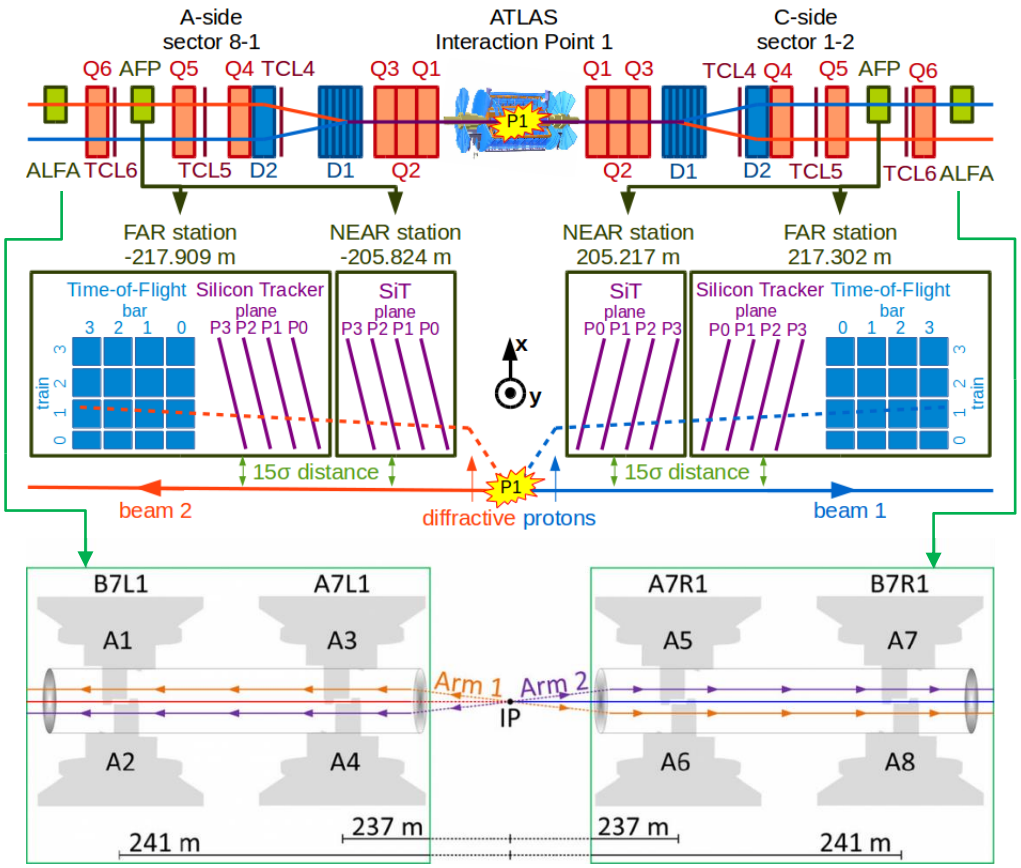
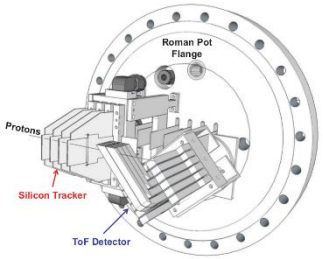
Status of AFP shielding/installation, ECR

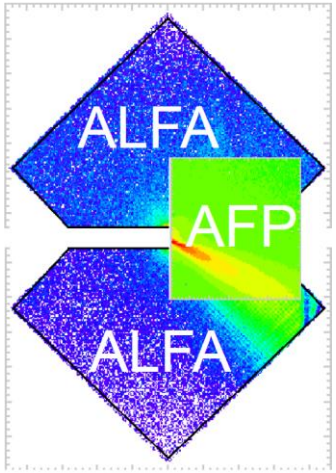
LHC Tunnel Region Experiments Working Group (TREX) Meeting

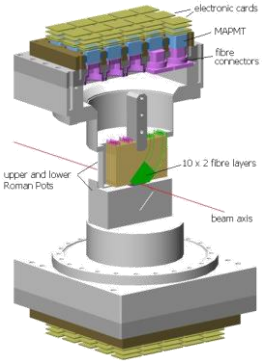


Maciej Trzebinski,
Marko Milovanovic

21.02.2025.







