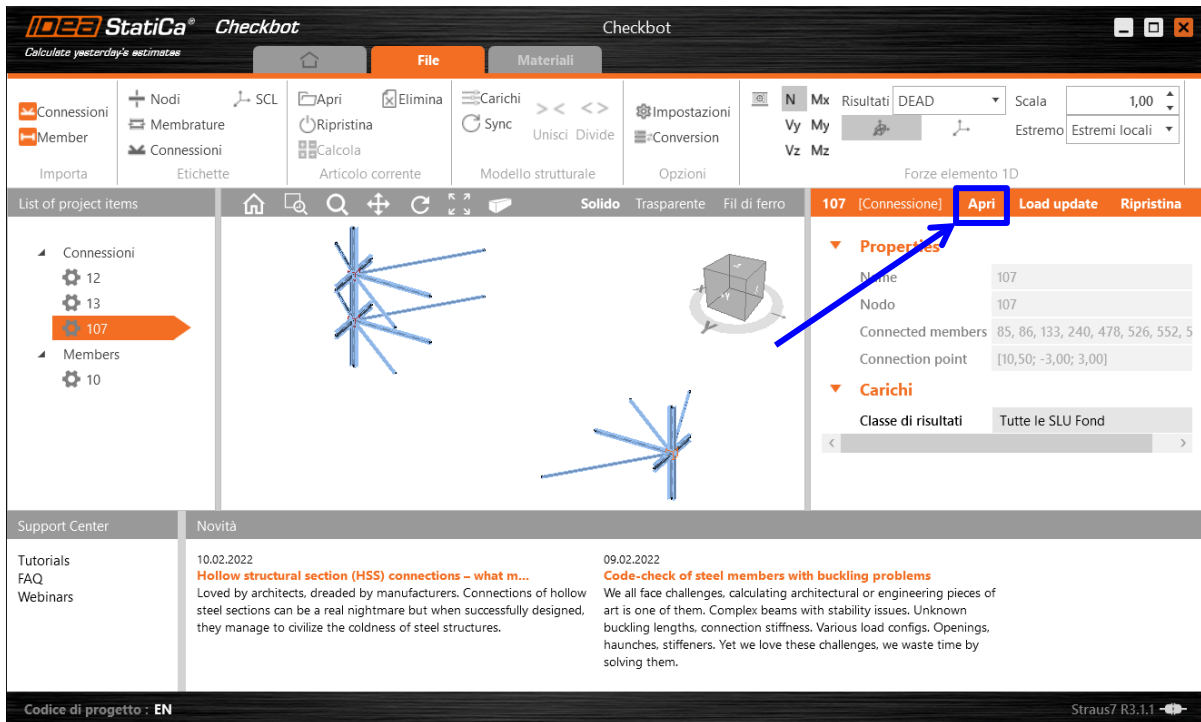
Click on “Connections” to filter the connections:



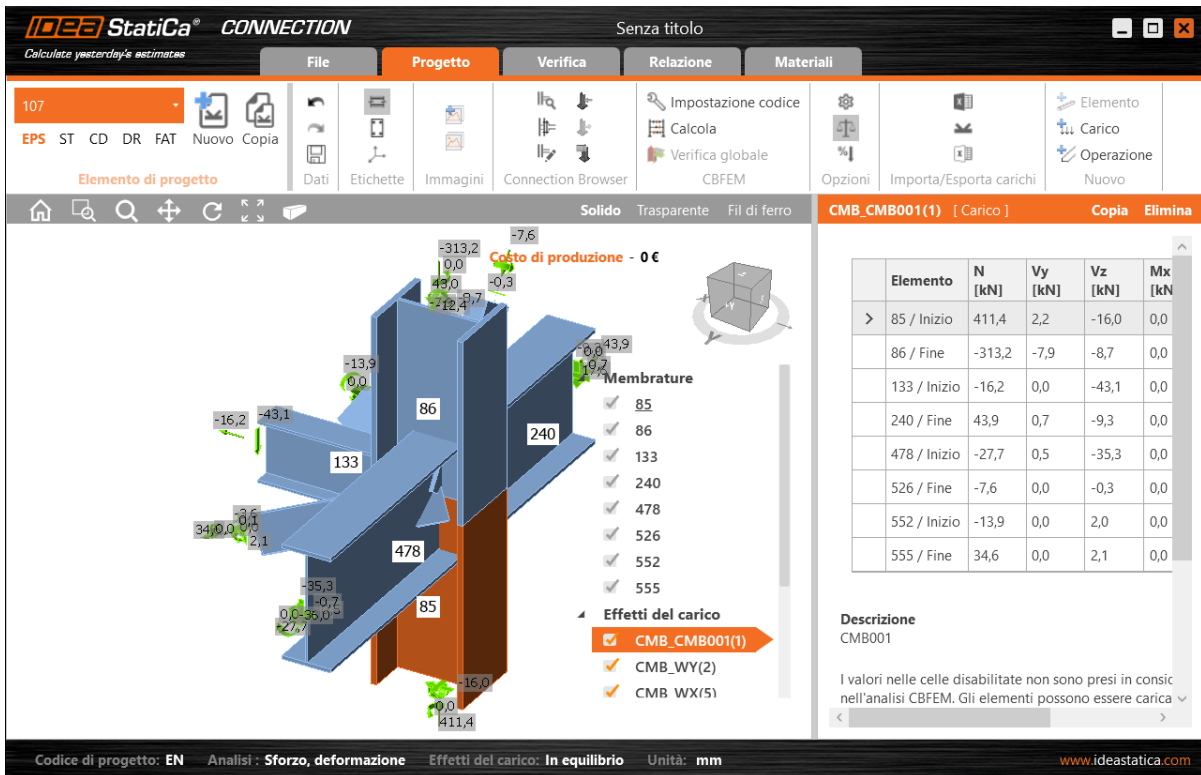
All the selected connections are shown:



Export for the connection:

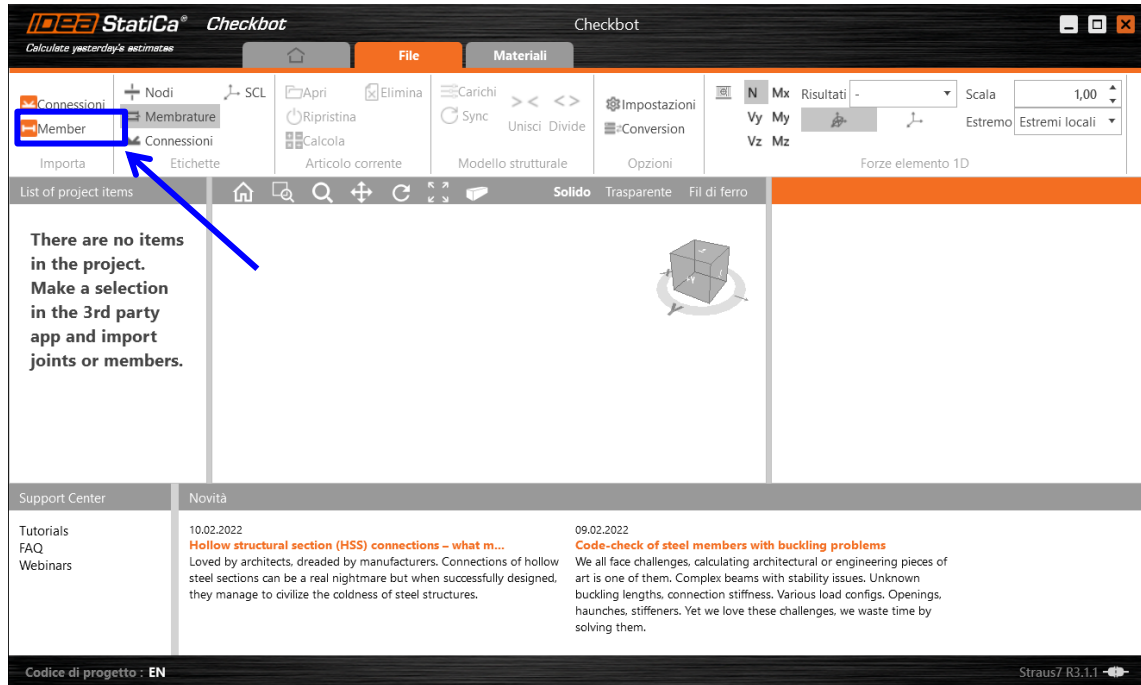


IDEA StatiCa Connection application will start:

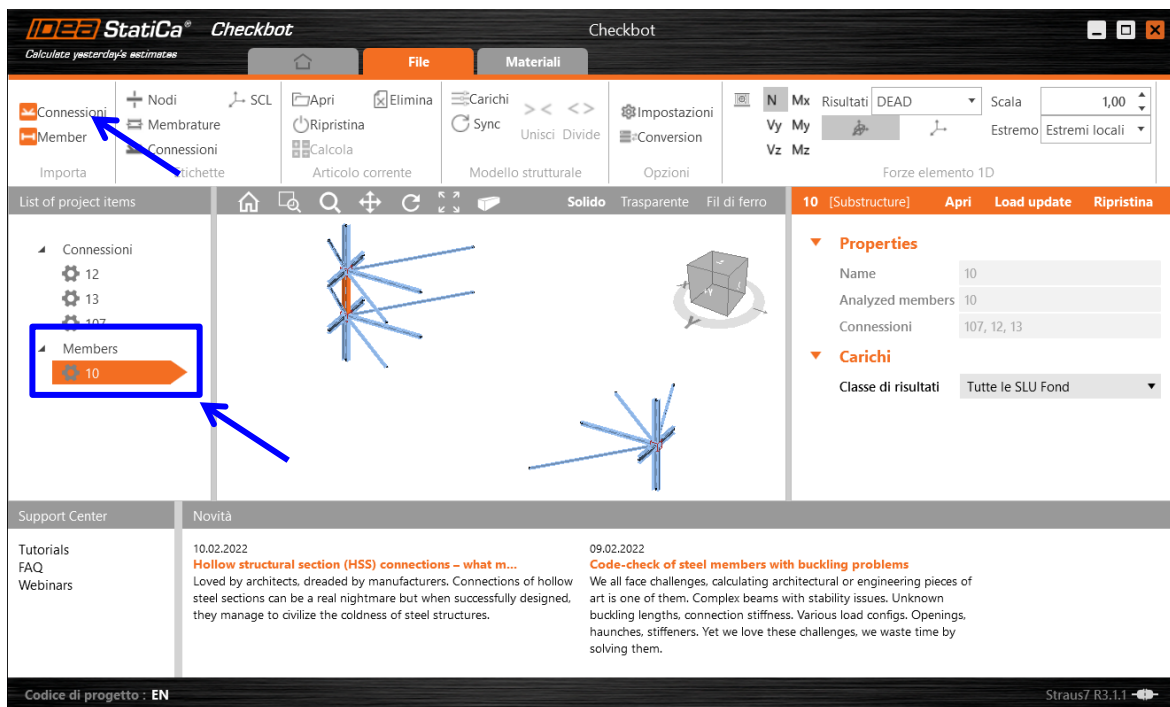


### 4.2.3 EXPORT MEMBERS (AND CONNECTIONS)

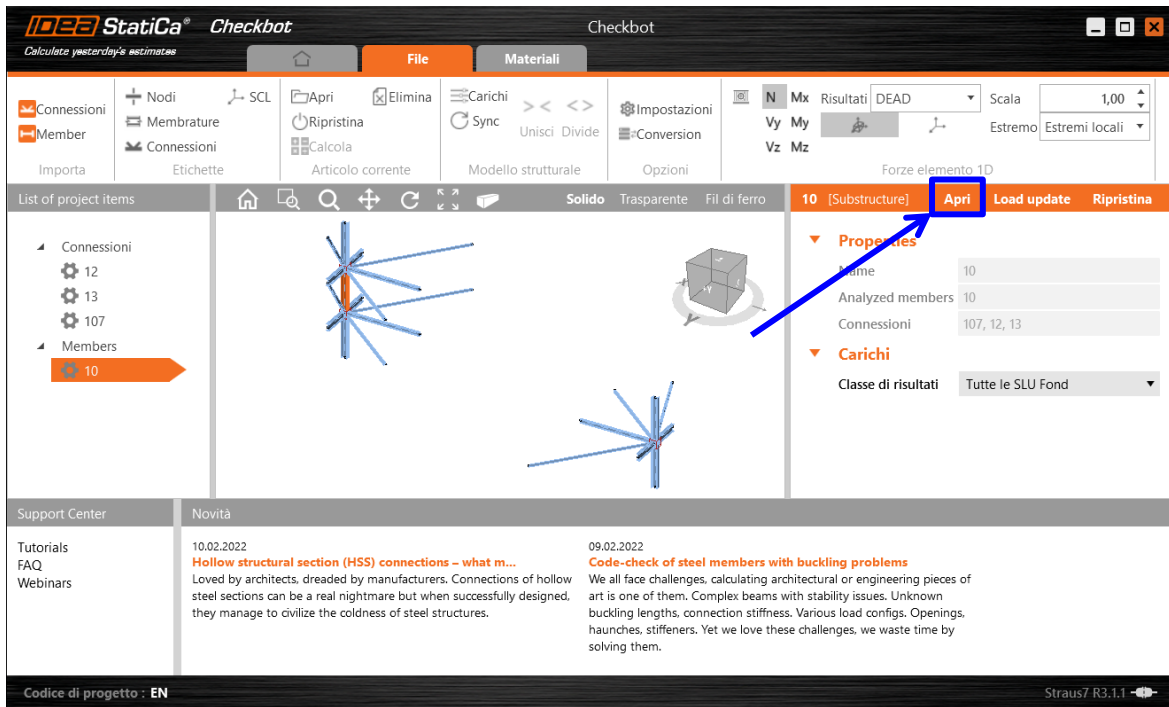
Click on “Member” to filter the members:



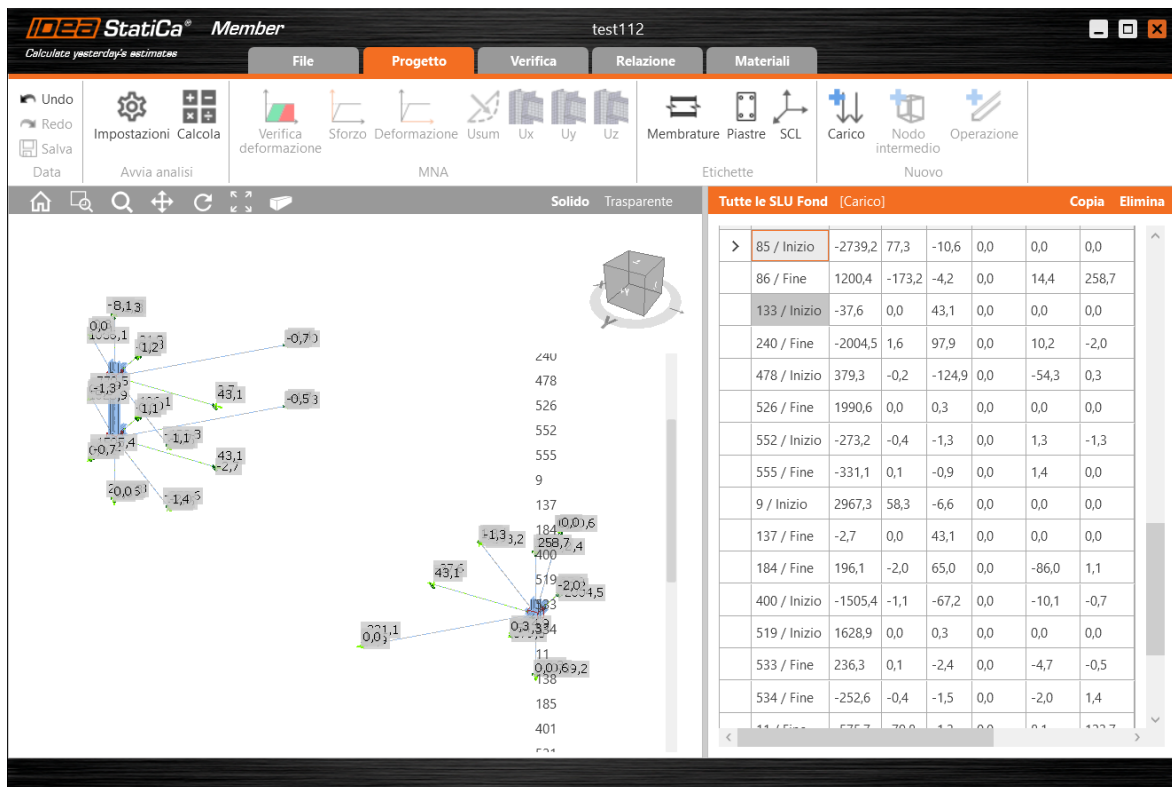
All the selected members are shown:



Export for the beam:



IDEA StatiCa Member application will start:



### 4.3 SUPPORTED SECTIONS

The following sections are supported for export from Straus7:



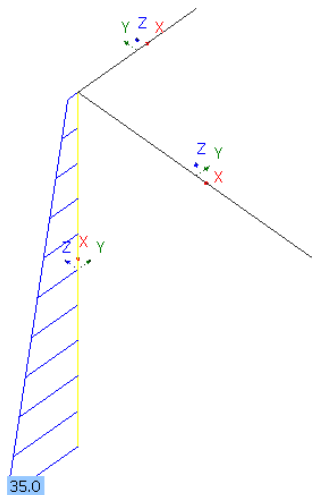
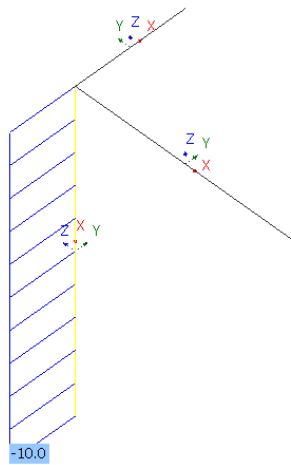
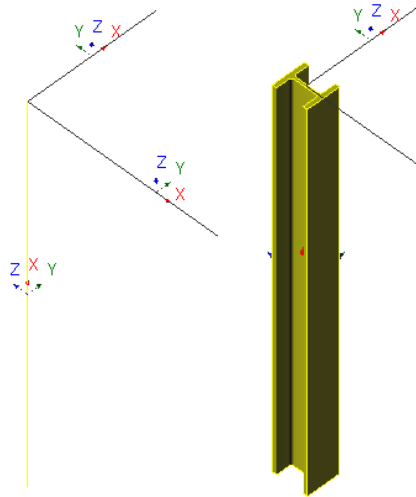
Where the section is not supported, and equivalent rod bar is applied and this can be changed later in the IdeaConnection Designer, in short there are no limits for the applications.



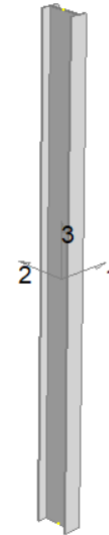
## 5. BENCHMARKS

### 5.1 TEST – FORCES - SINGLE FRAMES

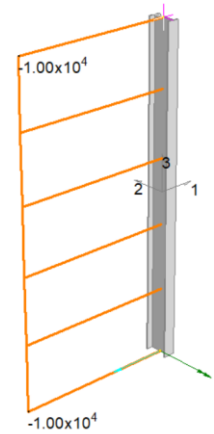
#### IDEA BIM



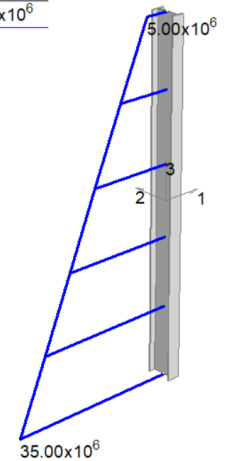
#### STRAUS7



	MIN	MAX
SF1(N)	$-1.00 \times 10^4$	$-1.00 \times 10^4$

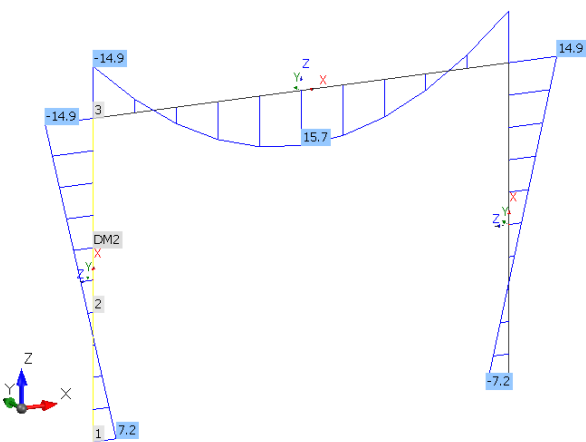
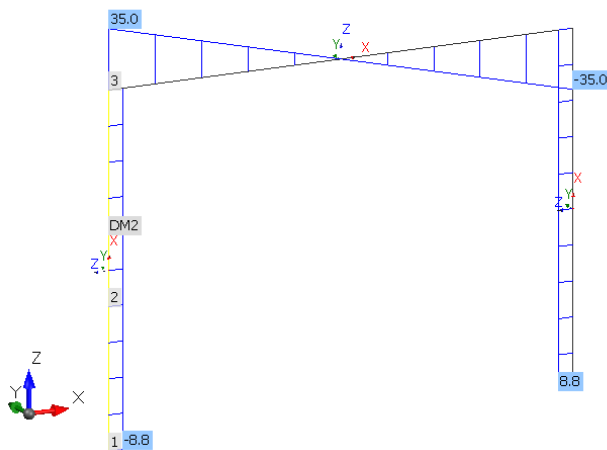
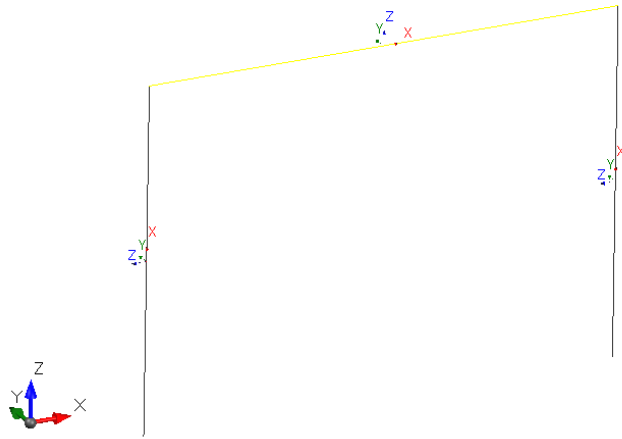


	MIN	MAX
BM1(N.mm)	$5.00 \times 10^6$	$35.00 \times 10^6$

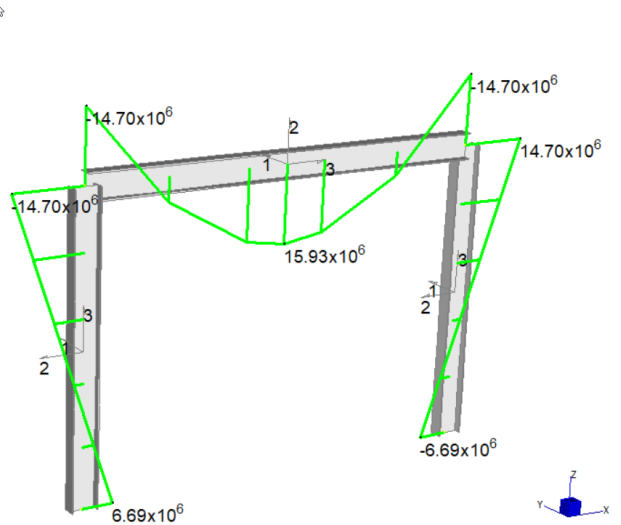
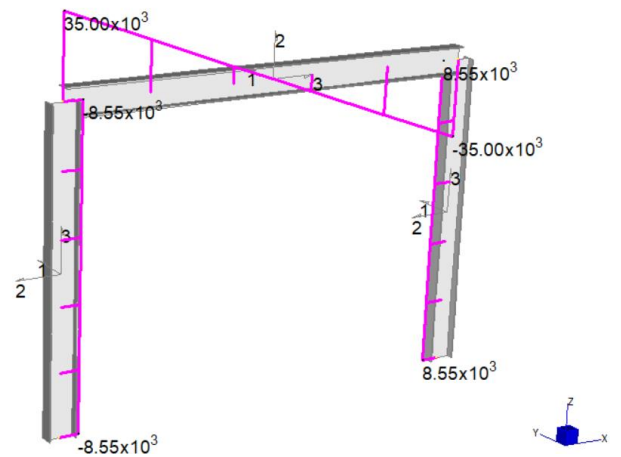
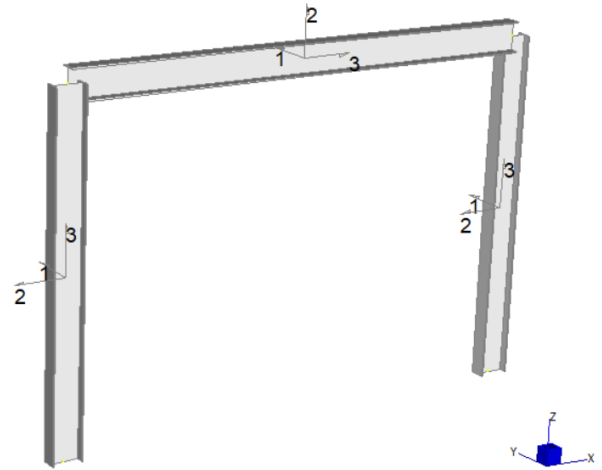


