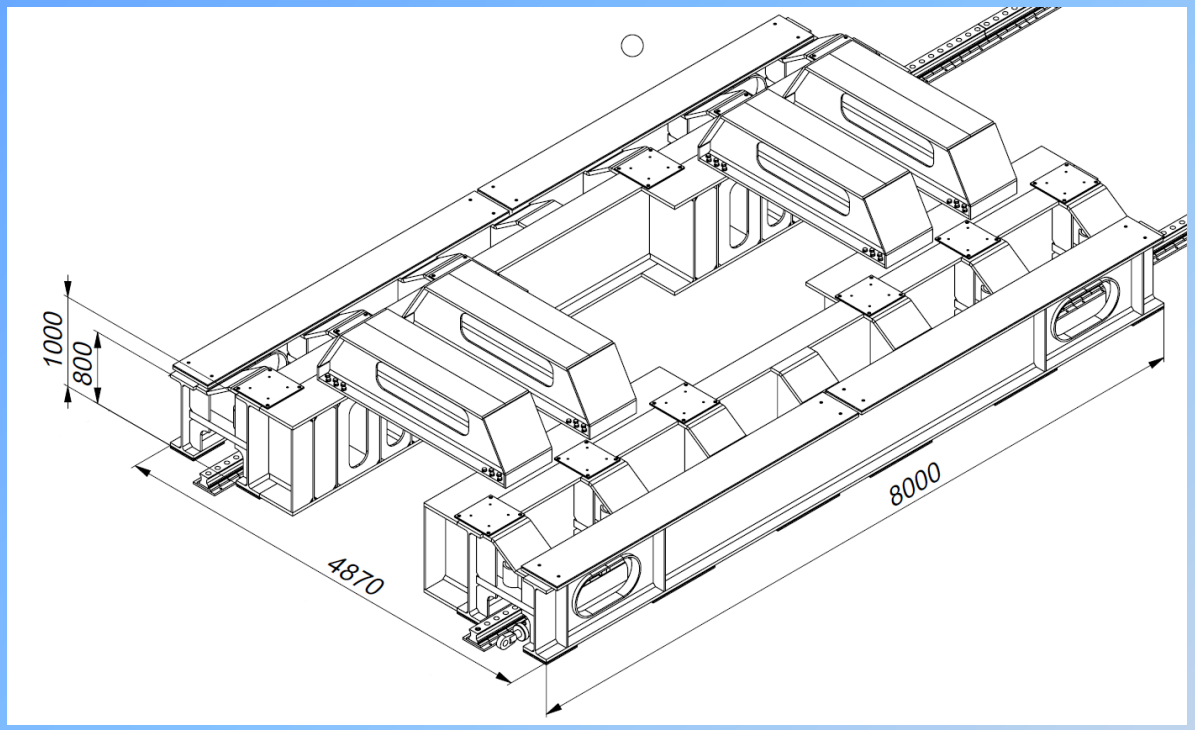
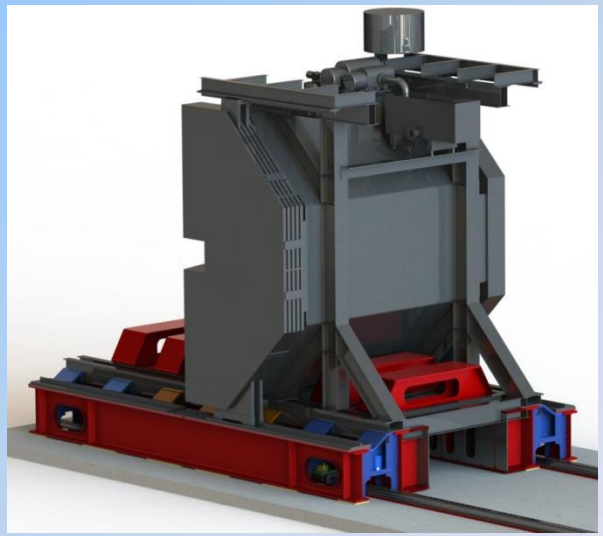
Platform for Target Spectrometer using I-beam HEB 1000 with the cable window

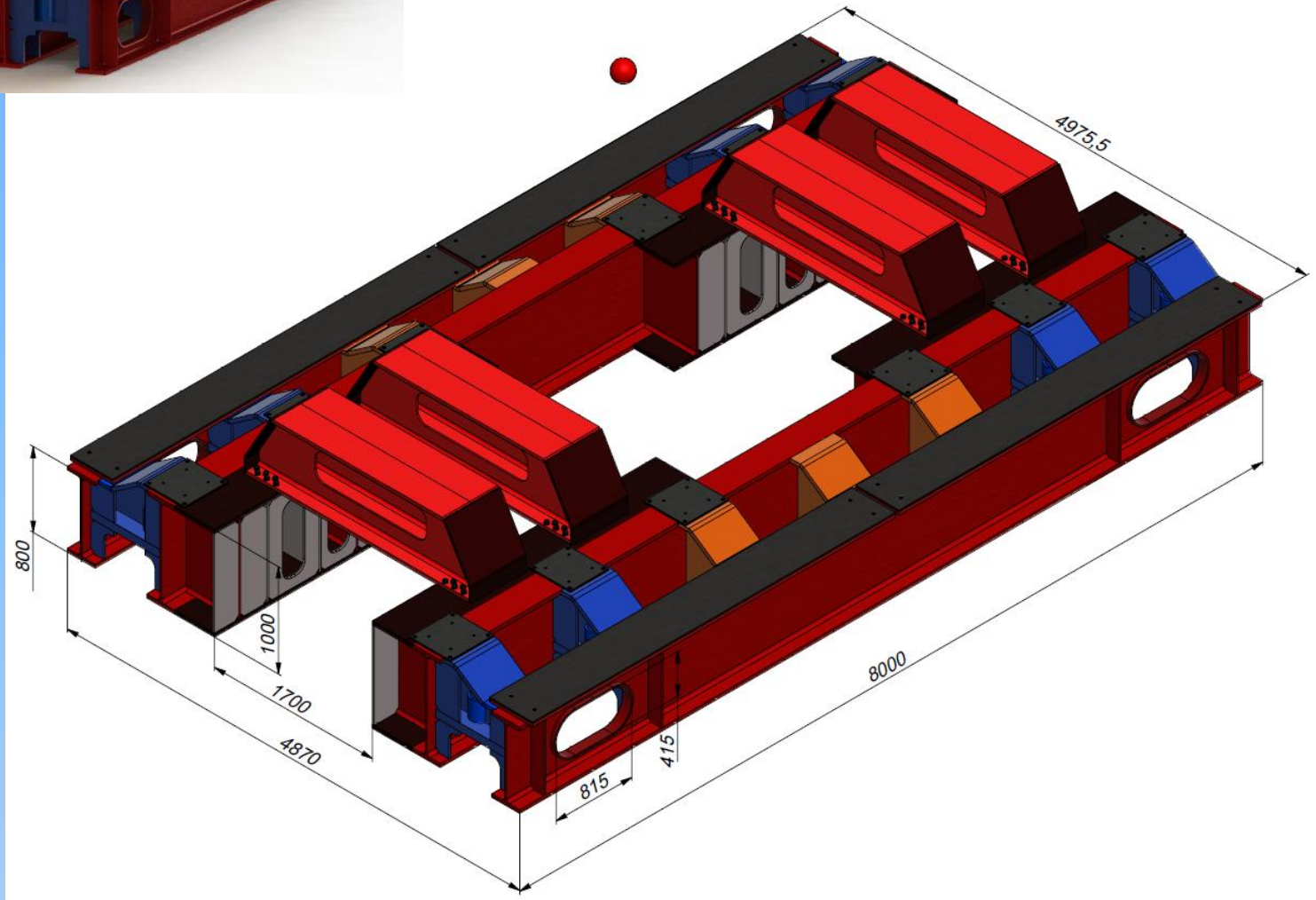




Cracow University of Technology Mechnical Design Group

Edward Lisowski

The platform for Target Spectometer – main dimensions



The interface between platform and yoke

platform – rear view
(Old proposition Evgeny Koshunikov)

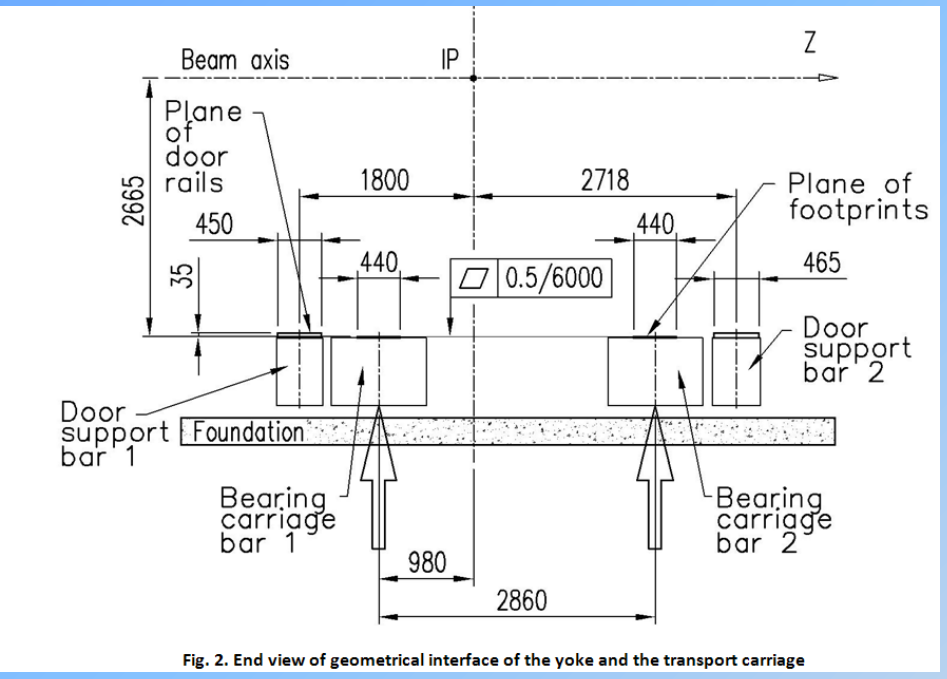
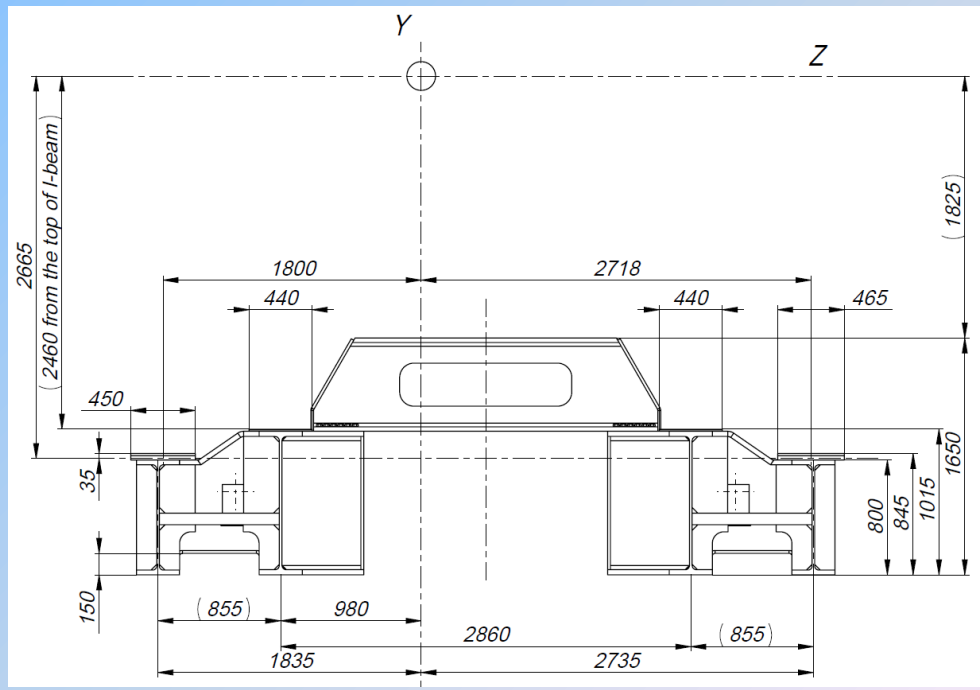


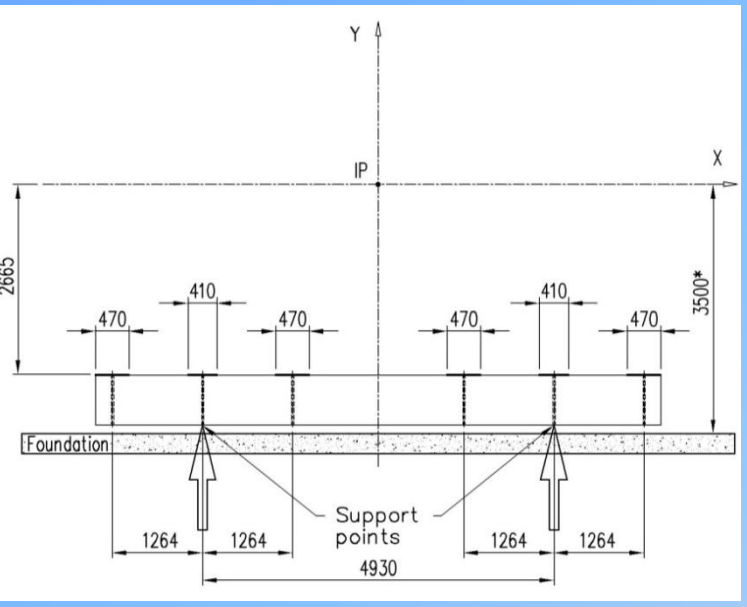
Fig. 2. End view of geometrical interface of the yoke and the transport carriage