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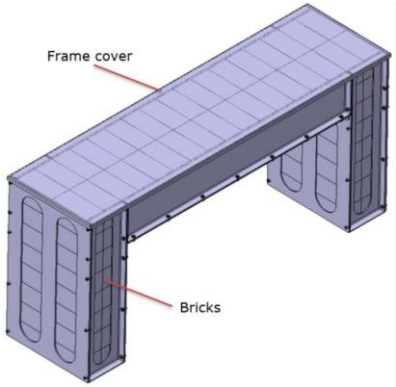
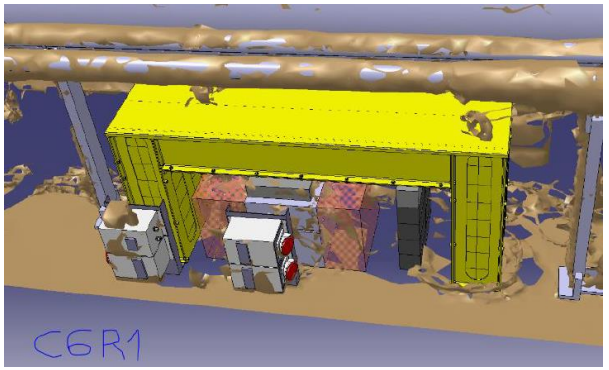
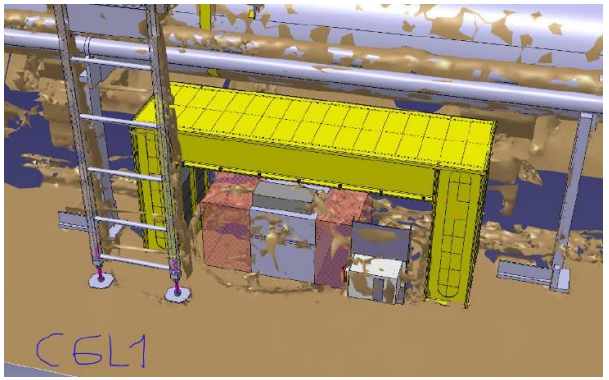
CERN

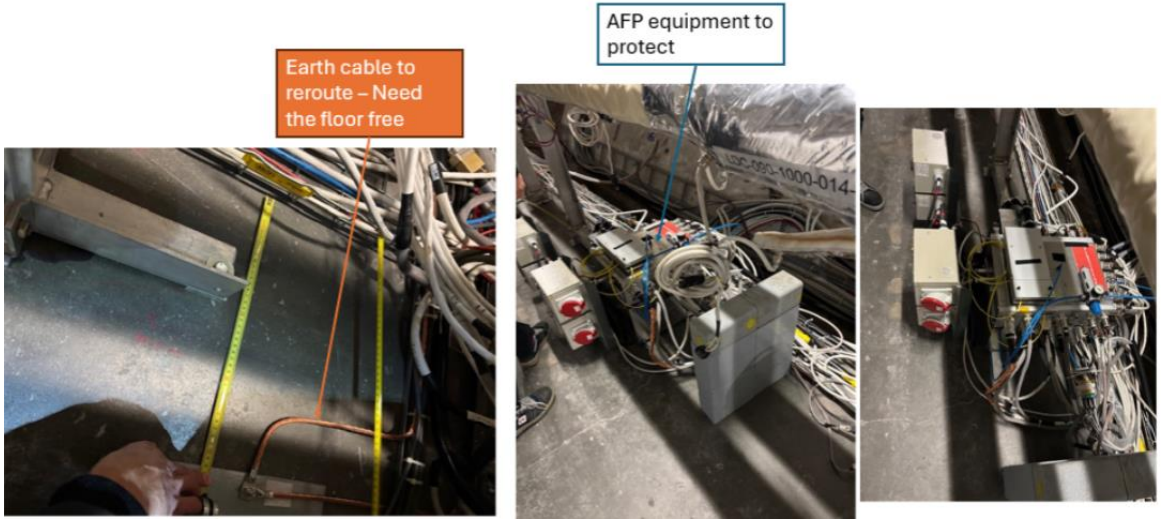
New AFP PP shielding update

- Inspection visit(s) last week with JPC, ML et.al. to measure the available space for the new AFP PP shielding:
  - Purpose: shield the PP electronics equipment with 200 mm of steel
  - Shielding material: steel bricks of 200 x 100 x 100 mm (provided by M.Lazzaroni)
  - Frame construction: an Al frame to support the bricks on top and hold the bricks on each side is already in production. To be transportable and installed by hand in the tunnel (to avoid using transport team services) – thanks to M.Lazzaroni, J.P.Corso, F.S.Galan for prompt reaction!
  - ANSYS calculation: done by Marija M. (see backup)
  - FLUKA simulations initiated; to be completed most likely next week.
  - ECR draft completed (thanks to BE-EA-EC/Marija M.!)
- Shielding should be completed/installed before 14.03!