5.2 TEST – FORCES - PORTAL FRAME

**IDEA BIM**

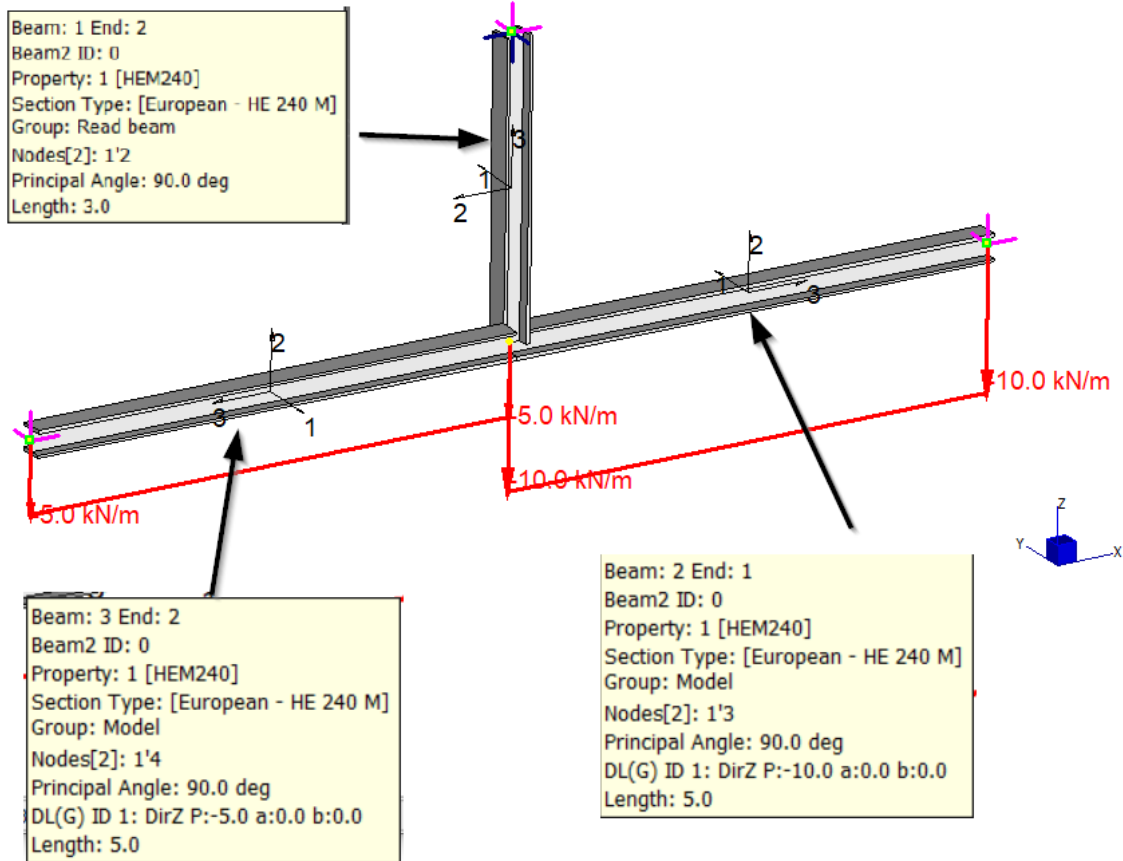


**STRAUS7**



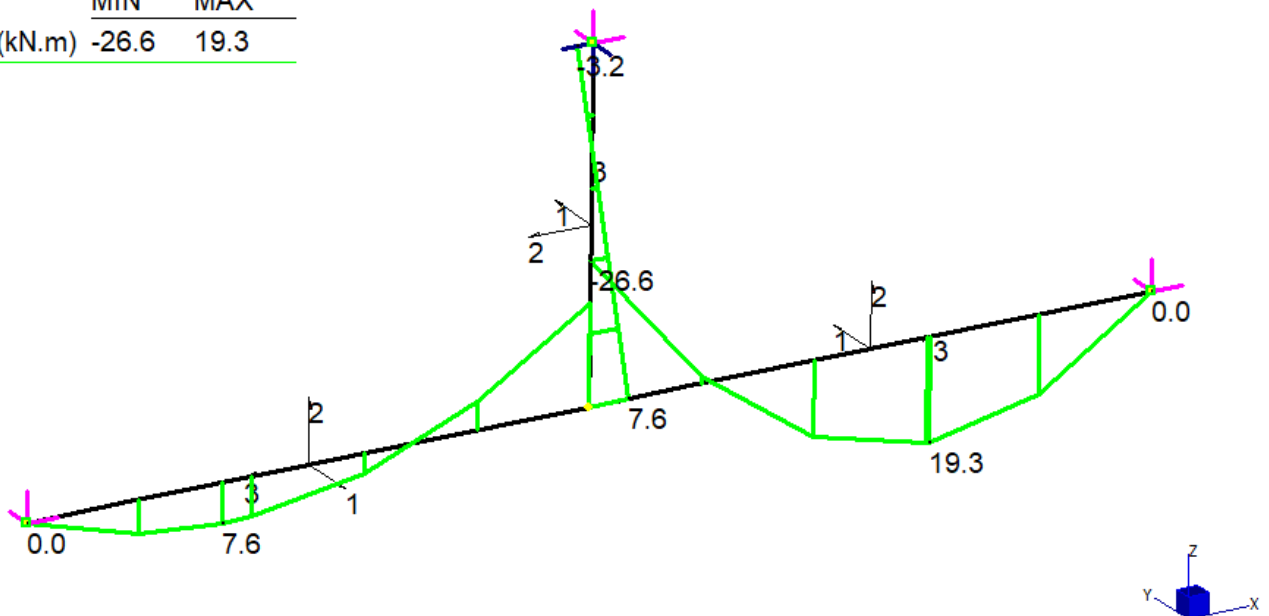
### 5.3 TEST – FORCES - CONTINUOUS BEAM

#### 5.3.1 STRAUS7



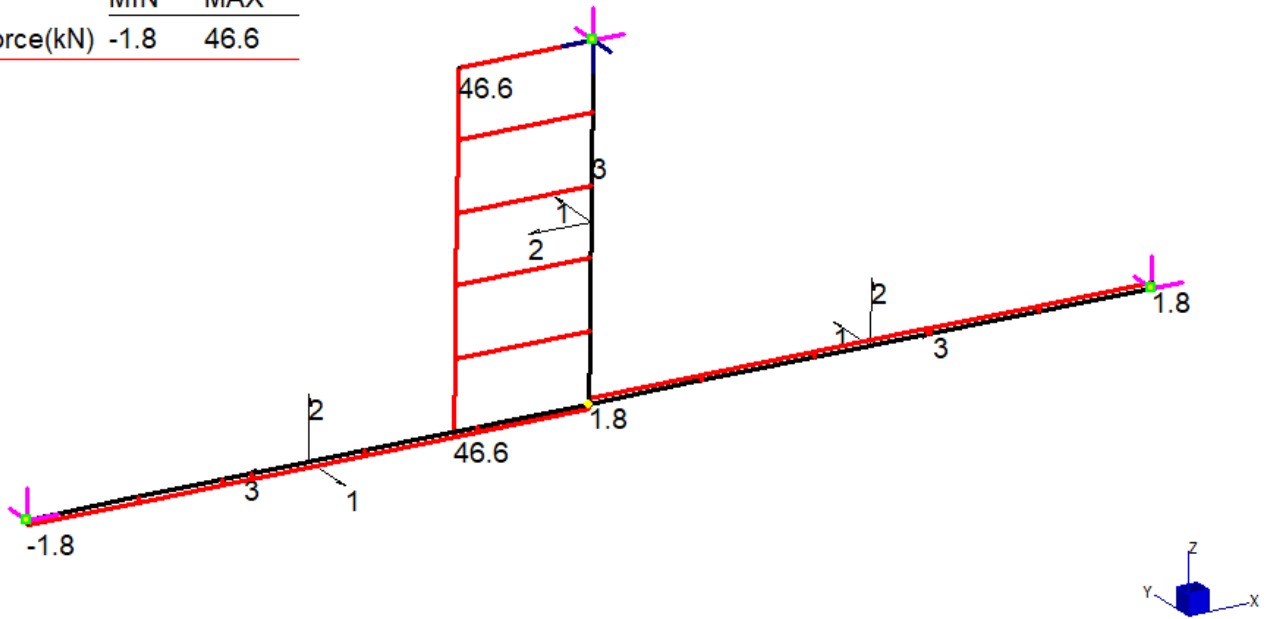
Bending moment:

	MIN	MAX
BM2(kN.m)	-26.6	19.3



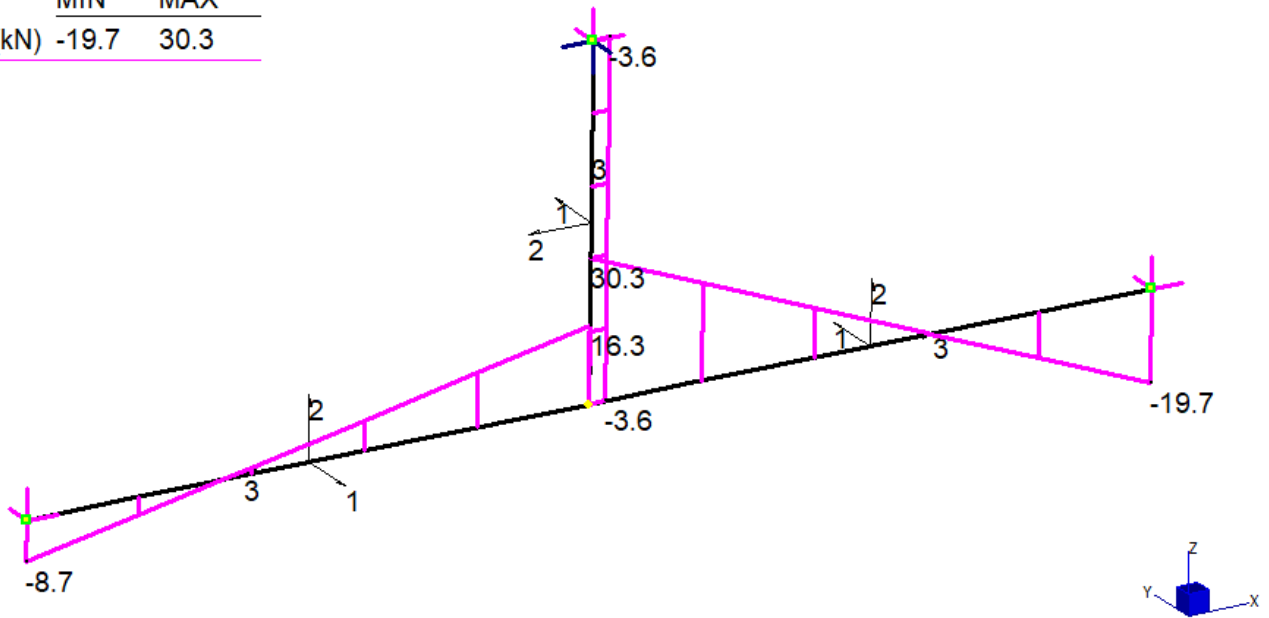
Axial Force:

	MIN	MAX
AxForce(kN)	-1.8	46.6

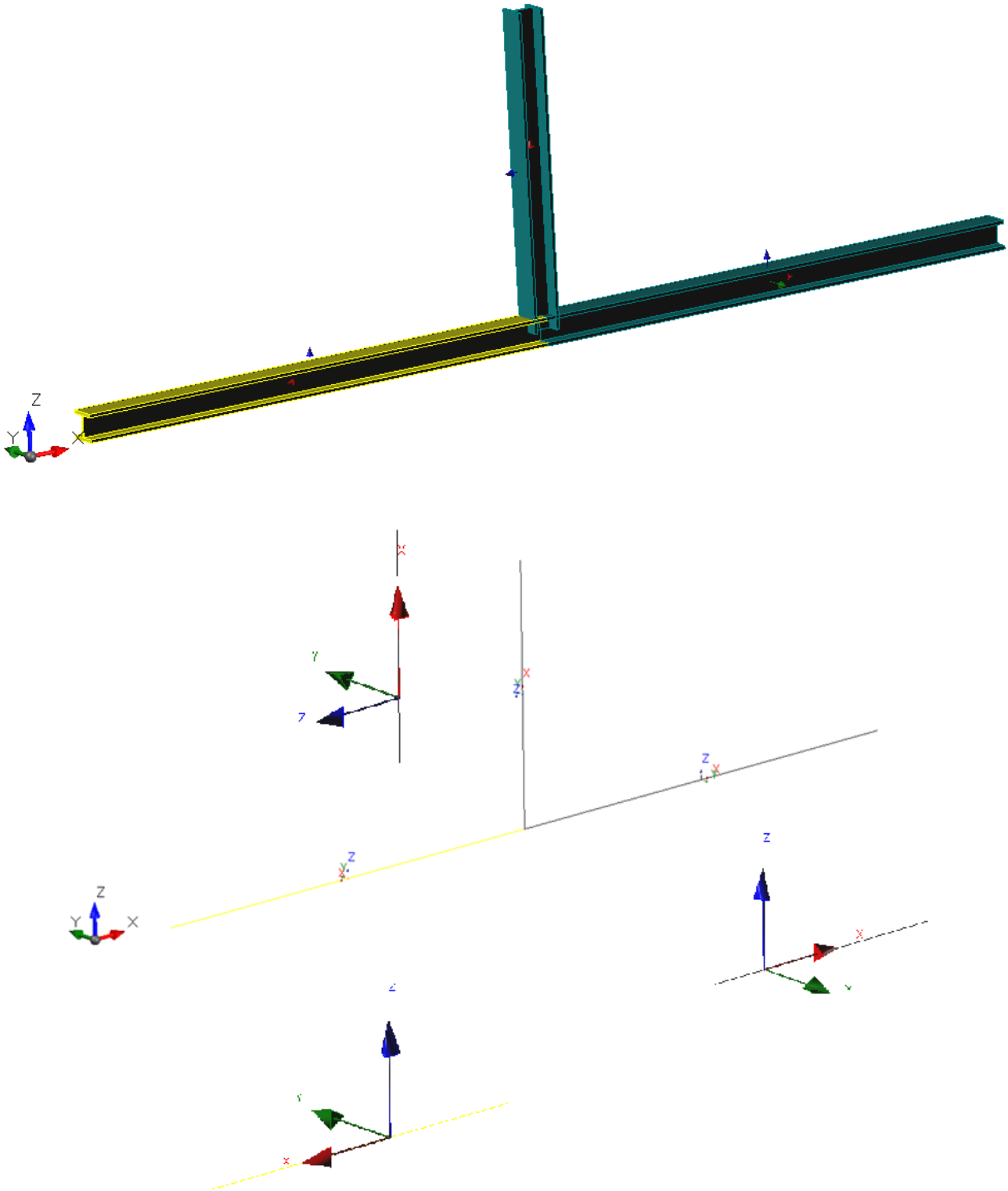


Shear Force

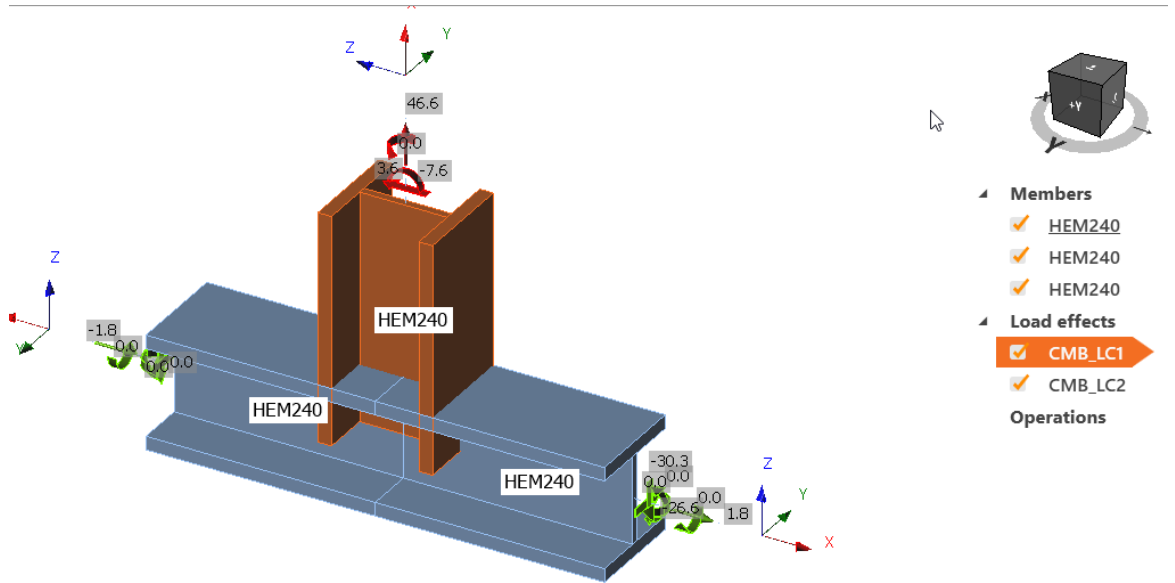
	MIN	MAX
SF2(kN)	-19.7	30.3



5.3.2 IDEA BIM



5.3.3 IDEA CONNECTION



Member	N [kN]	Vy [kN]	Vz [kN]	Mx [kNm]	My [kNm]	Mz [kNm]
HEM240 / End	46.6	0.0	3.6	0.0	-7.6	0.0
HEM240 / End	1.8	0.0	-30.3	0.0	-26.6	0.0
HEM240 / End	-1.8	0.0	-16.3	0.0	-19.0	0.0

**Description**  
LC1

Values in disabled cells are not taken into account in CBFE analysis. Members can be loaded only by that components of internal forces which are defined in member "Model type".