The new platform – rear view

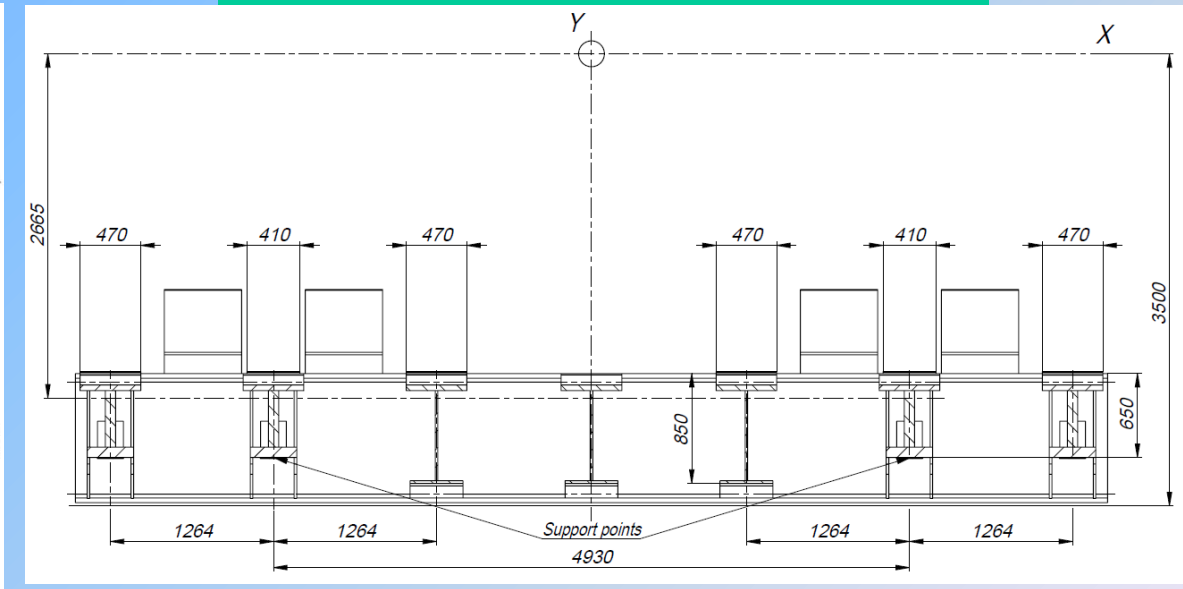


The interface

platform – side view
(old prop. Evgeny)

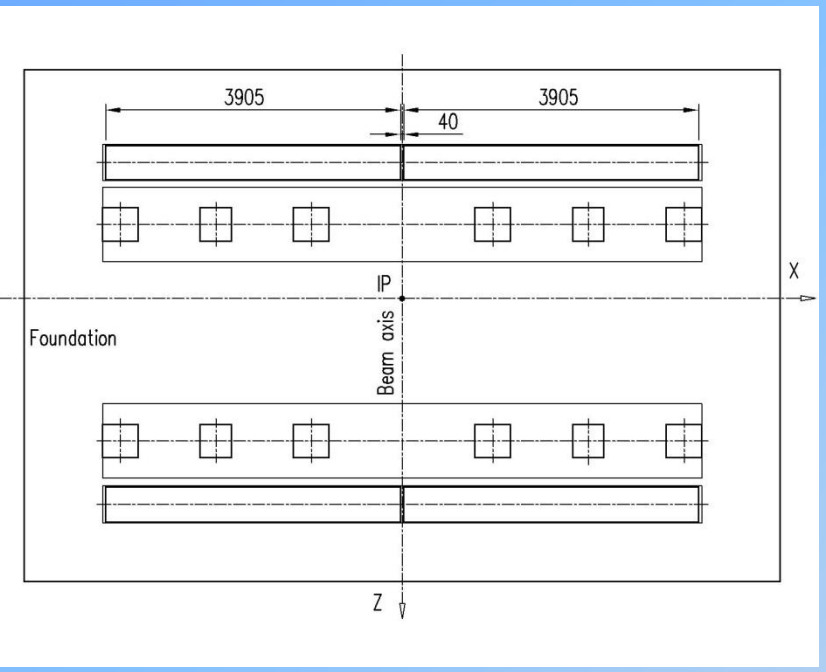


The new platform – side view

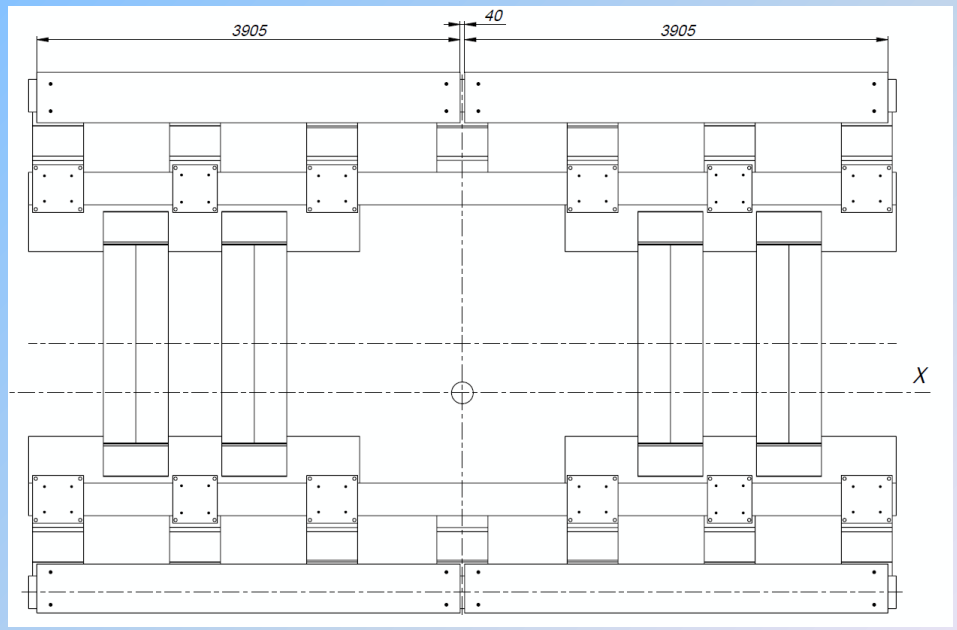


The interface

platform – top view
(old prop. Evgeny)

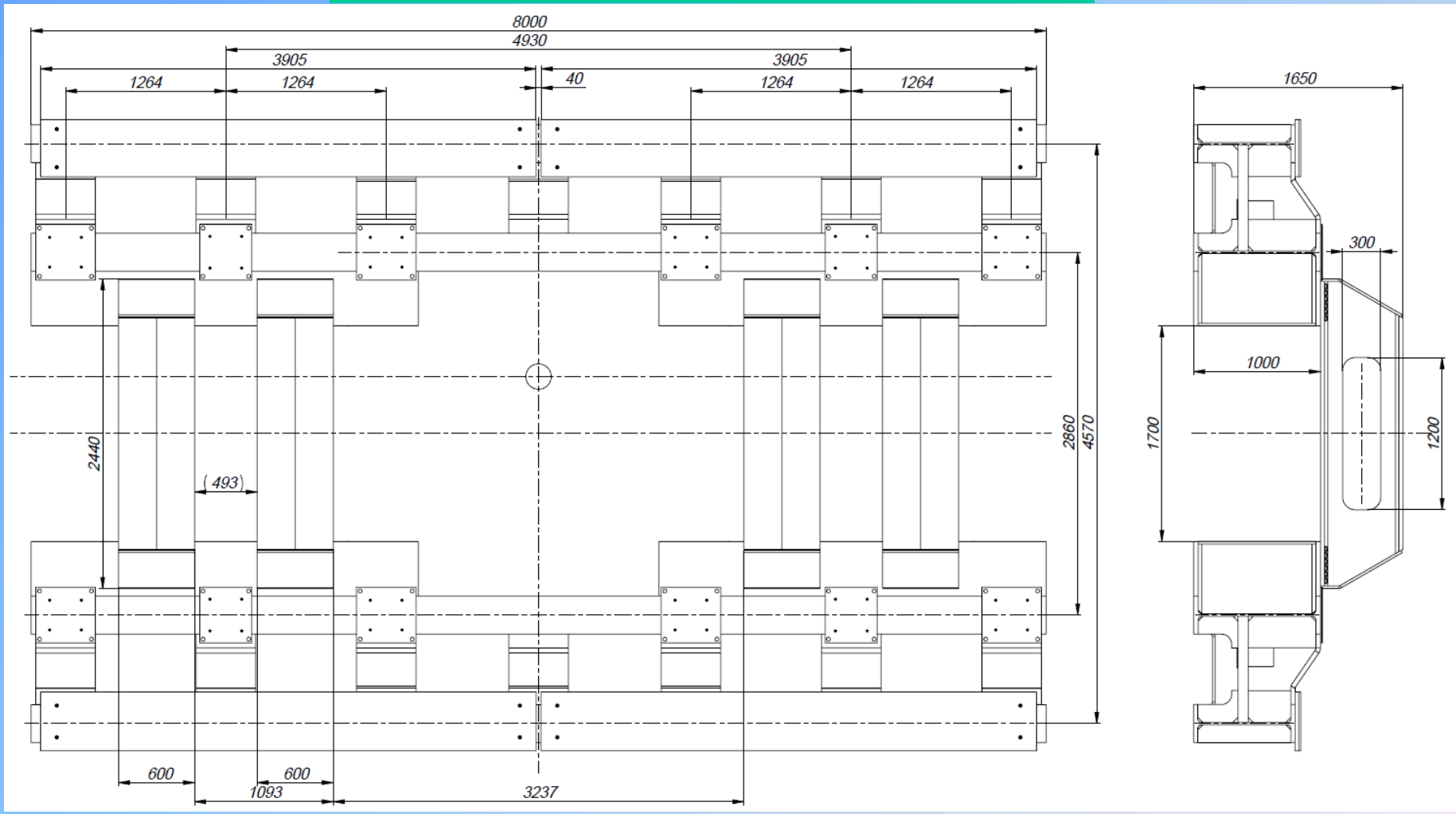


The platform – top view



Additional dimensions

The platform – top and end views

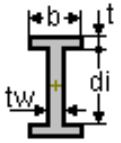


Data of a single I-beam HEB 1000

Mass 314 kg/m, EN 10034;
Material stal S355 EN 10025, Re=355MPa

Moment of Inertia (Principal Coordinate System)
6.2859e+09 [mm^4]

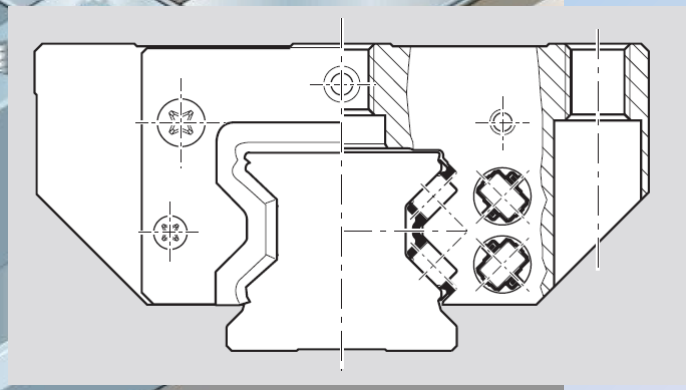
Beam Section "BeamSection1"

Property	Value
Type	I Beam 
Dimensions	b = 300 [mm] t = 36 [mm] di = 928 [mm] tw = 19 [mm]
Area	39232 [mm^2]
J	1.07201e+07 [mm^4]
Moment of Inertia (Principal Coordinate System)	$\begin{bmatrix} 1.6253e+08 & 0 \\ & 6.2859e+09 \end{bmatrix}$ [mm^4]