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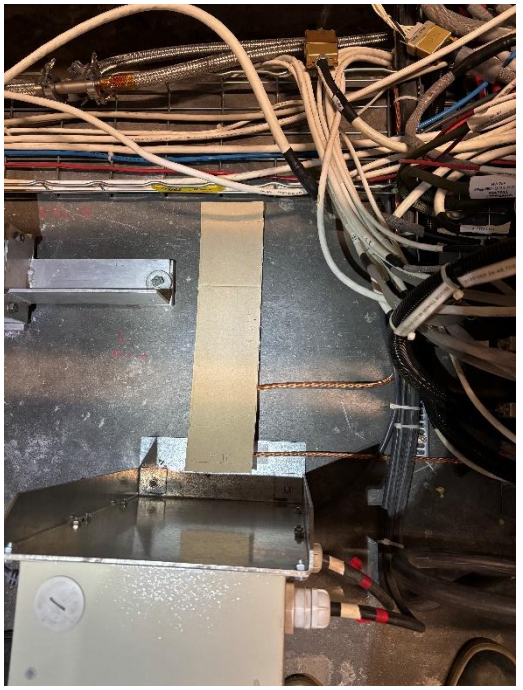
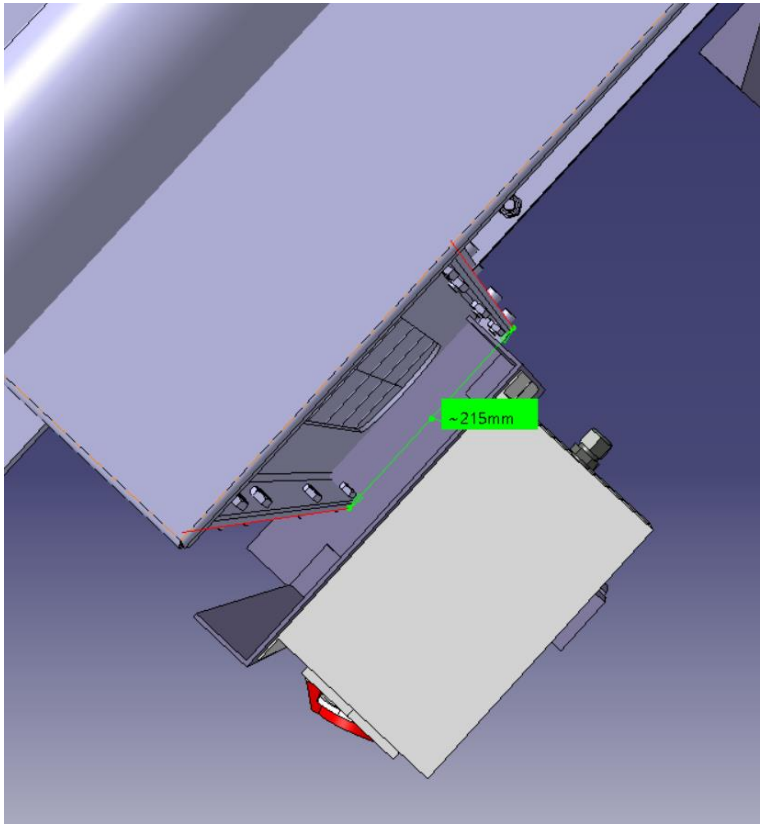
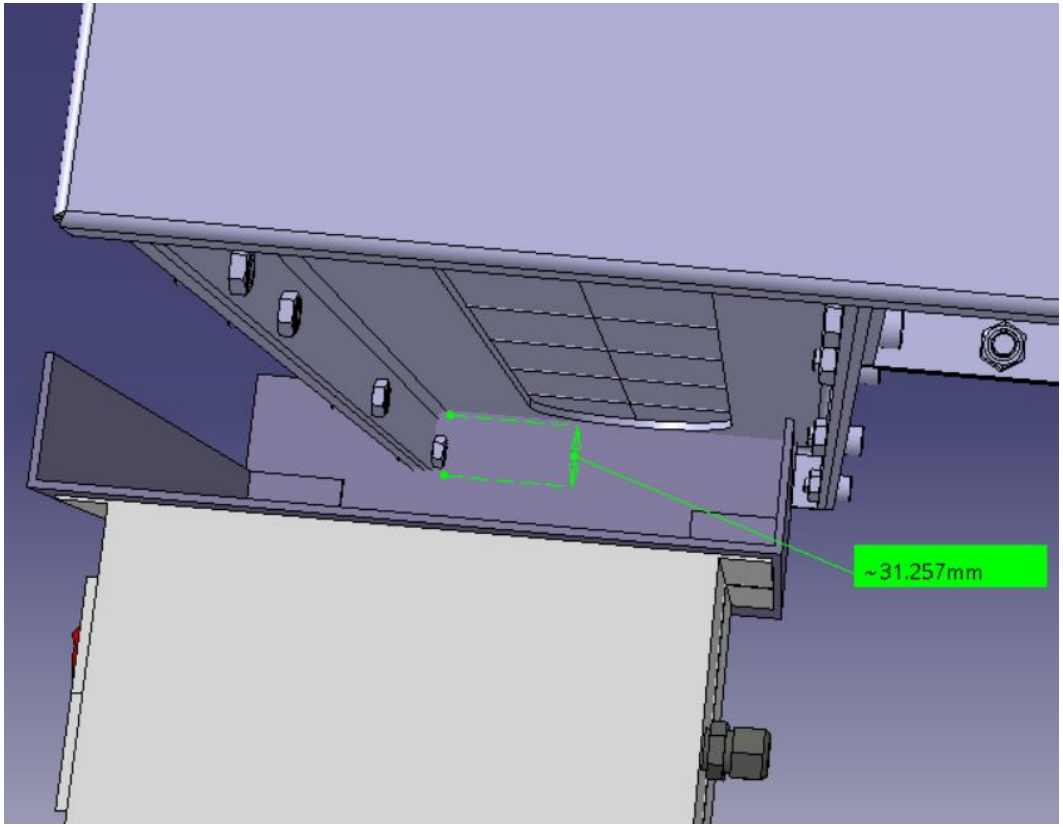
New AFP PP shielding update