**Unbalanced forces**

X [kN]	Y [kN]	Z [kN]	Mx [kNm]	My [kNm]	Mz [kNm]
0.0	0.0	0.0	0.0	-15.2	0.0

Member	N [kN]	Vy [kN]	Vz [kN]	Mx [kNm]	My [kNm]	Mz [kNm]
HEM240 / End	46.6	0.0	3.6	0.0	-7.6	0.0
HEM240 / End	1.8	0.0	-30.3	0.0	-26.6	0.0
HEM240 / End	-1.8	0.0	-16.3	0.0	-19.0	0.0

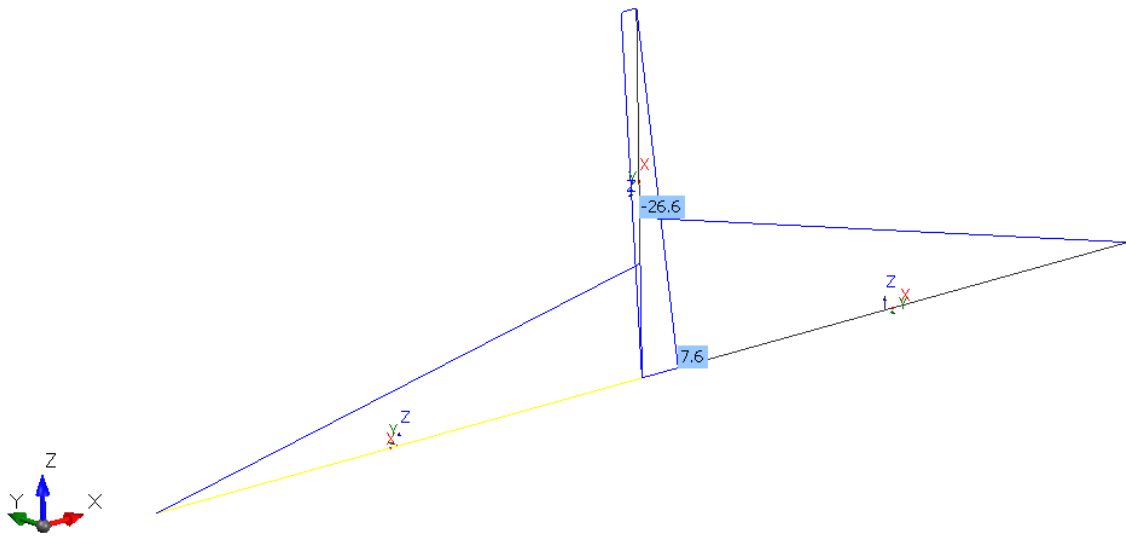
**Description**  
LC1

Values in disabled cells are not taken into account in CBFE analysis. Members can be loaded only by that components of internal forces which are defined in member "Model type".

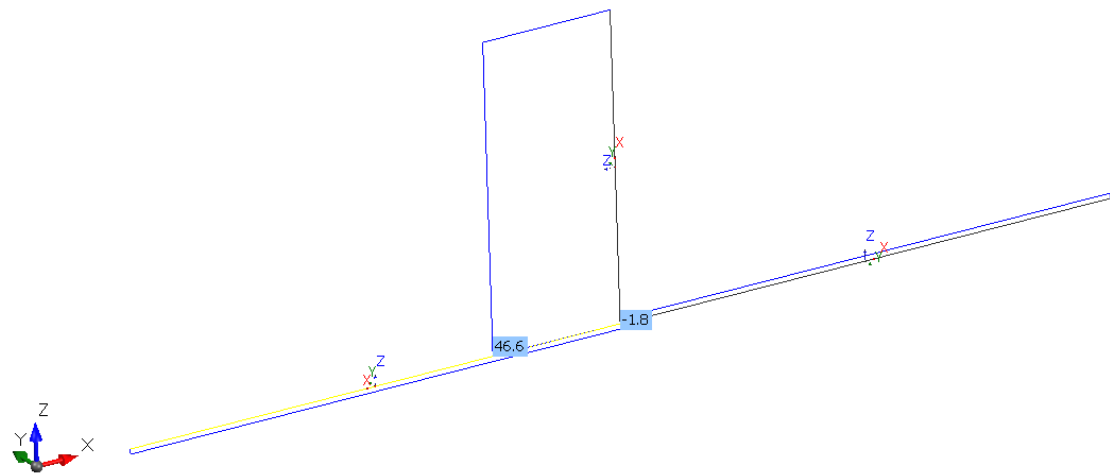
**Unbalanced forces**

X [kN]	Y [kN]	Z [kN]	Mx [kNm]	My [kNm]	Mz [kNm]
0.0	0.0	0.0	0.0	-15.2	0.0

Bending moment:

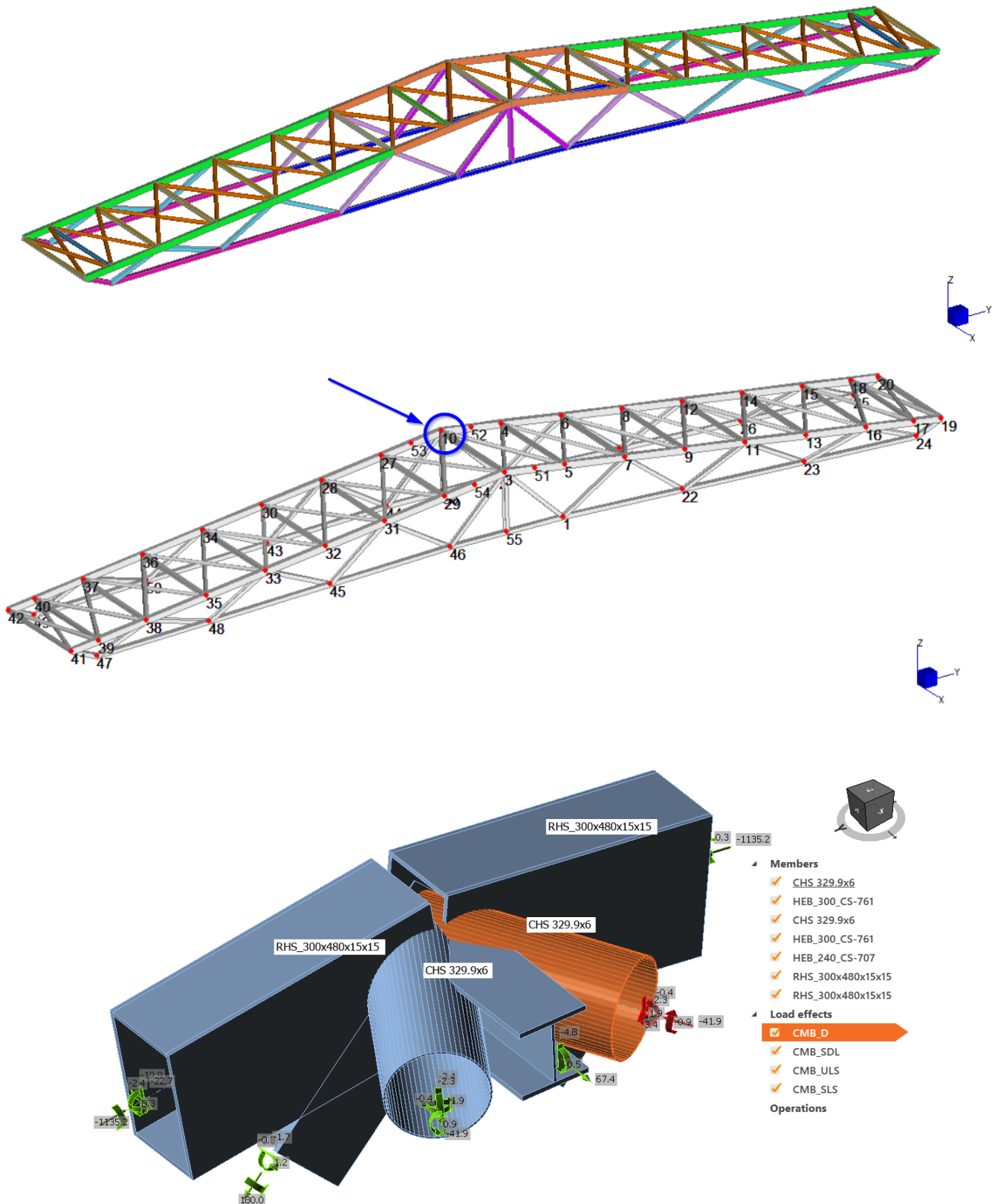


Axial force:



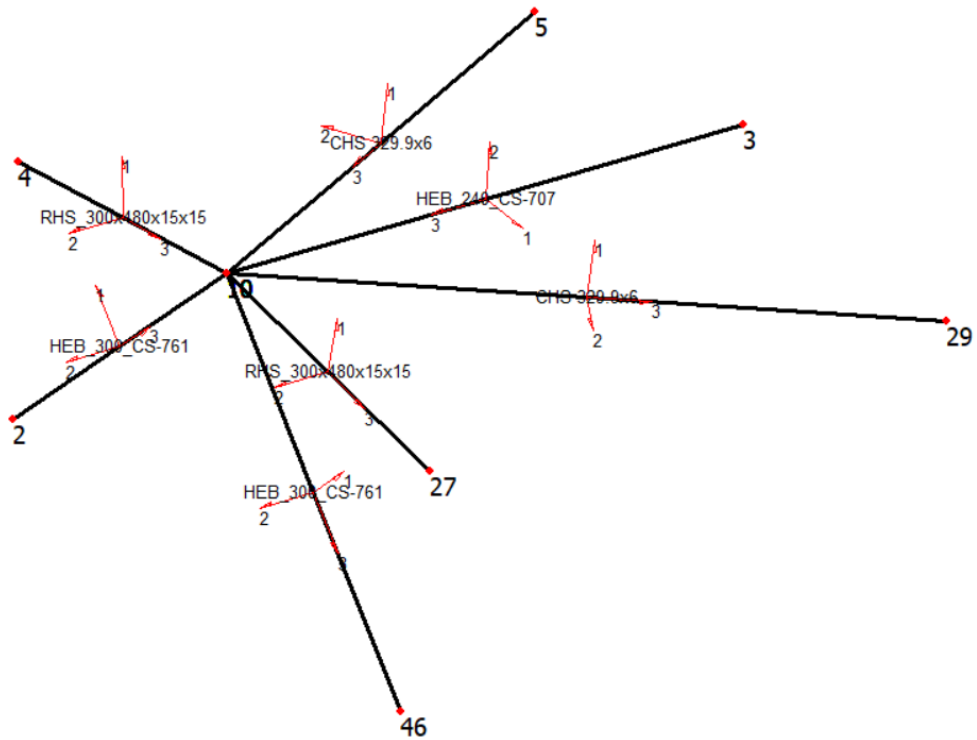
### 5.4 TEST – 3D TRUSS FRAME

The following 3D frame is considered:

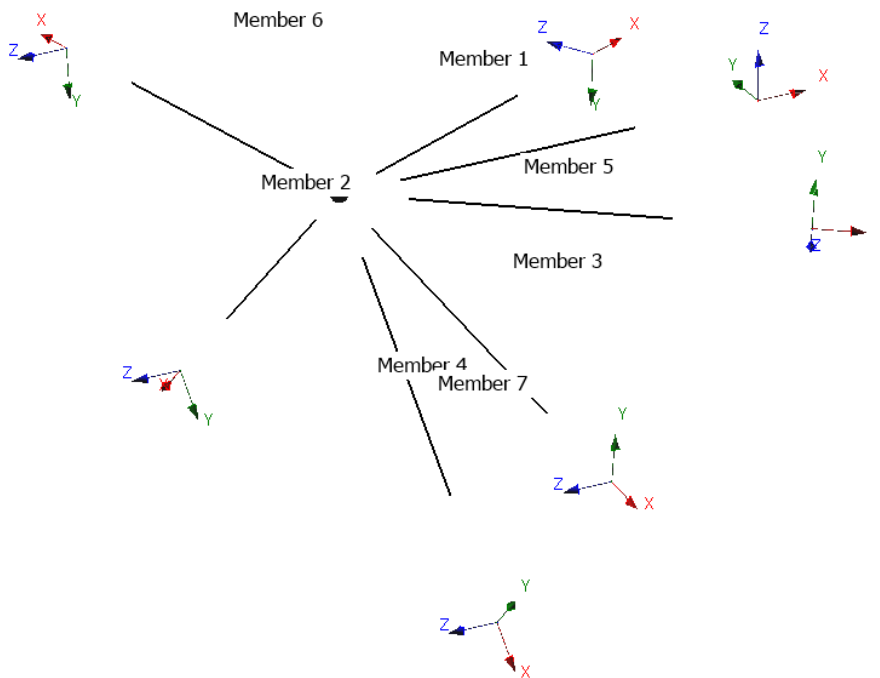




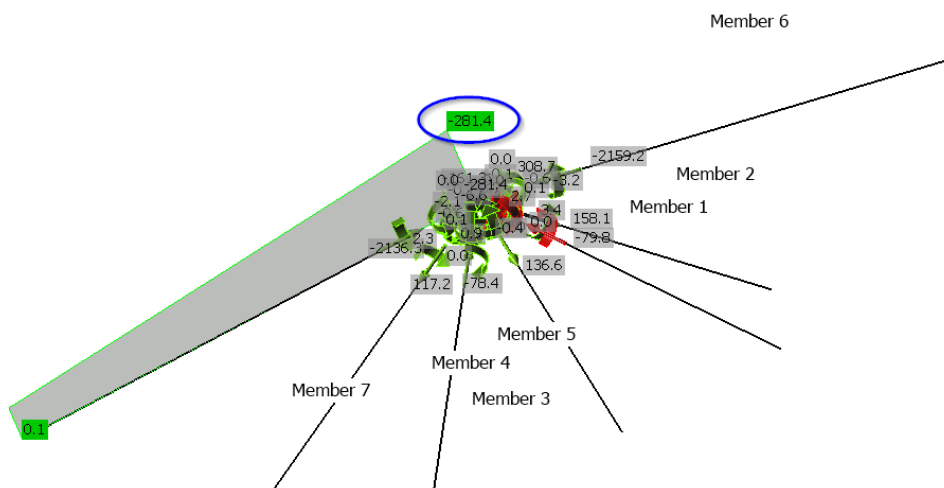
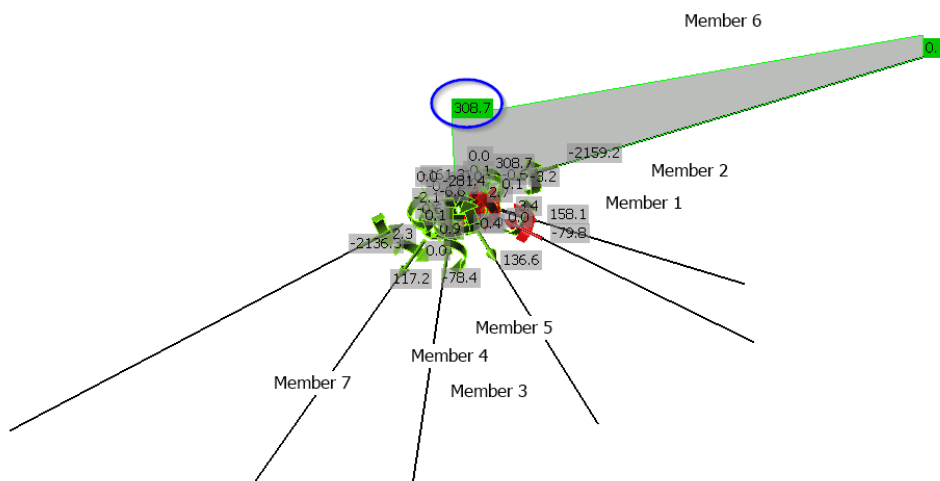
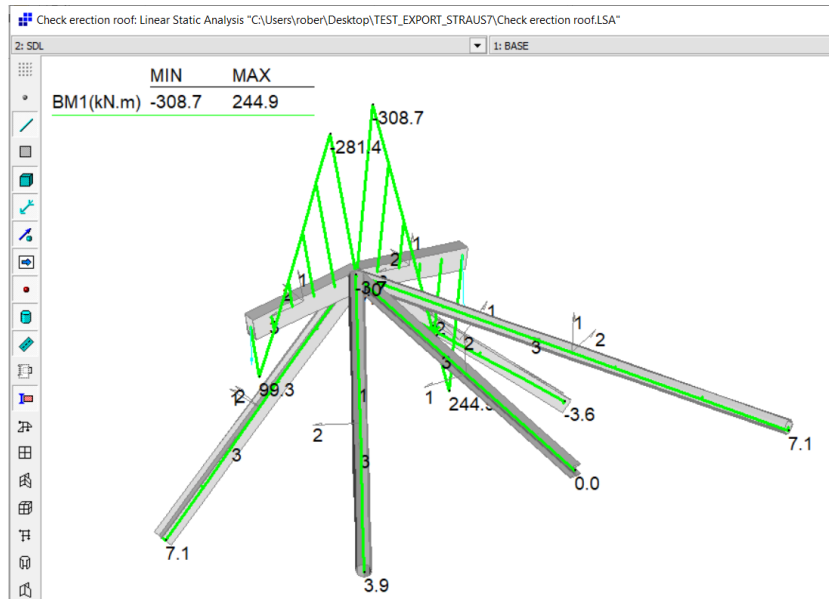
5.4.1 LOCAL AXIS



Local axis 2 and Z are aligned: OK.