Linear Montion drive system Rexroth

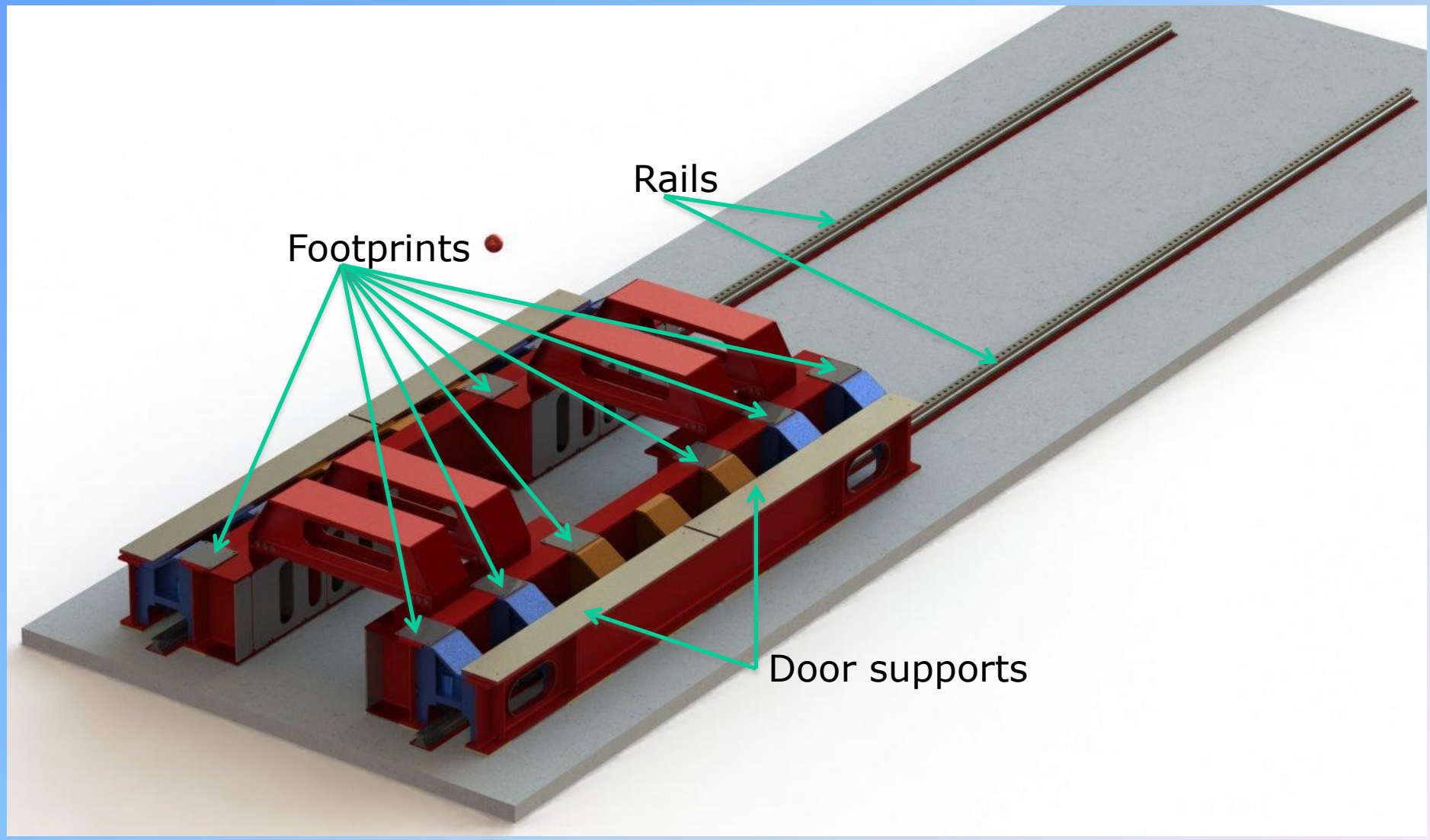
Heavy Duty Roller Rail System

Max load capacity
130 tones per one block
4x130=520 tones

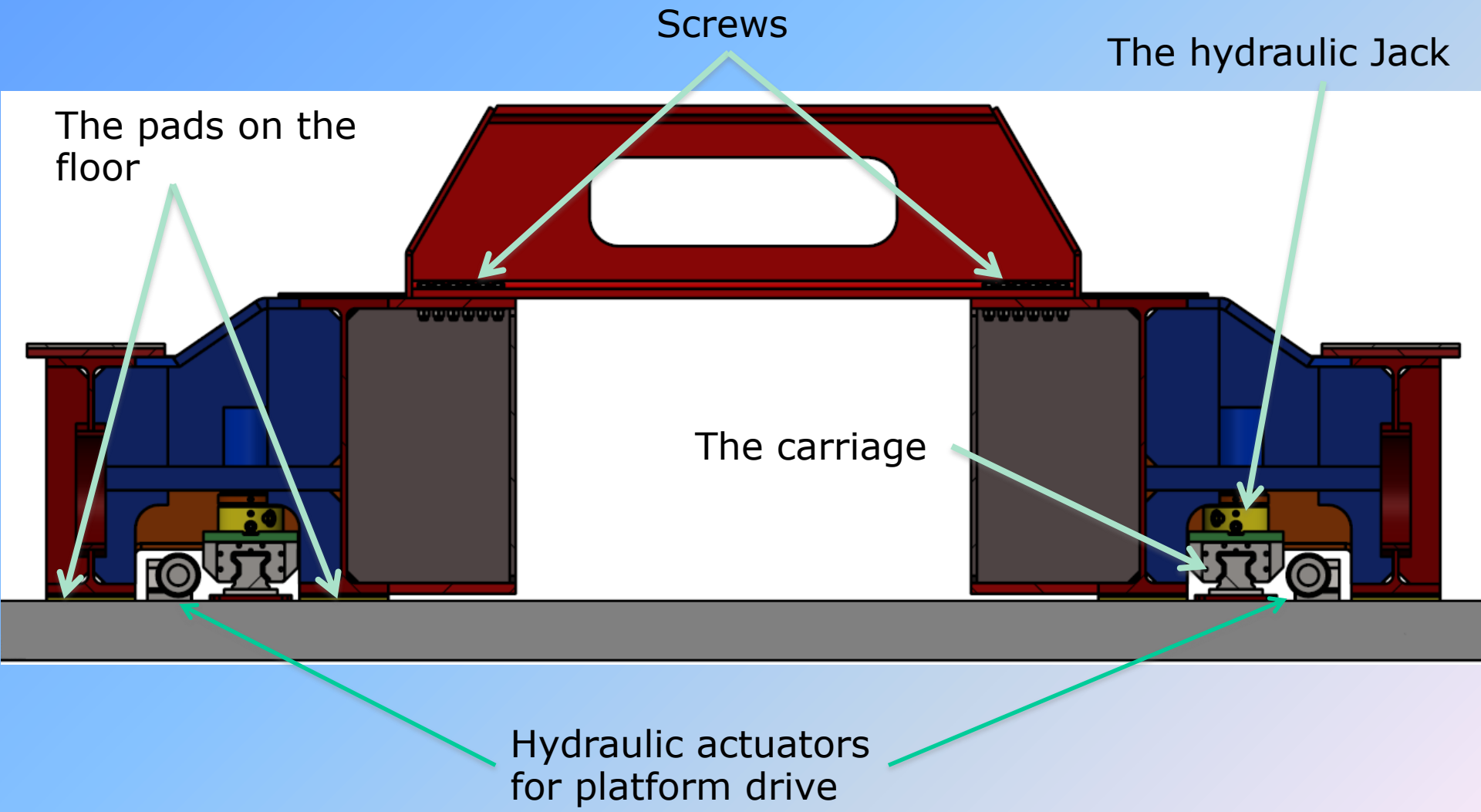


Size	Load capacities (N)		Moment loads (Nm)	
	C	C_0	M_t	M_{t0}
100	461 000	811 700	25 720	45 290
125	757 200	1 324 000	54 520	95 330