- Constraint:
  - There was a need to need to re-route the grounding for the elelcric socket box in LSS1R (Sector 1-2), or move the whole box.
  - EN-EL (Patrick VP) offered a quick solution which he already implemented, but some more work might have to be done (to remove the screw in the middle potentially, depending on the frame size?..)



New AFP PP shielding update





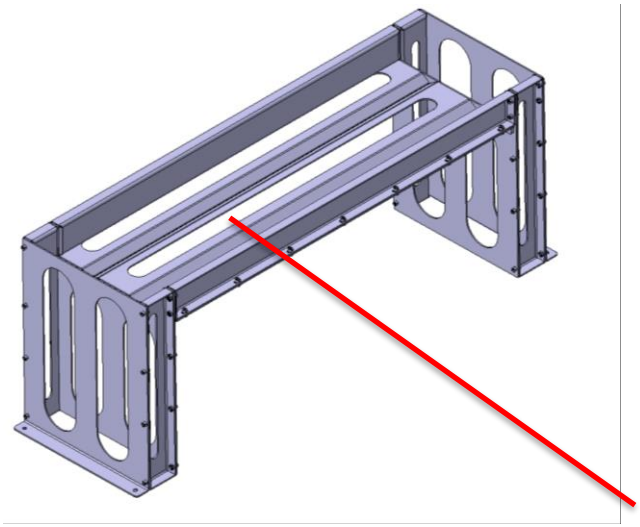
Backup

Backup slides.

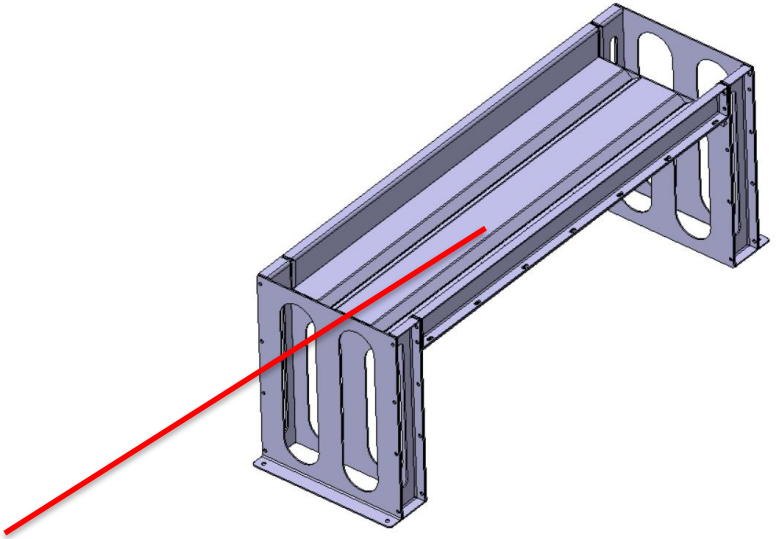
Ansys analysis performed by M.Majstorovic