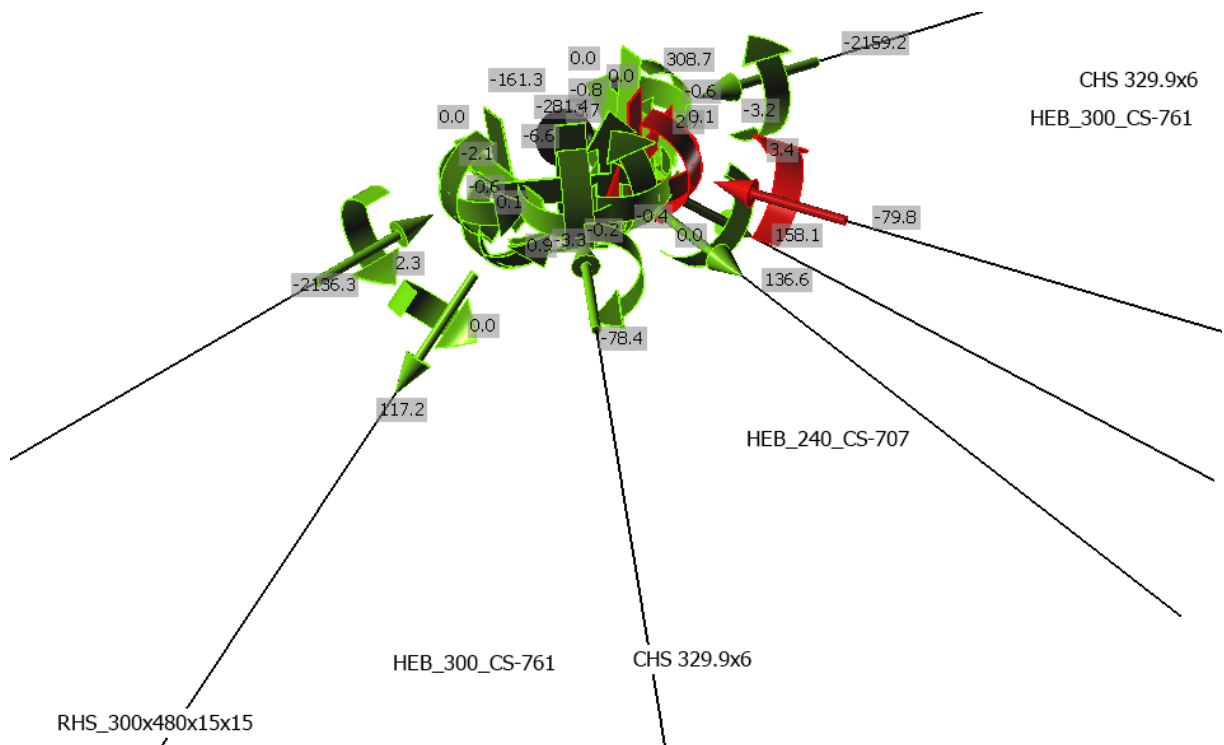
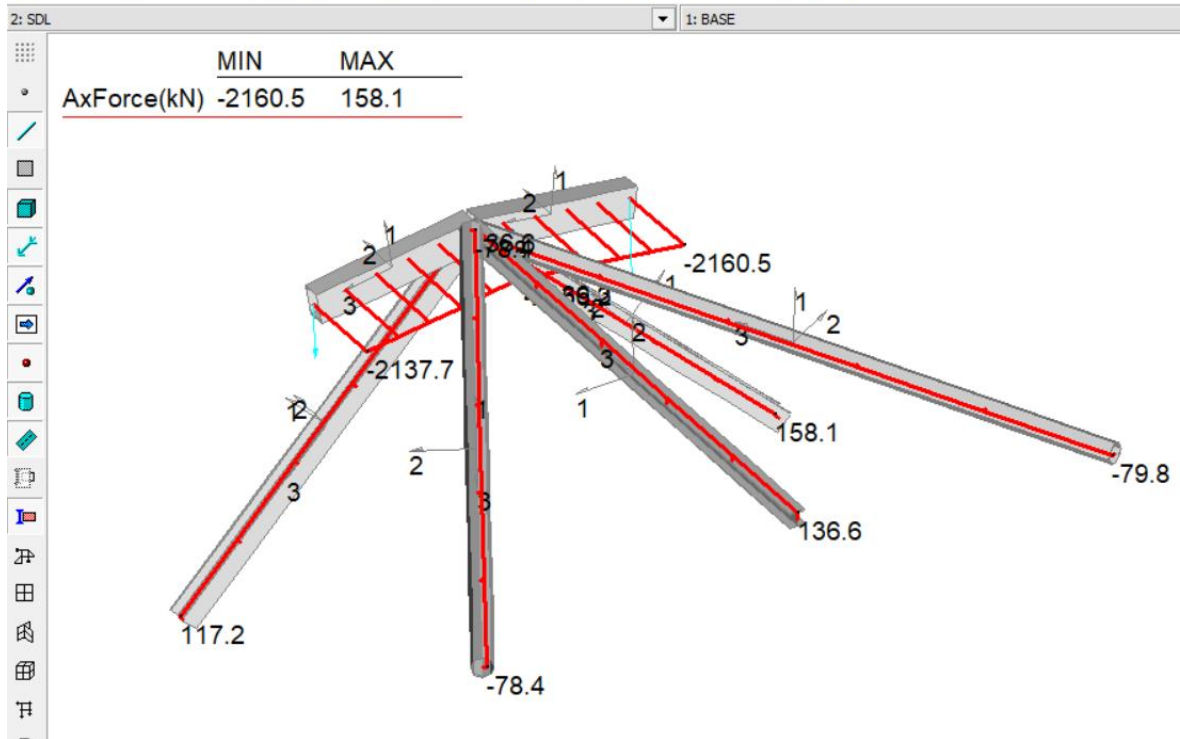


5.4.2 BENDING MOMENTS



### 5.4.3 AXIAL FORCES

Check erection roof: Linear Static Analysis "C:\Users\rober\Desktop\TEST\_EXPORT\_STRAUS7\Check erection roof.LSA"



Forces are compliant with Straus7.

### 5.4.1 NODAL UNBALANCED FORCES

**Members**

- CHS 329.9x6
- HEB\_300\_CS-761
- CHS 329.9x6
- HEB\_300\_CS-761
- HEB\_240\_CS-707
- RHS\_300x480x15x15
- RHS\_300x480x15x15

**Load effects**

- CMB\_D
- CMB\_SDL
- CMB\_ULS
- CMB\_SLS

**Operations**

Member	N [kN]	Vy [kN]	Vz [kN]	Mx [kNm]	My [kNm]	Mz [kNm]
> CHS 329.9x6 / End	-79.8	1.0	-0.6	3.4	2.6	2.7
HEB_300_CS-761 / End	158.1	-3.3	-0.1	0.0	0.8	-17.4
CHS 329.9x6 / End	-78.4	-0.8	-0.6	-0.2	2.7	-3.7
HEB_300_CS-761 / End	117.2	-2.1	-0.1	0.0	0.9	-6.6
HEB_240_CS-707 / End	136.6	0.0	0.0	0.0	-0.4	0.0
RHS_300x480x15x15 / End	-2159.2	232.3	0.0	-3.2	0.1	308.7
RHS_300x480x15x15 / End	-2136.3	-161.3	0.0	2.3	0.1	-281.4

**Description**  
SDL

Values in disabled cells are not taken into account in CBFEM analysis. Members can be loaded only by that components of internal forces which are defined in member "Model type".

**Unbalanced forces**

X [kN]	Y [kN]	Z [kN]	Mx [kNm]	My [kNm]	Mz [kNm]
0.0	0.0	0.0	0.0	0.0	0.0