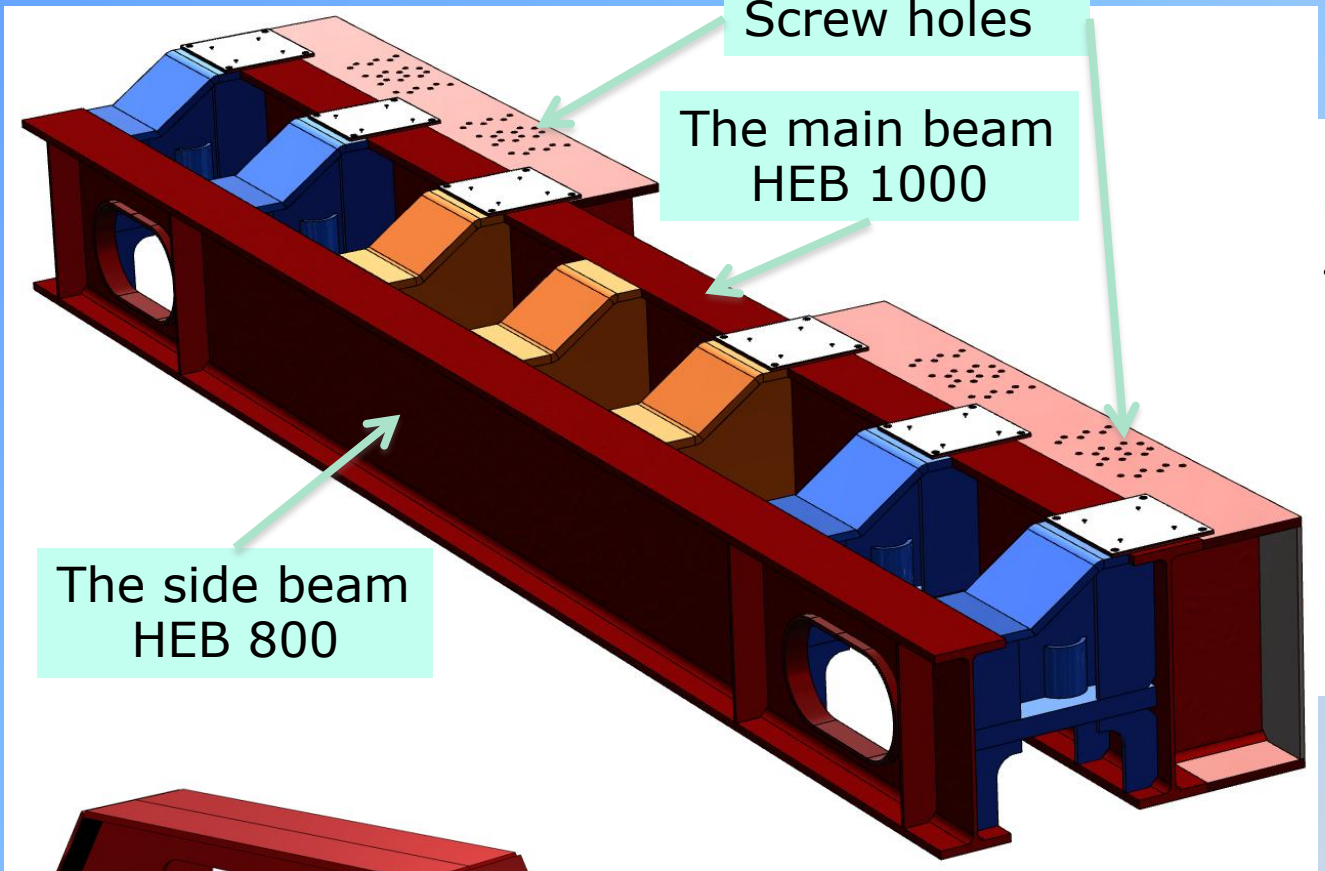
The model of the platform with rails

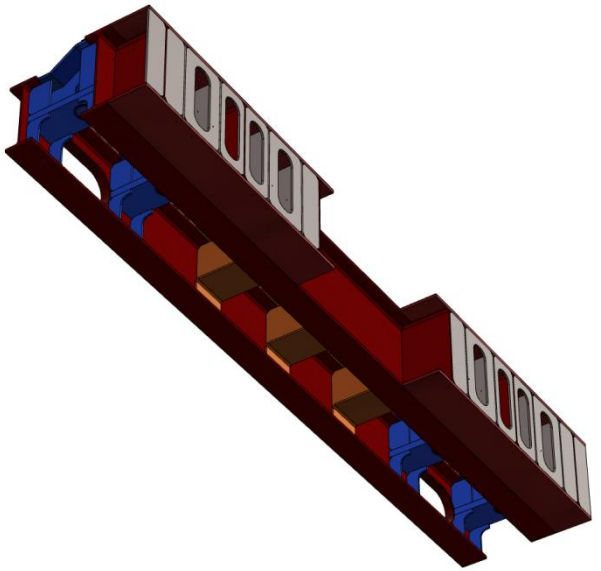


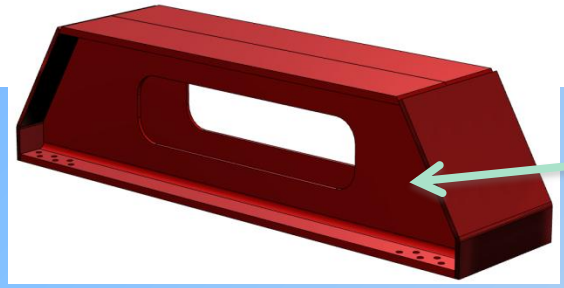
Rear view of the platform



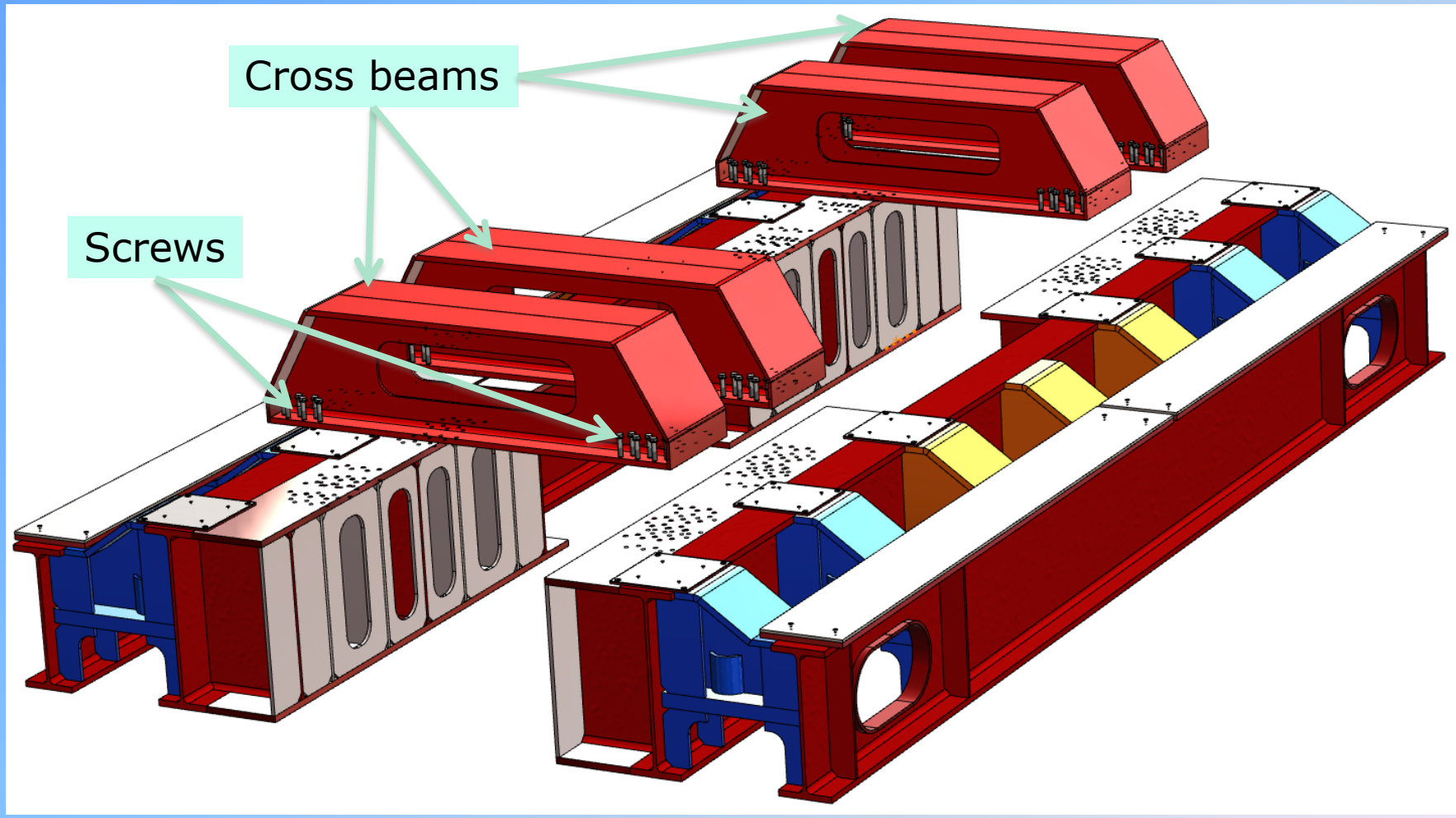
Main components of the frame to assembly



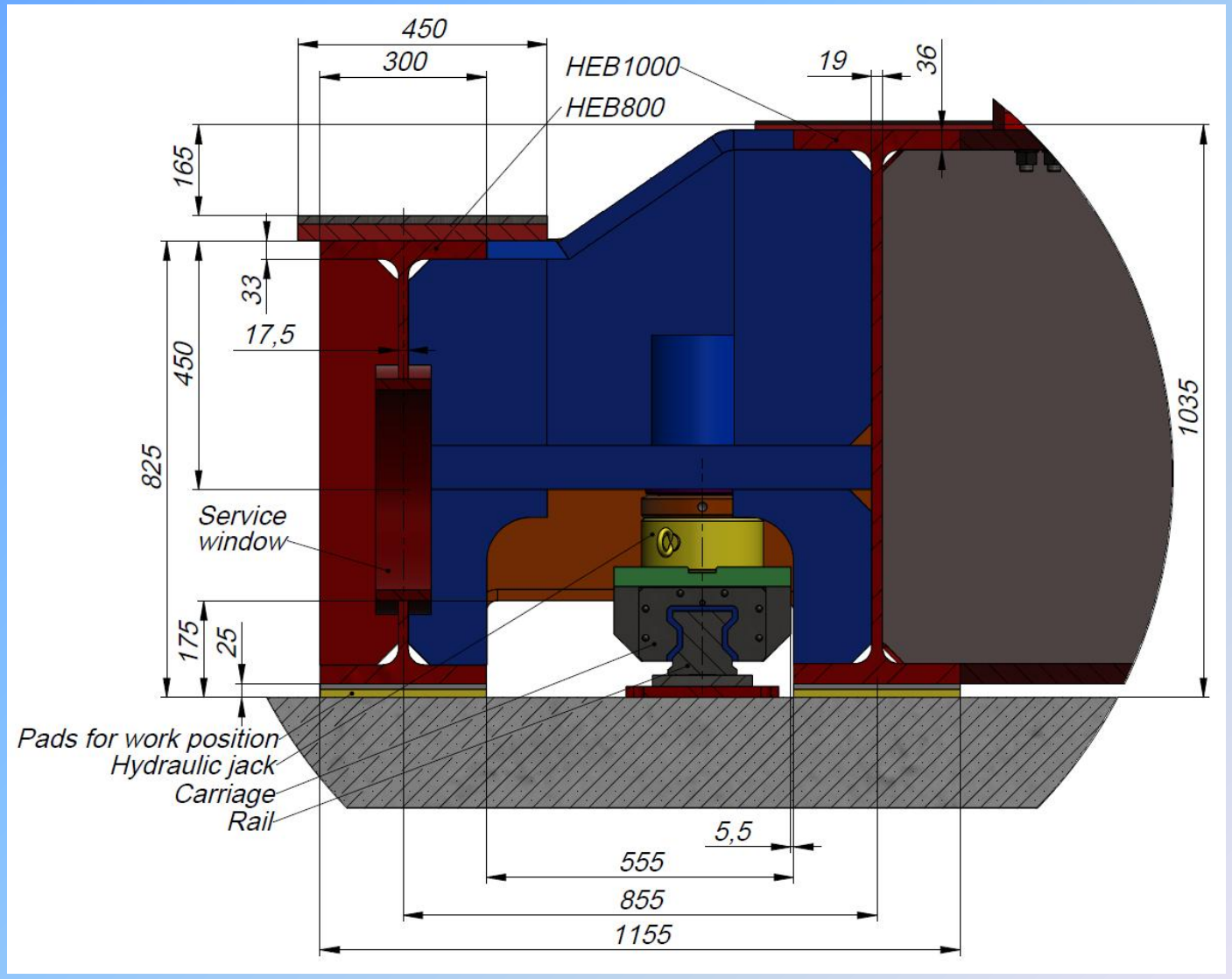




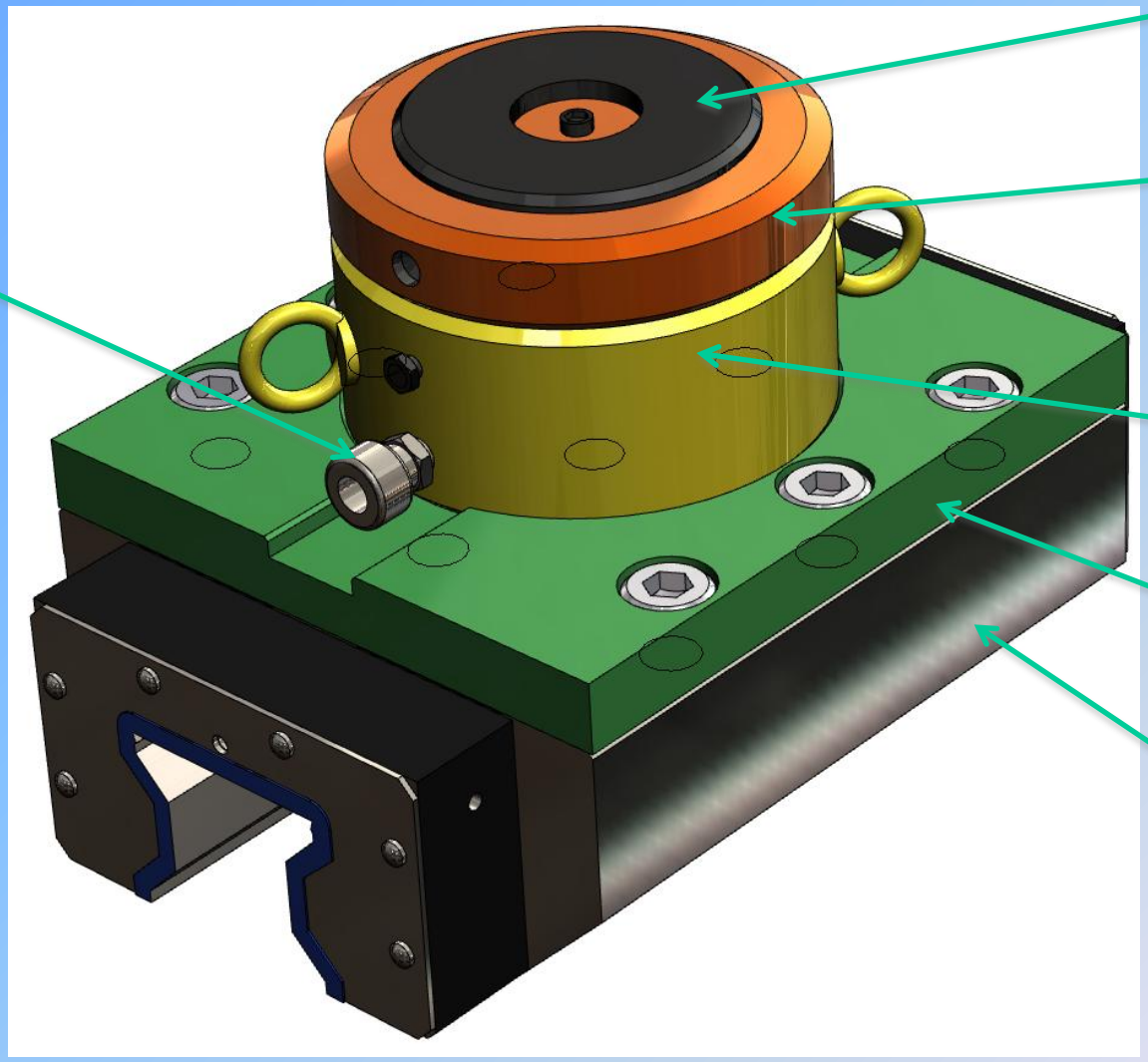
Main components of the frame to assembly