Modification of first 3D proposal

Initial proposal



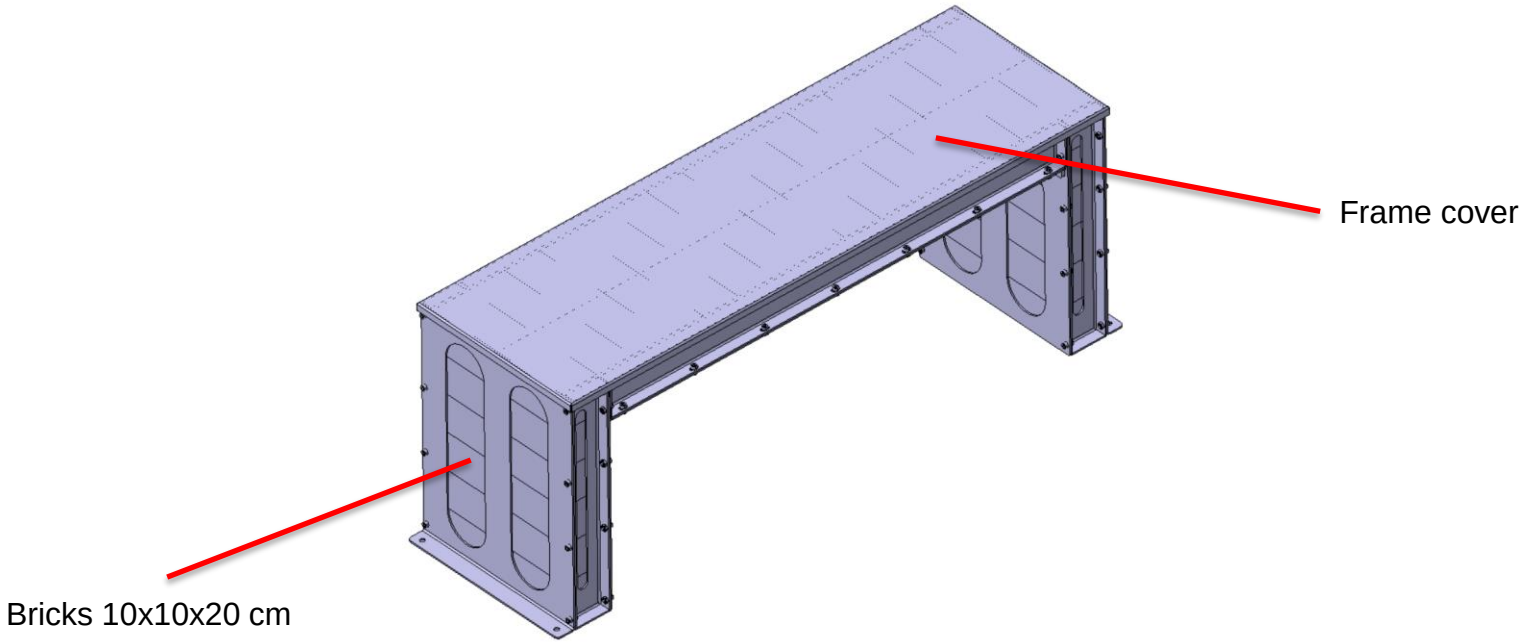
Modified proposal



Modified plate for bricks

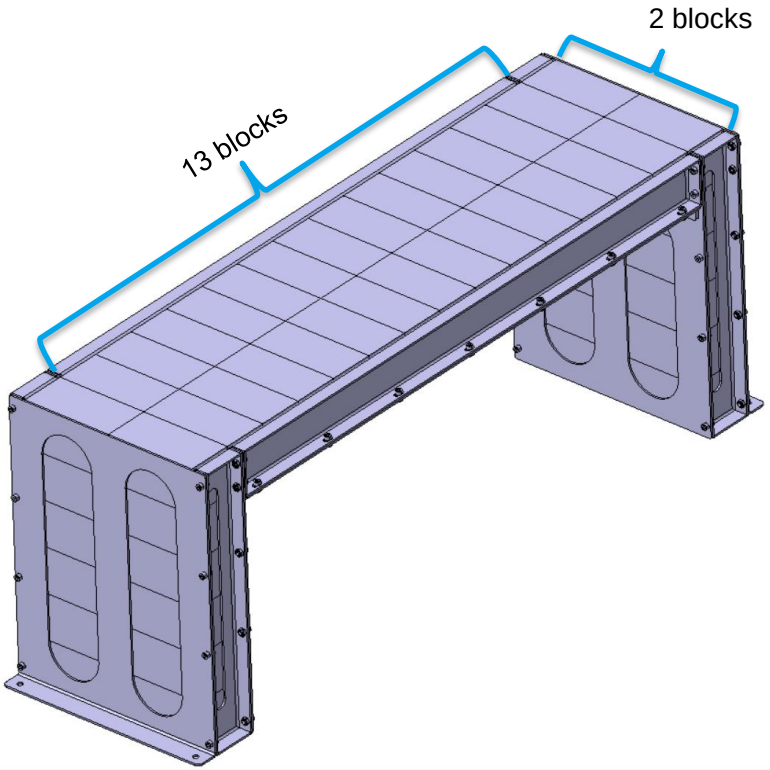
Ansys analysis performed by M.Majstorovic

Modified proposal



Ansys analysis performed by M.Majstorovic

Shielding blocks

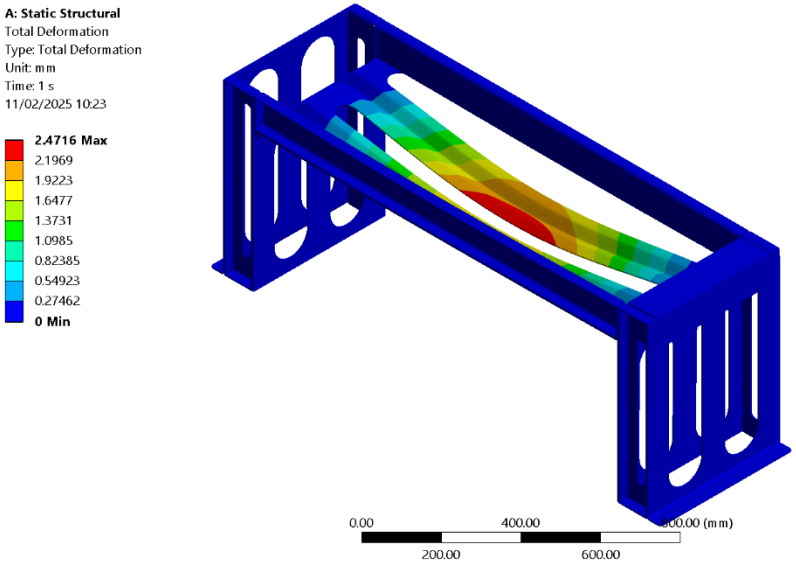


2 * 13 = 26 blocks

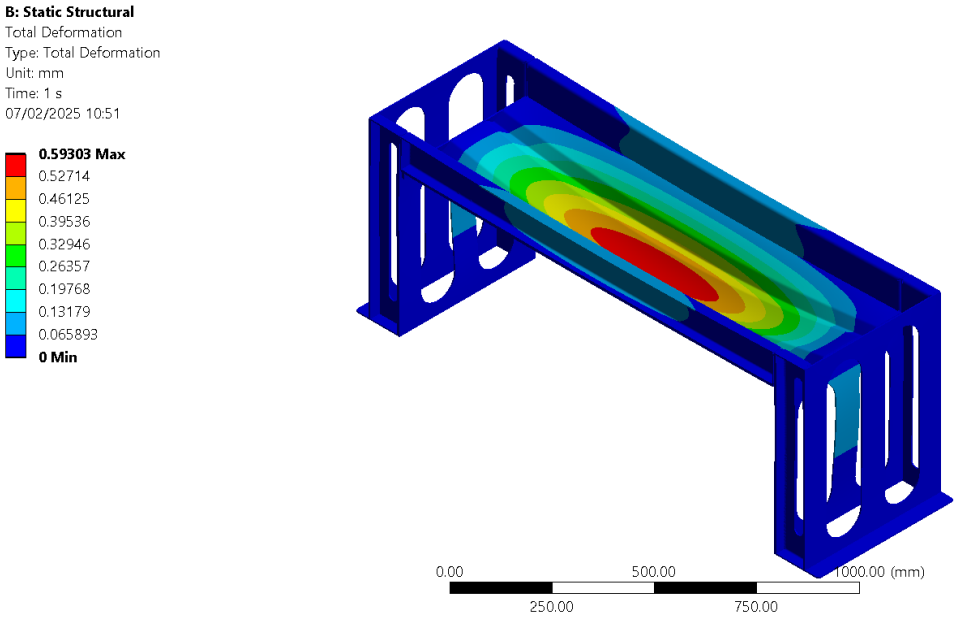
1 block = 16kg

Ansys analysis performed by M.Majstorovic

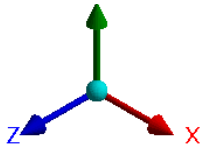
Total Deformation – load : 26 blocks * 16kg = 416kg