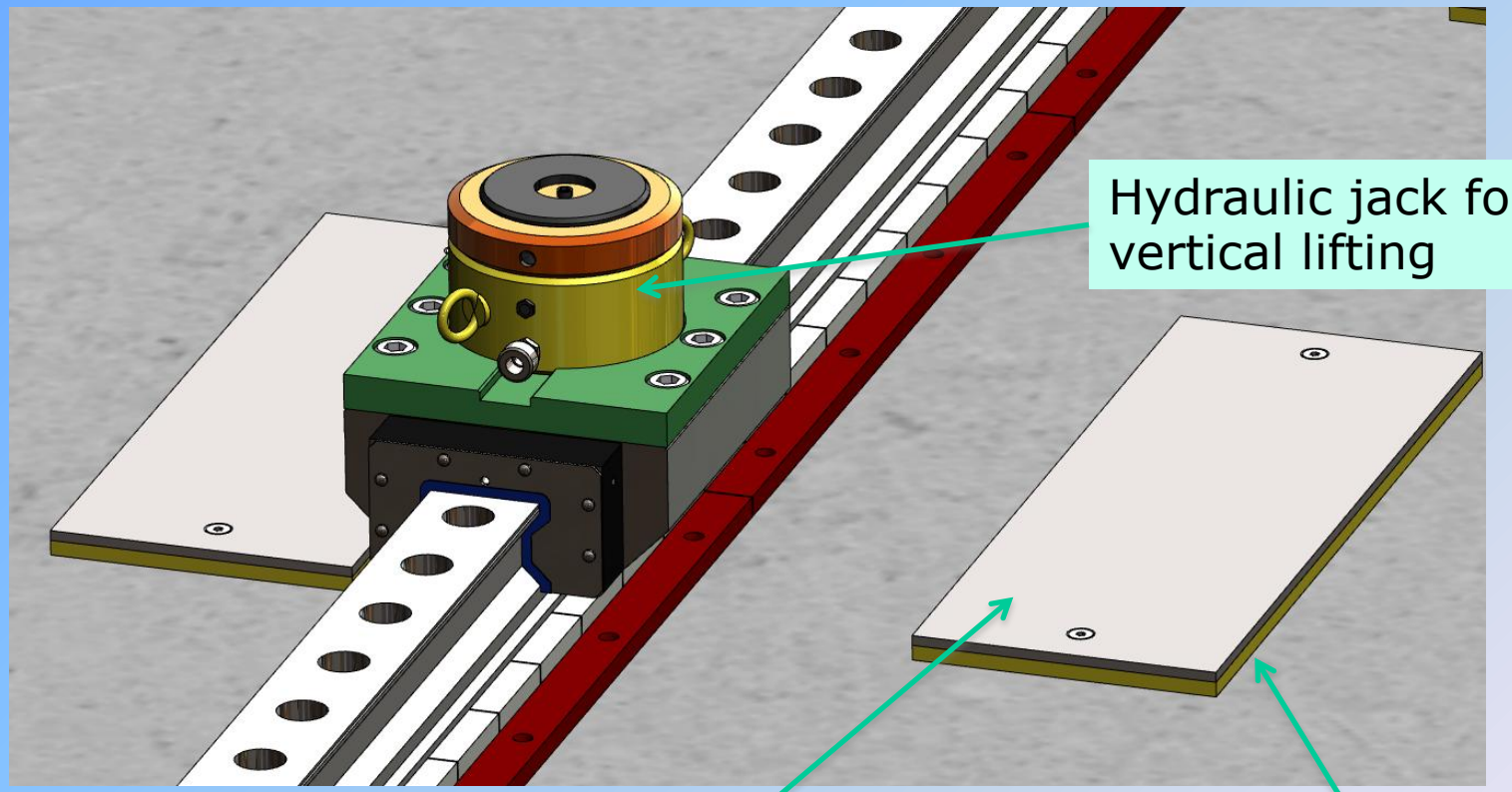
Moving the Target, view of the carriage area



View of the carriage outside before assembly

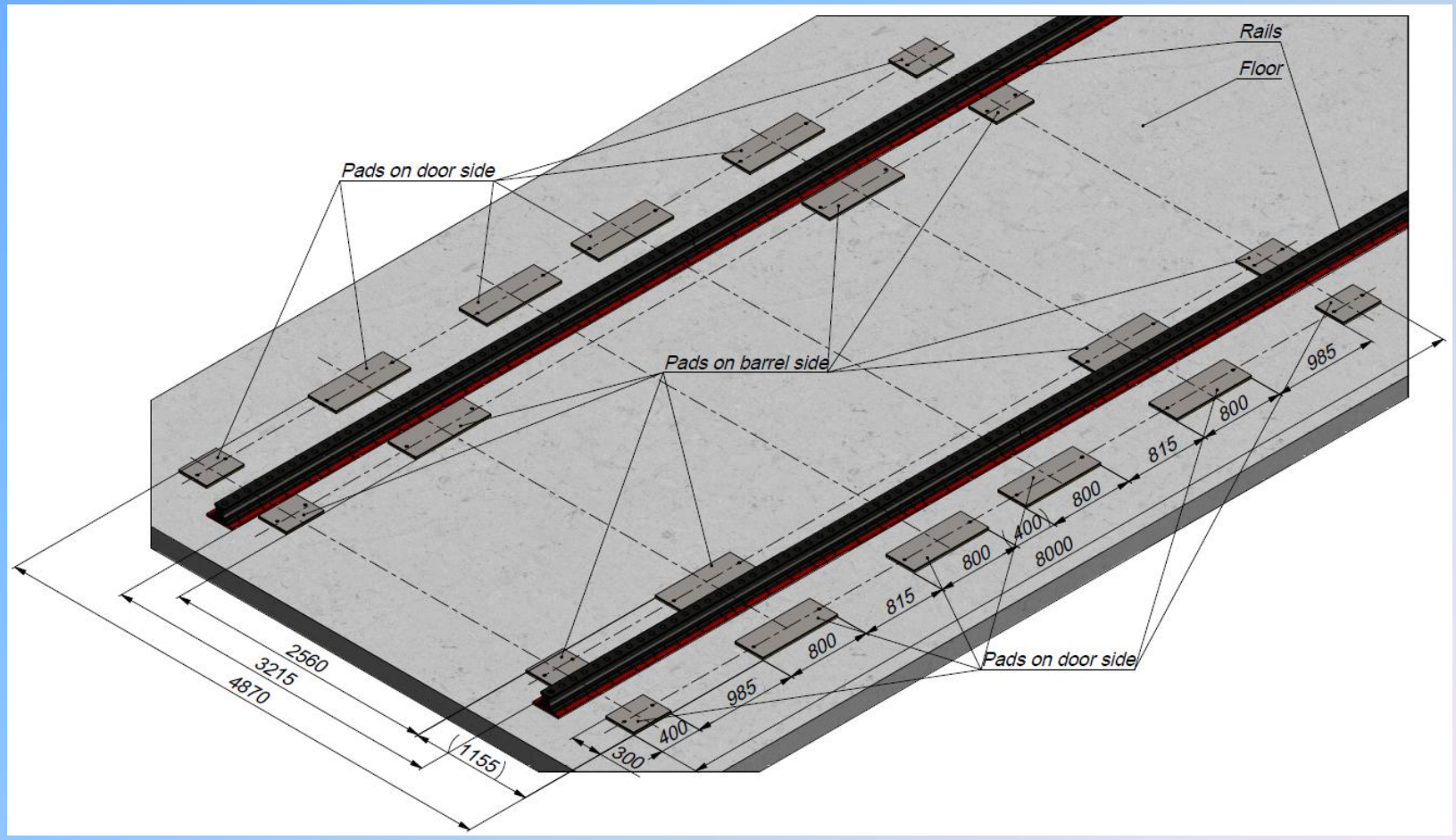


Carriage, hydraulic jack and pads at the support point

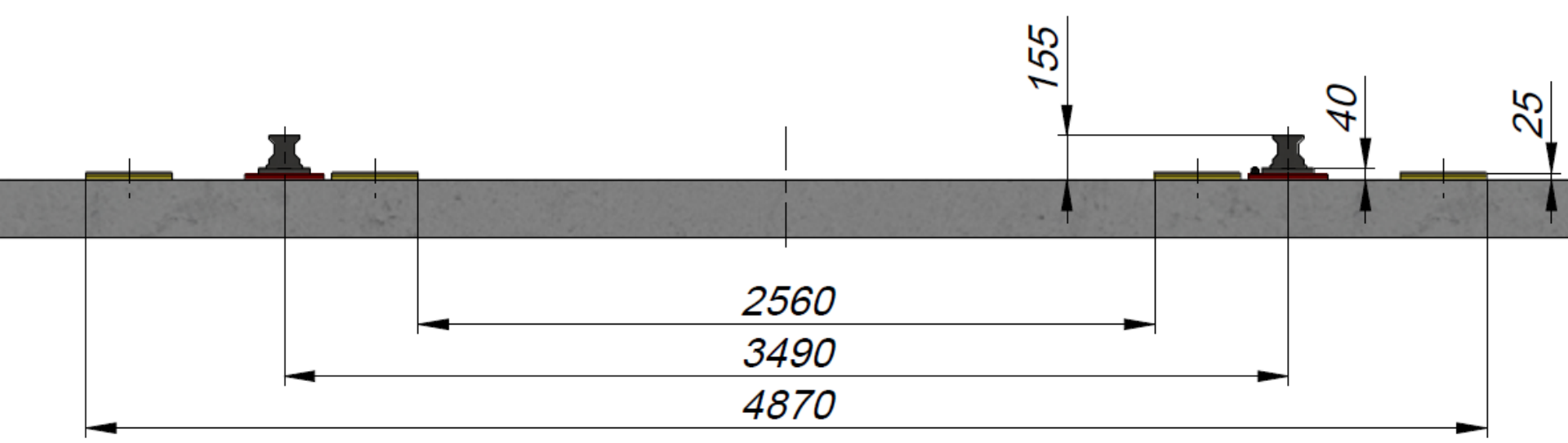


Technology of assembly – pernament support

1. Fasten rails with carriages to the floor very precisely.
2. Fasten draft pads (plates for hydraulic jack and frame) to the floor.
3. Regulate the height and flatness of the platform