Initial proposal



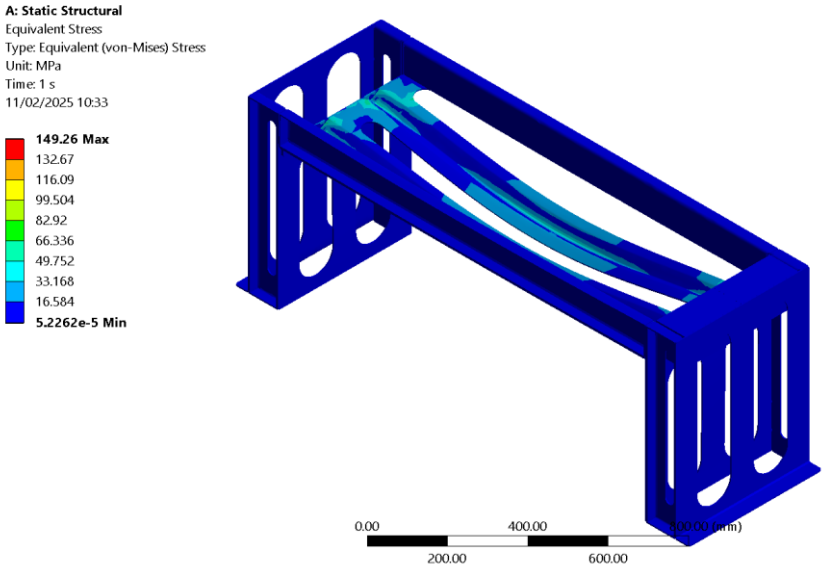
Modified proposal



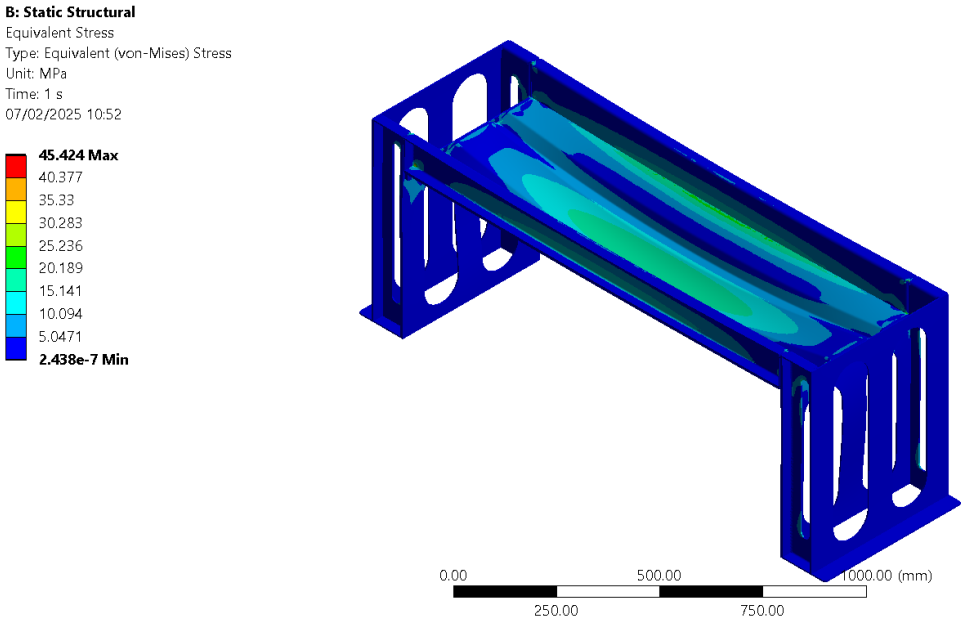
Material: S235 Structural steel

Ansys analysis performed by M.Majstorovic

Equivalent Stress – load : 26 blocks * 16kg = 416kg



Initial proposal



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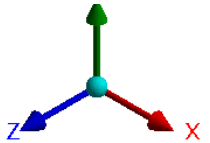
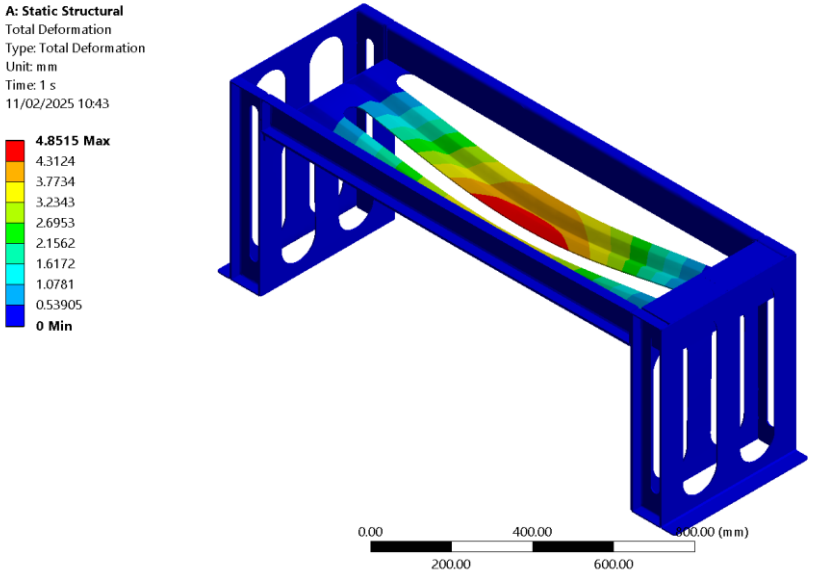


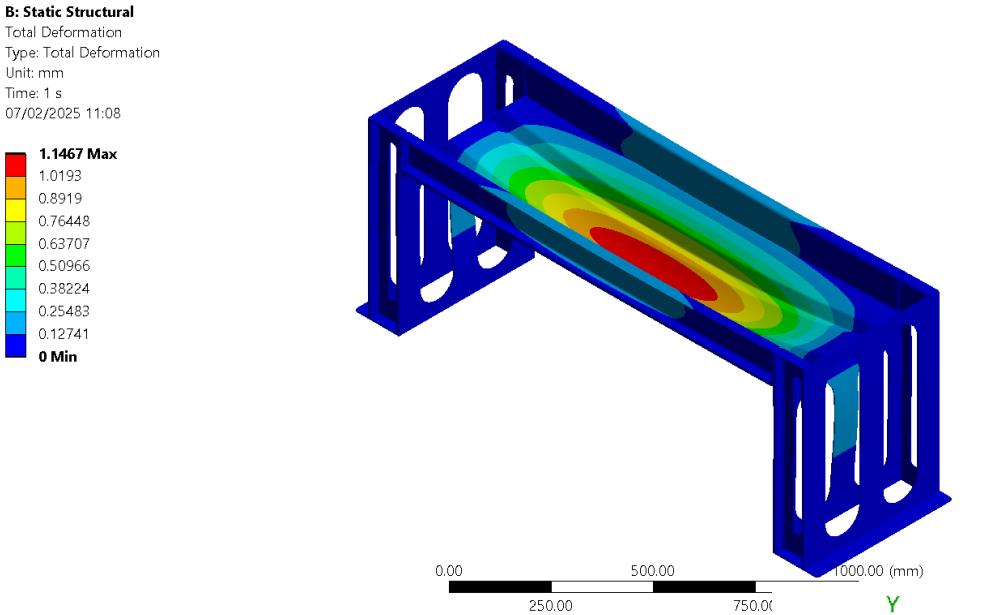
Material: S235 Structural steel

Ansys analysis performed by M.Majstorovic

Total Deformation – load : 52 blocks * 16kg = 832kg



Initial proposal

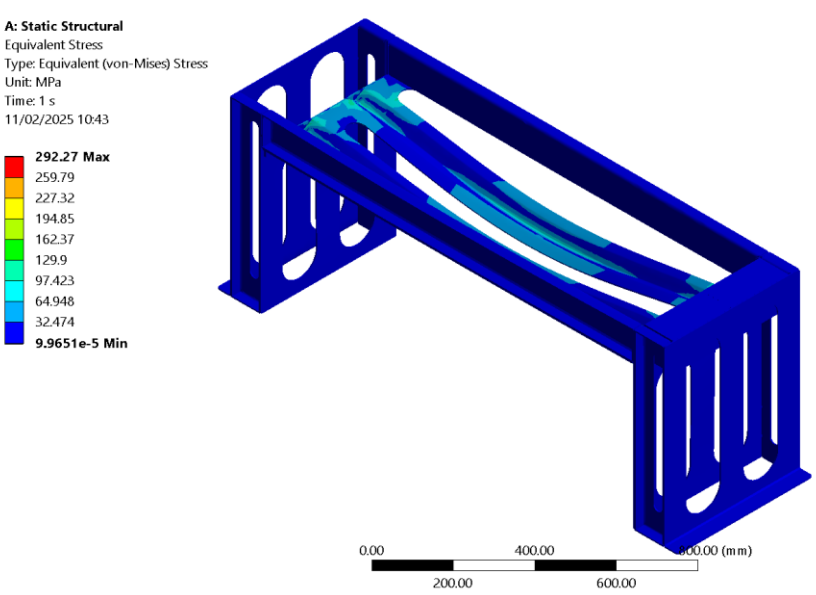


Modified proposal

Material: S235 Structural steel

Ansys analysis performed by M.Majstorovic

Equivalent Stress – load : 52 blocks * 16kg = 832kg



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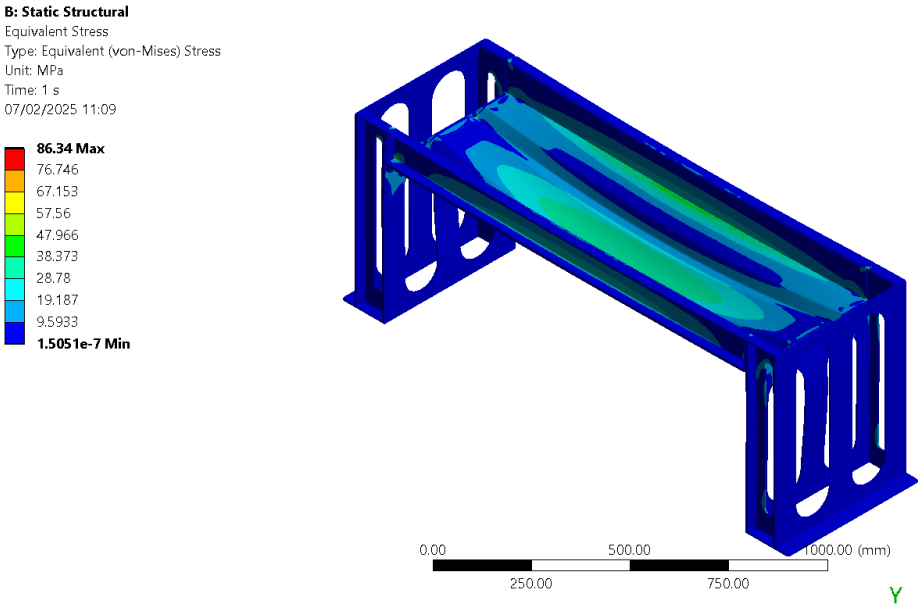

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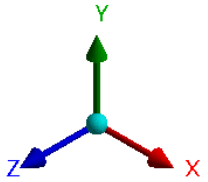
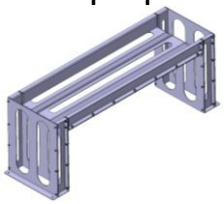
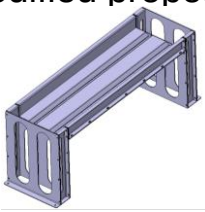


Material: S235 Structural steel

Ansys analysis performed by M.Majstorovic

Results:

	Initial proposal 		Modified proposal 	
Weight	416kg	832kg	416kg	832kg
Max Equivalent Stress [MPa]	149.26	292.27	45.424	86.32
Max Total Deformation [mm]	2.4716	4.8515	0.59303	1.1467

Material: S235 Structural steel