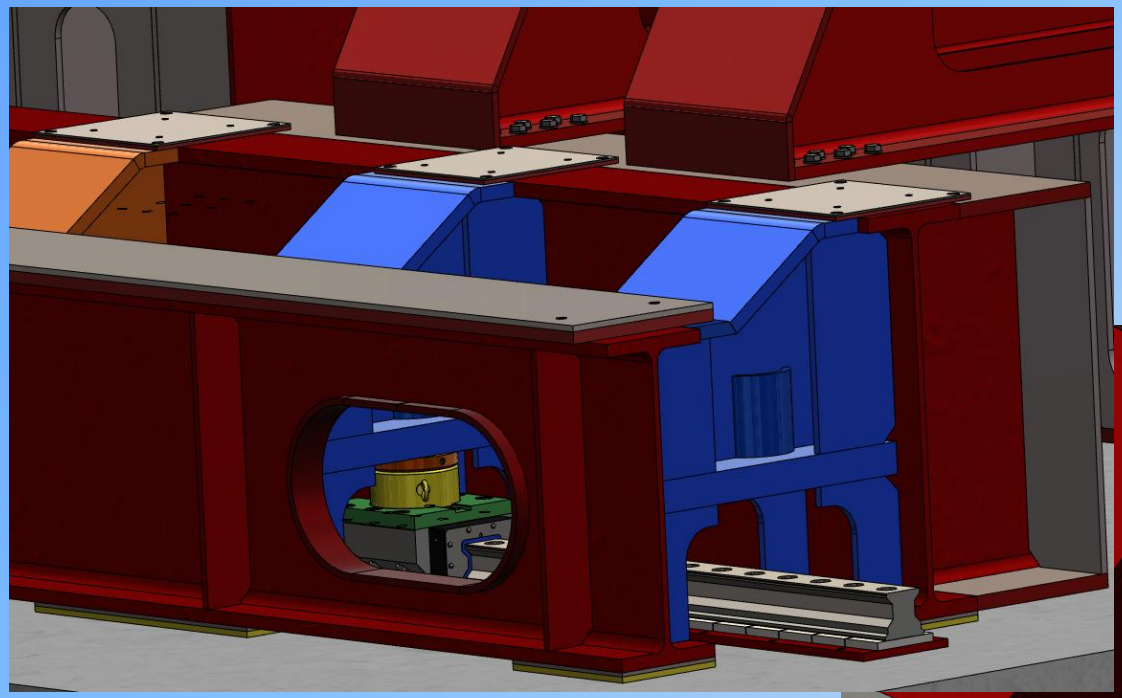


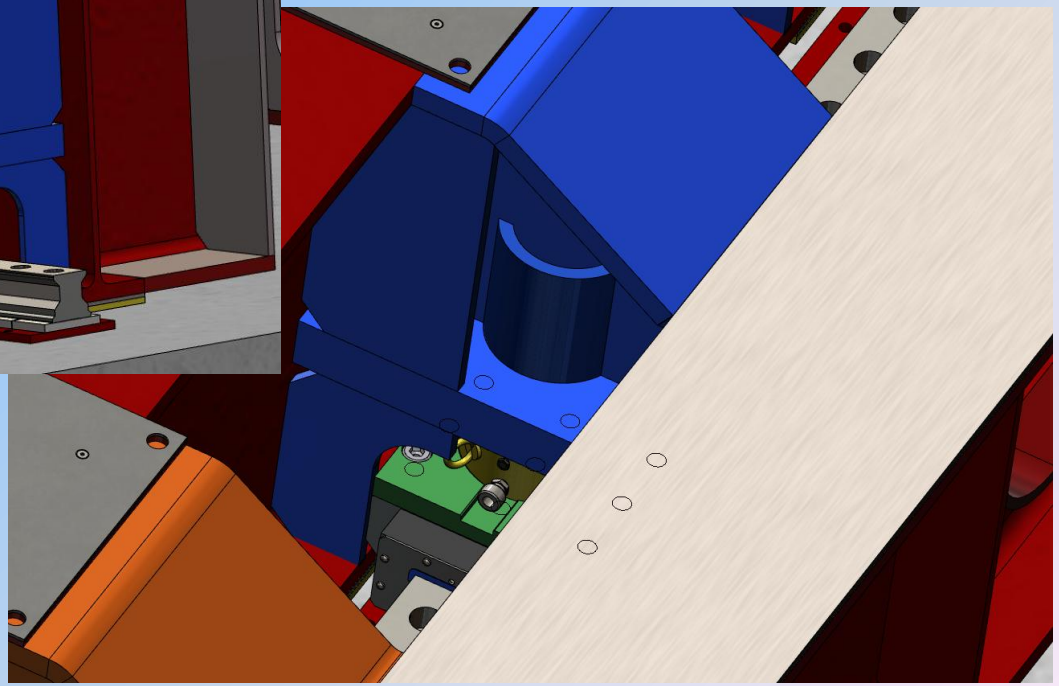
Rail and pads gauges



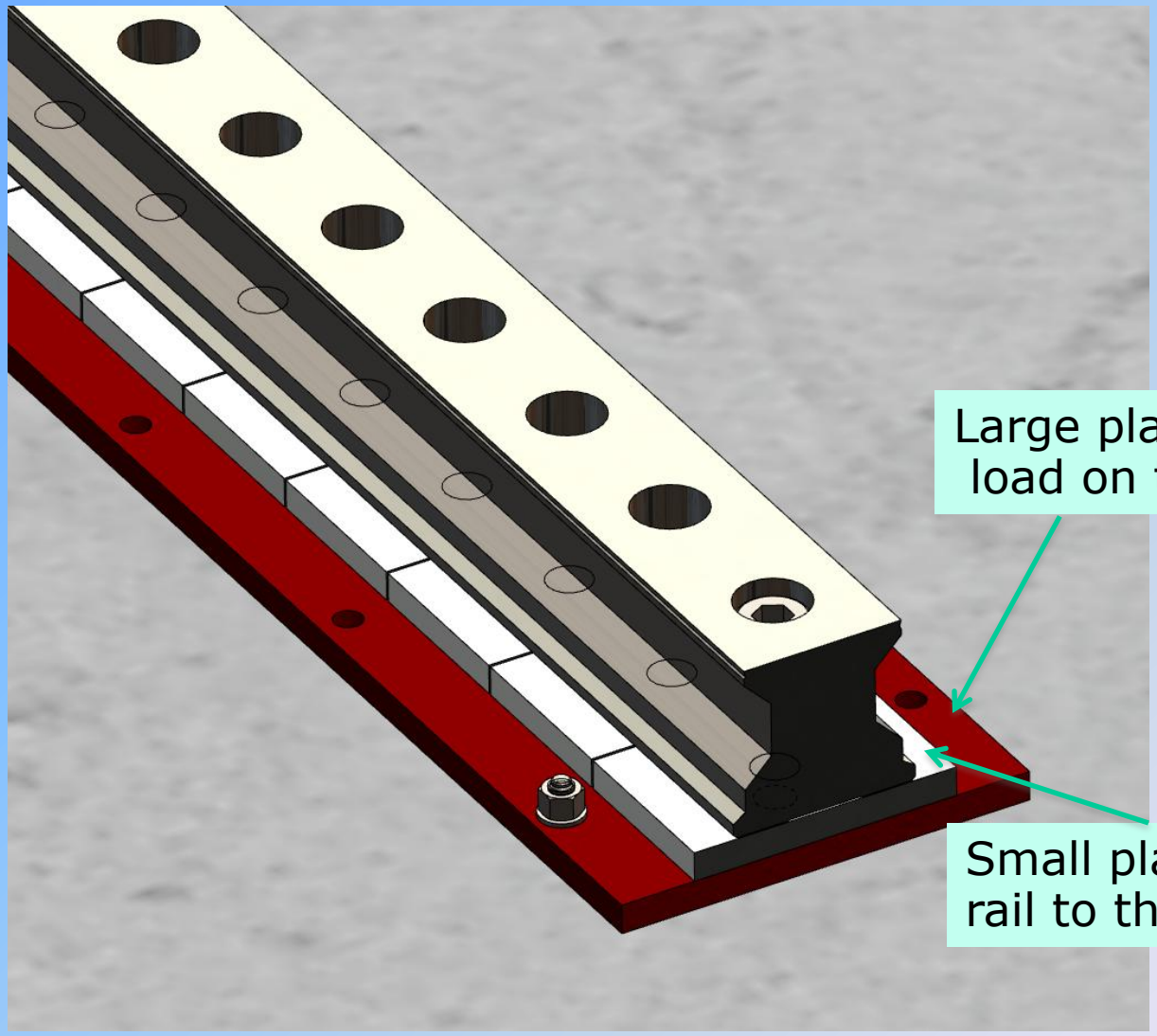
Some details of installation

Access windows for carriage and hydraulic jack under platform



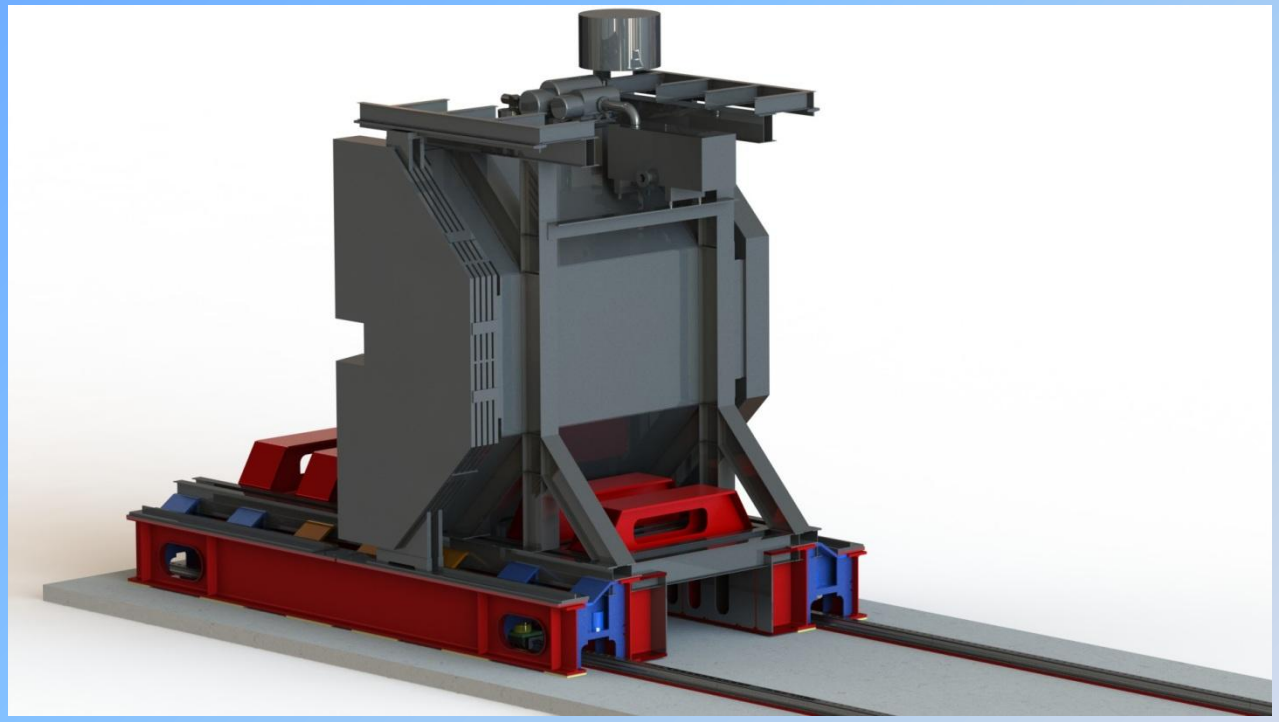


Installation of the rail on the floor

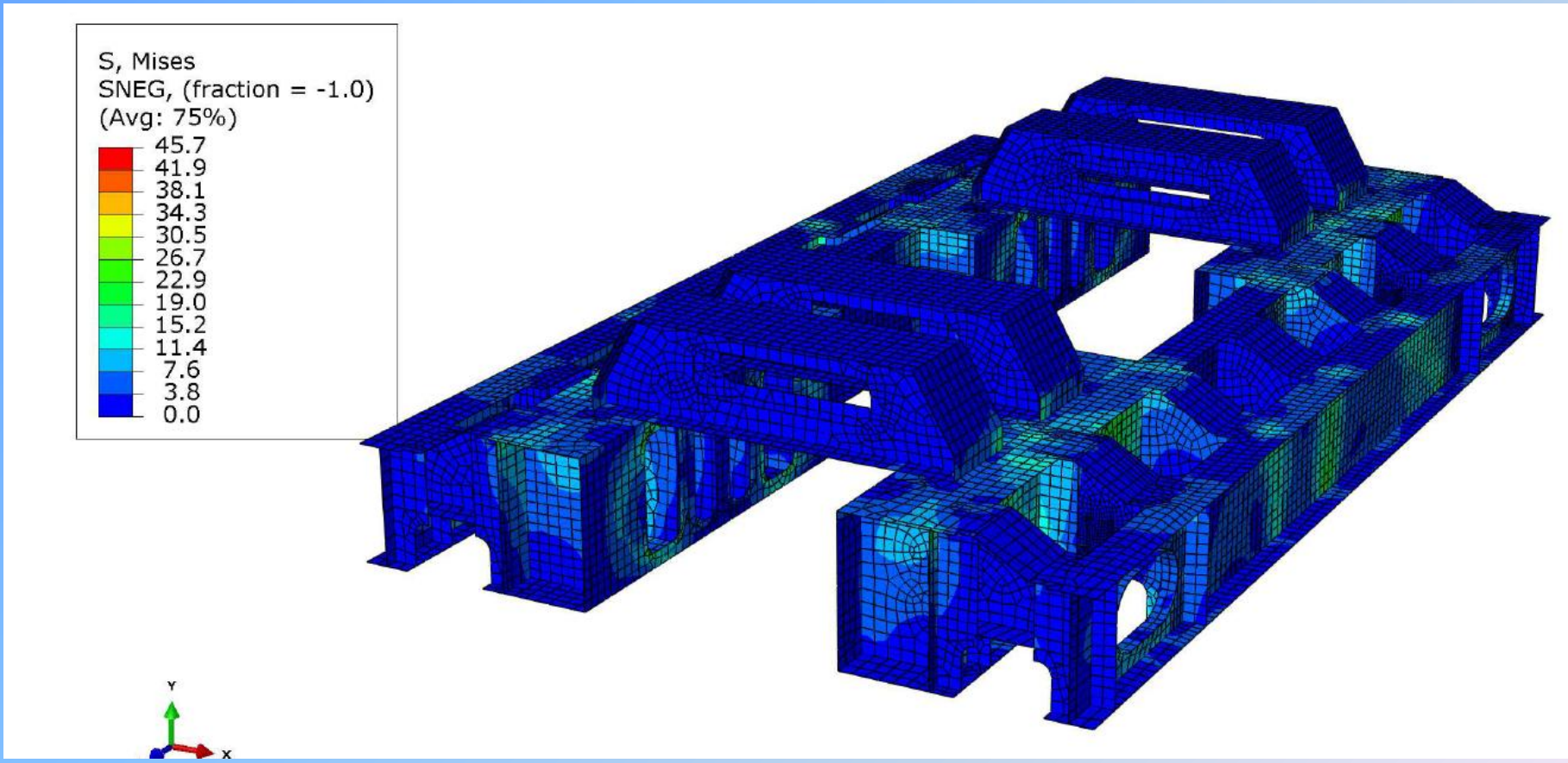


FEM Analysis

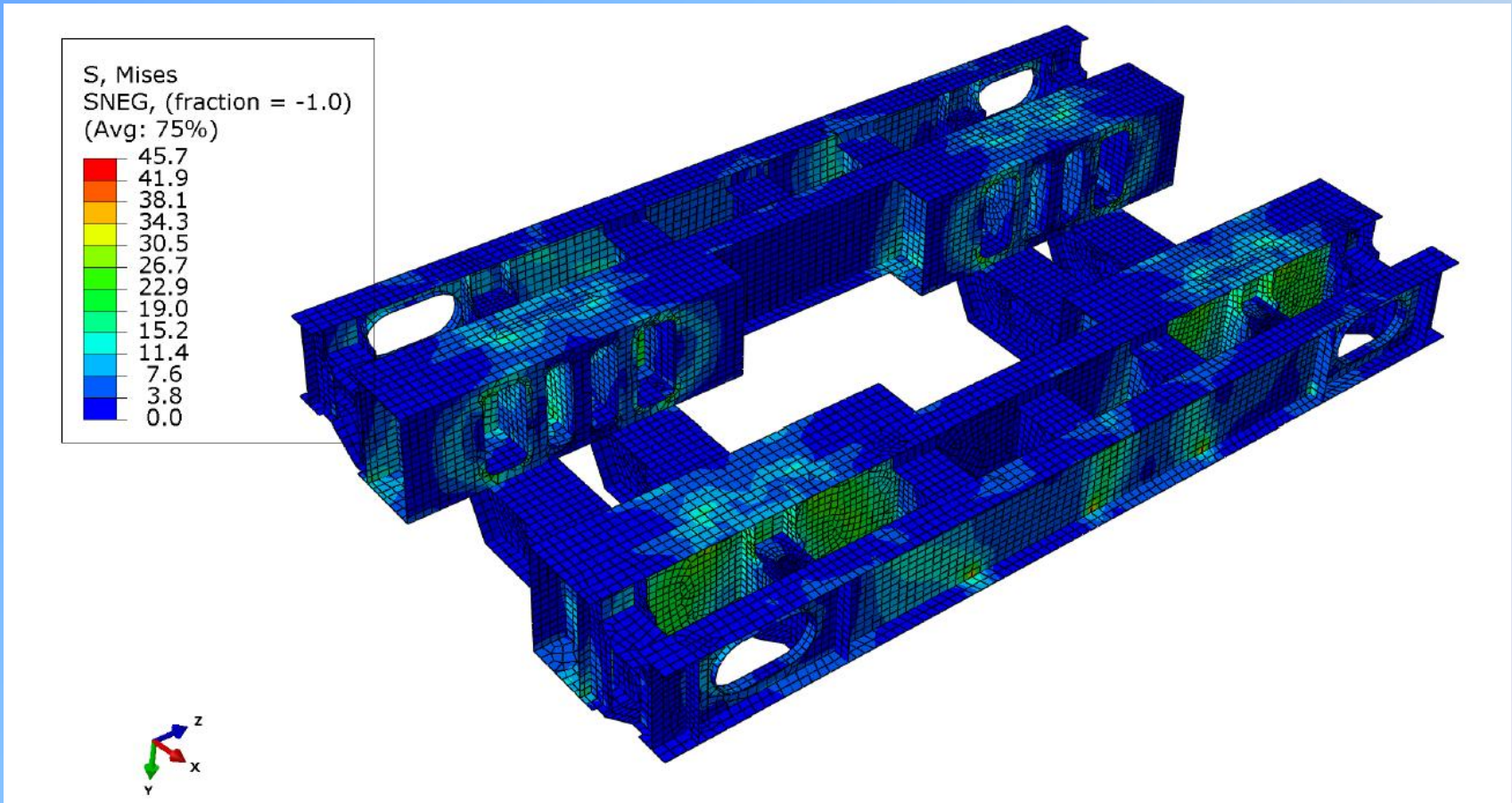
1. Permanent supports (domestic possition)
2. Moving – supports platform on four carriages



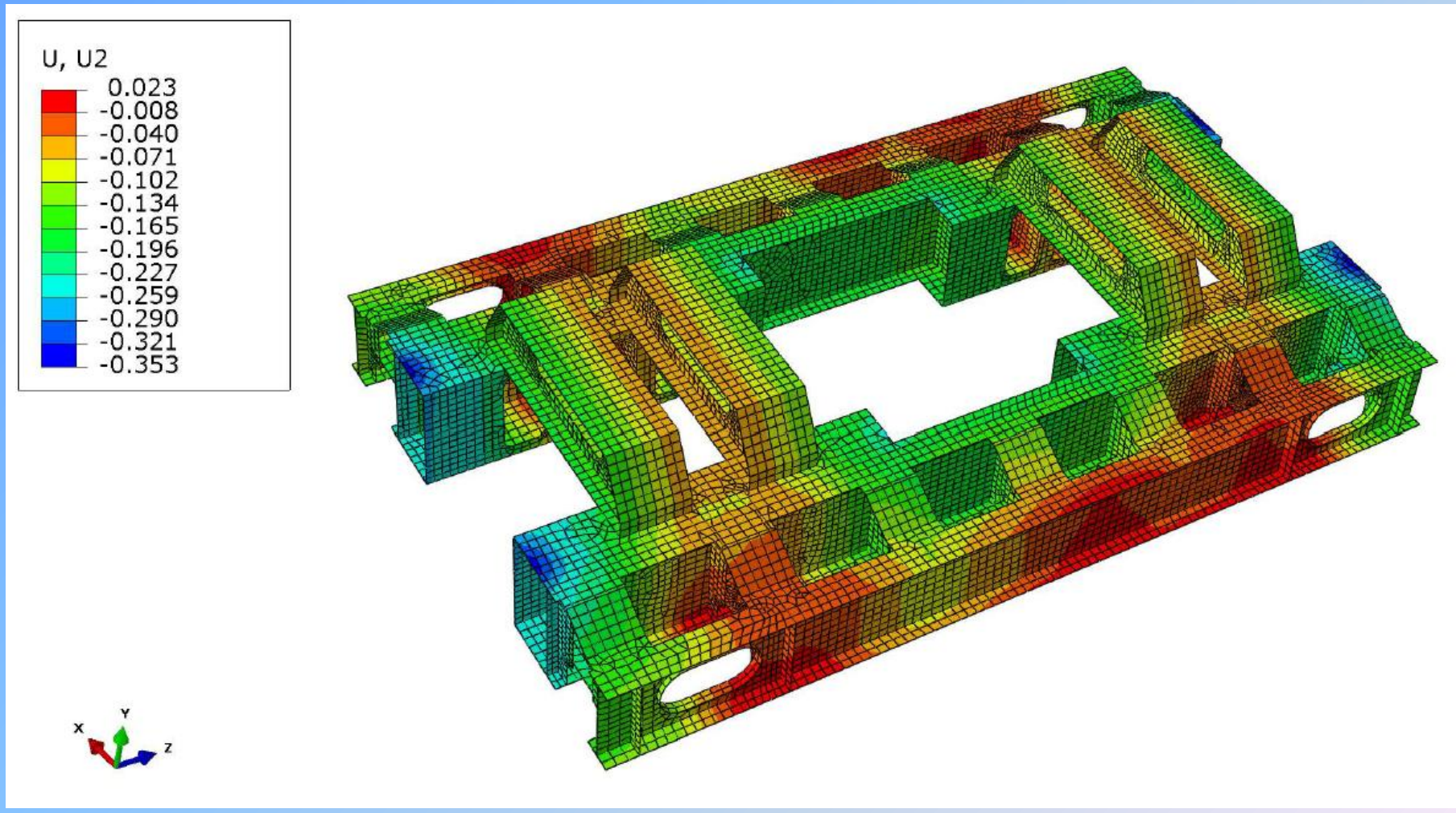
Pernament supports on 12 pads, 8 under doors
Stress von Mises – izo top view



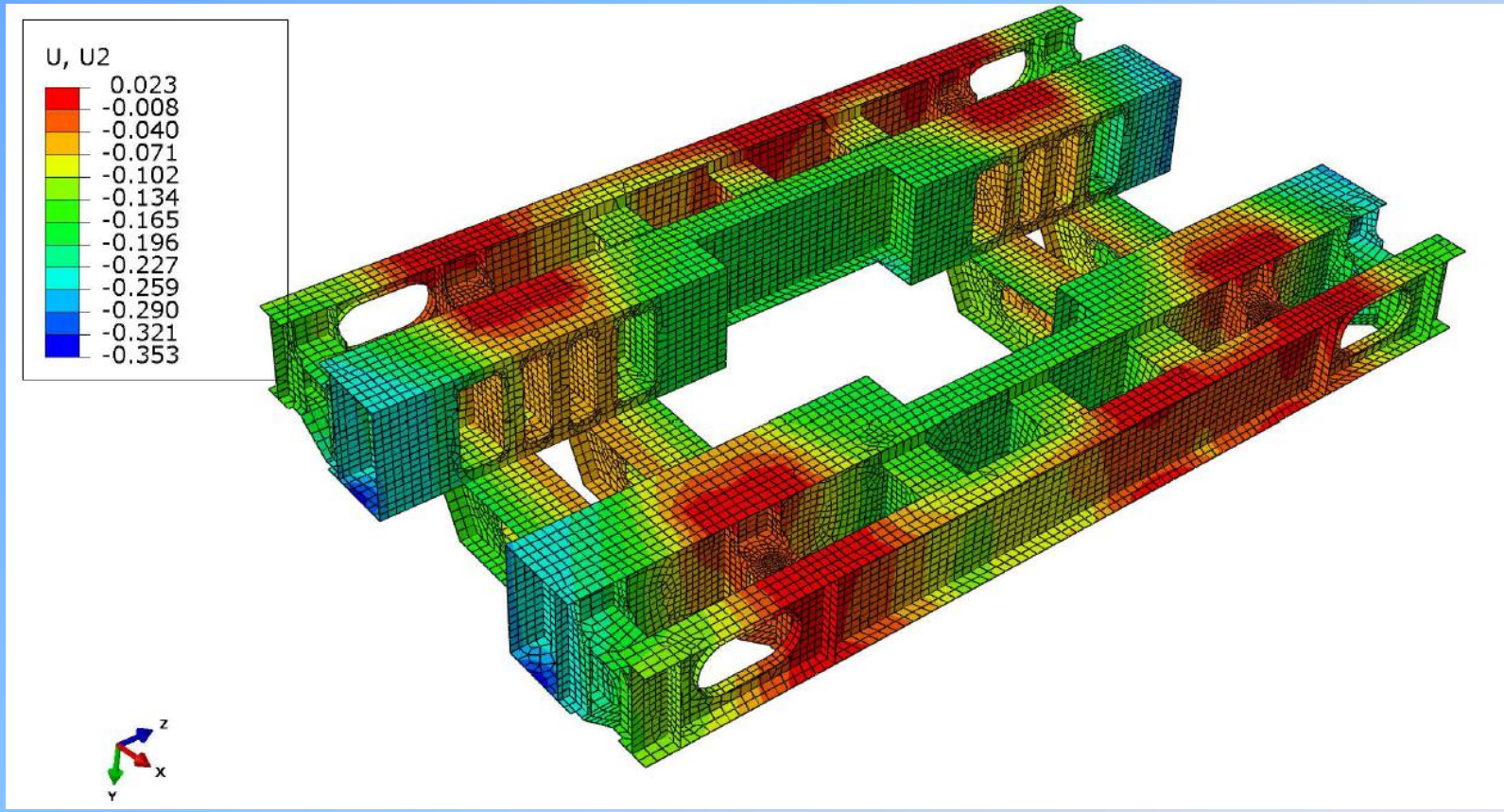
Pernament supports on 12 pads, 8 under doors
Stress von Mises – izo botton view



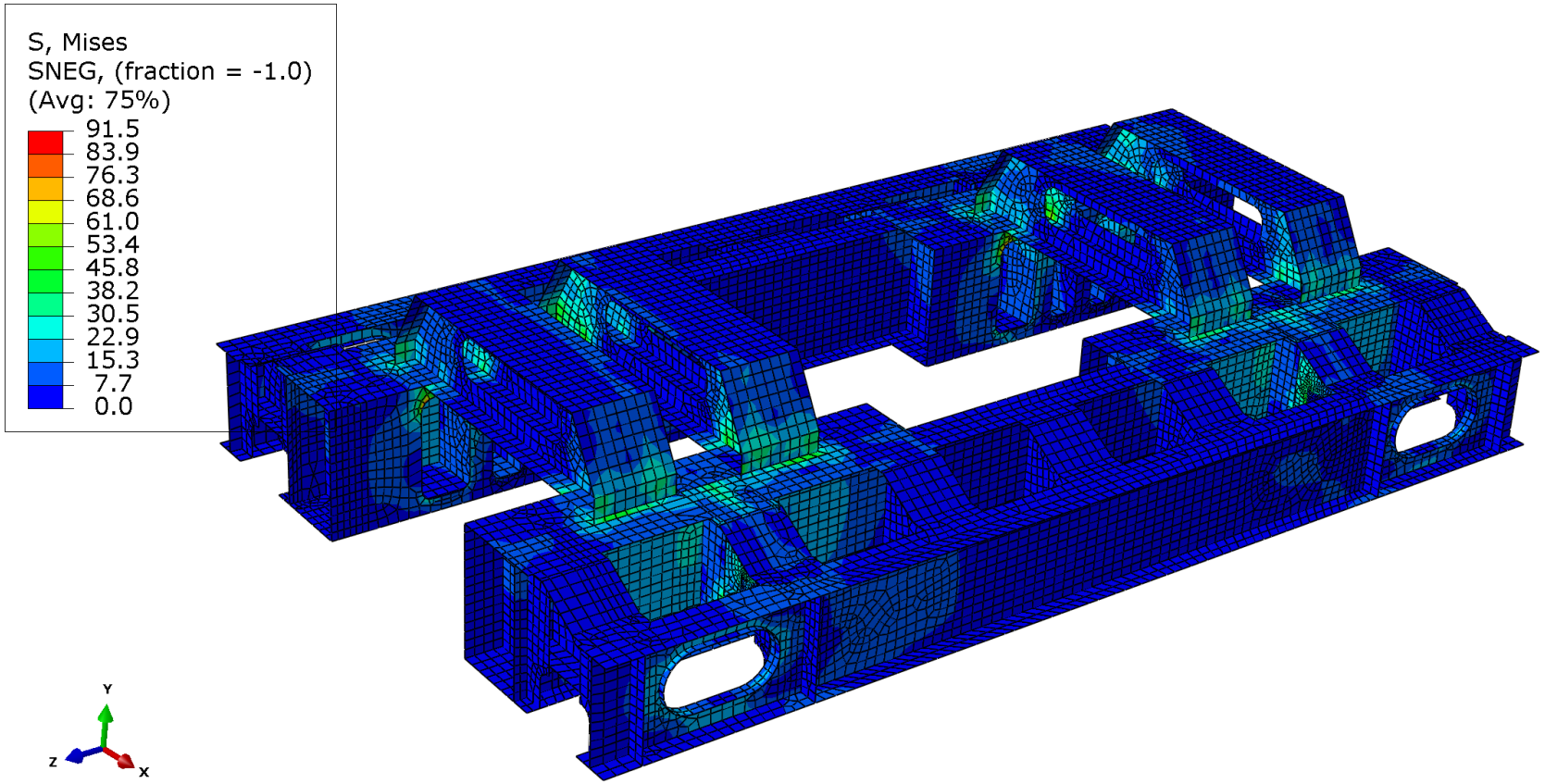
Pernament supports on 12 pads, 8 under doors
Displacement in Y direction – izo top view



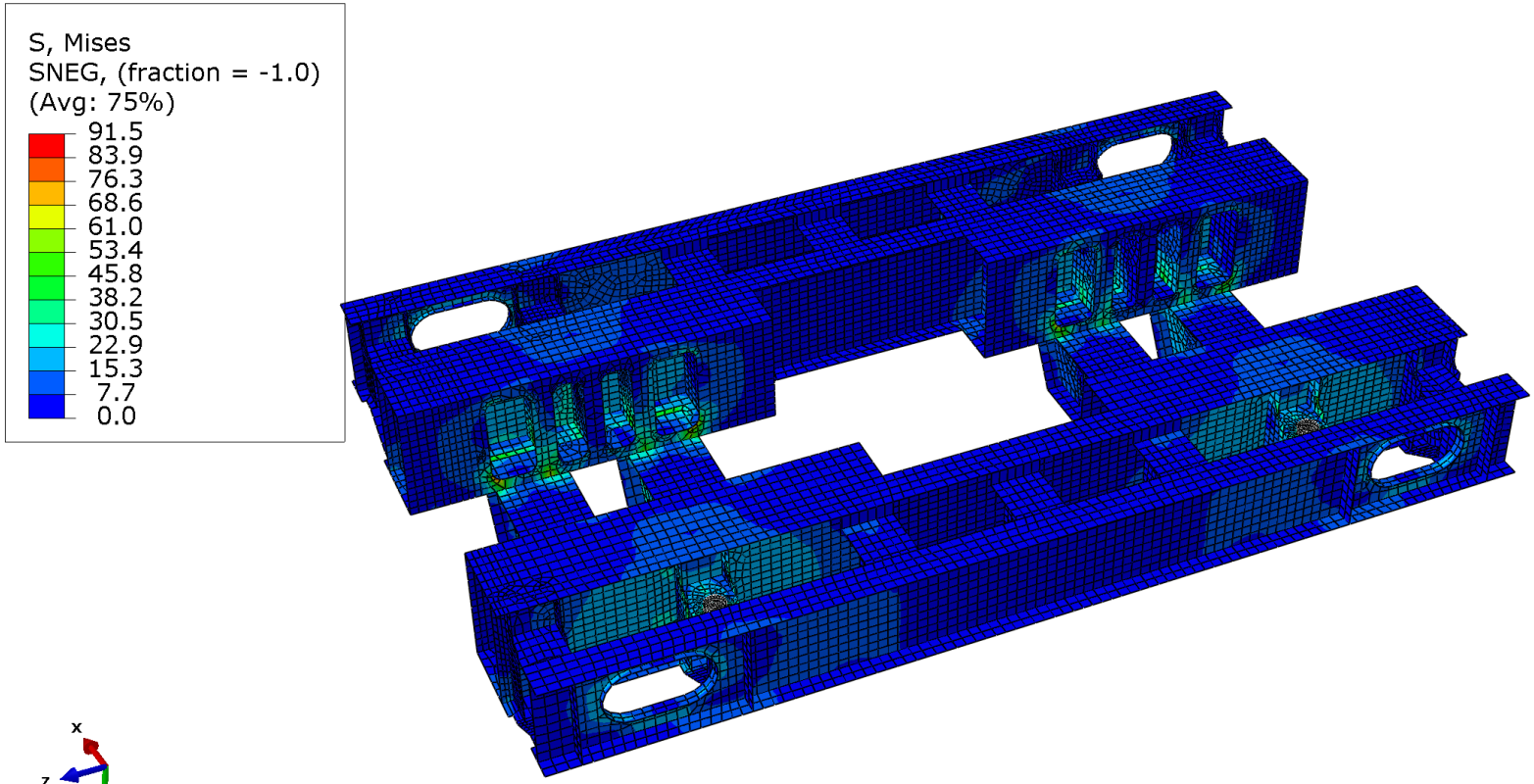
Pernament supports on 12 pads, 8 under doors
Displacement in Y direction – izo botton view



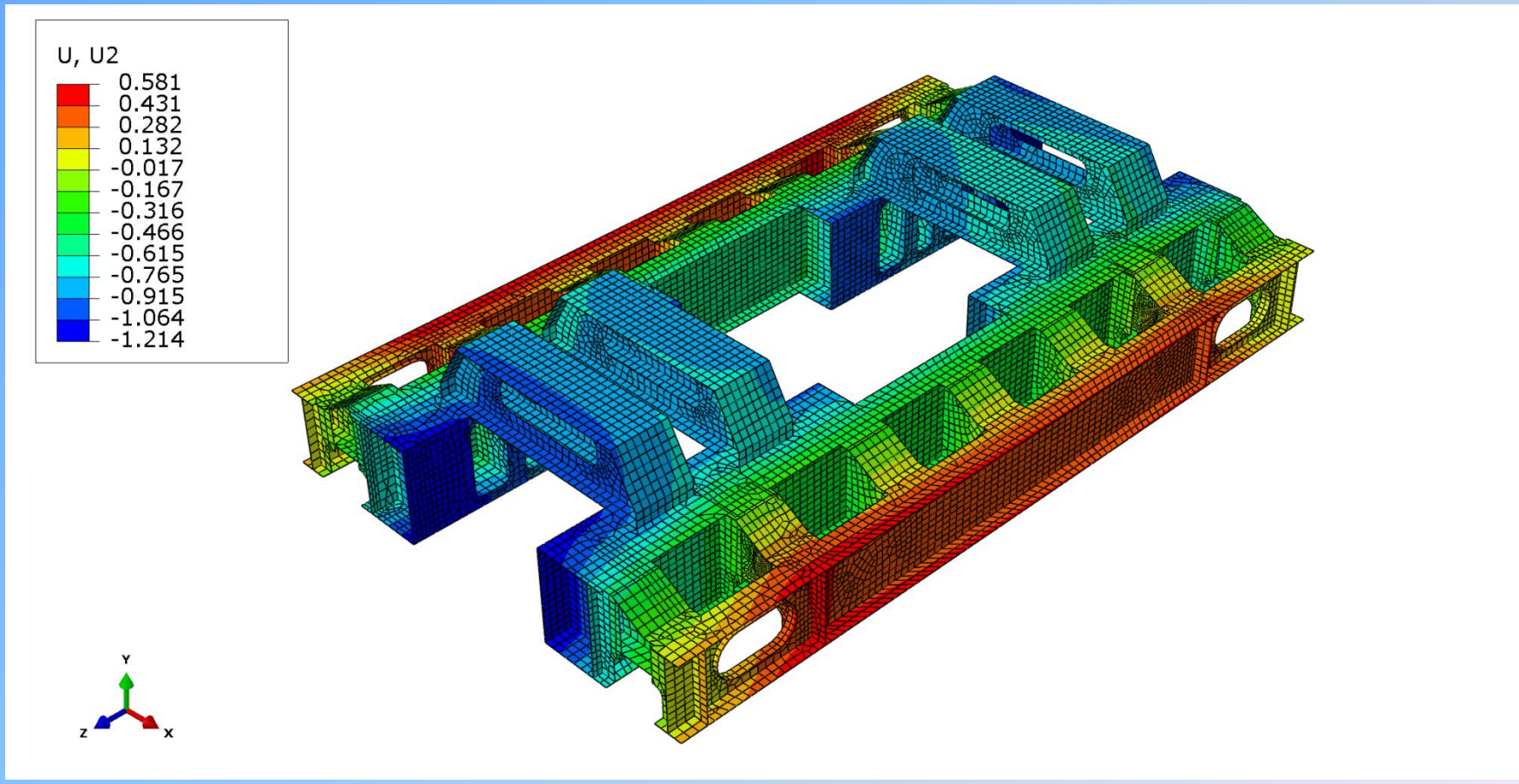
Moving on 4 carriages, doors fixed to the yoke
Stress von Mises – izo top view



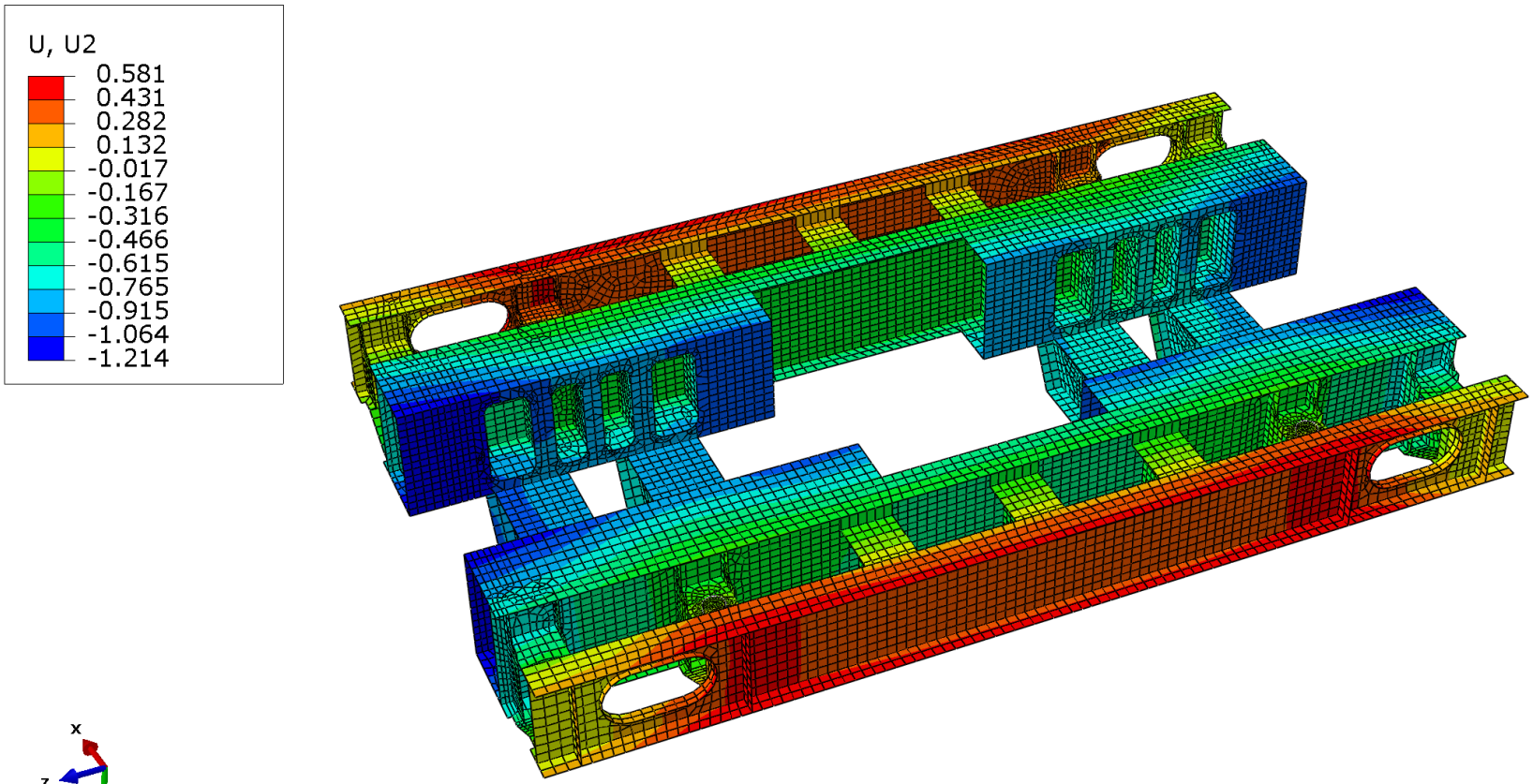
Moving on 4 carriages, doors fixed to the yoke
Stress von Mises – izo botton view



Moving on 4 carriages, doors fixed to the yoke
Displacement in Y direction – izo top view



Moving on 4 carriages, doors fixed to the yoke
Displacement in Y direction – izo botton view



Operation of device

1. Before first usage adjust the height of the platform using precise pads and hydraulic jack.
2. For the transport of the magnet from in-beam to park position lift the platform a few millimetres
3. Lock hydraulic jacks
4. Fasten the horizontal hydraulic actuators
5. Start slowly moving using hydraulic actuators to the park position.

Resume

1. Secure level of risk about stress above 2.5
2. Magnet must be transport with closed door and fixed to the yoke
3. Very small speed of the transport, no vibrations
4. Very precise positioning and repositioning
5. The main element of the frame is I_BEAM HEB1000 (it is standard in industry)
6. Total mas of the platform about 29 tones