

Time Projection Chamber – rails and installation tooling manufacture status

Sergey Savitski, company Kraina, Minsk



Outline

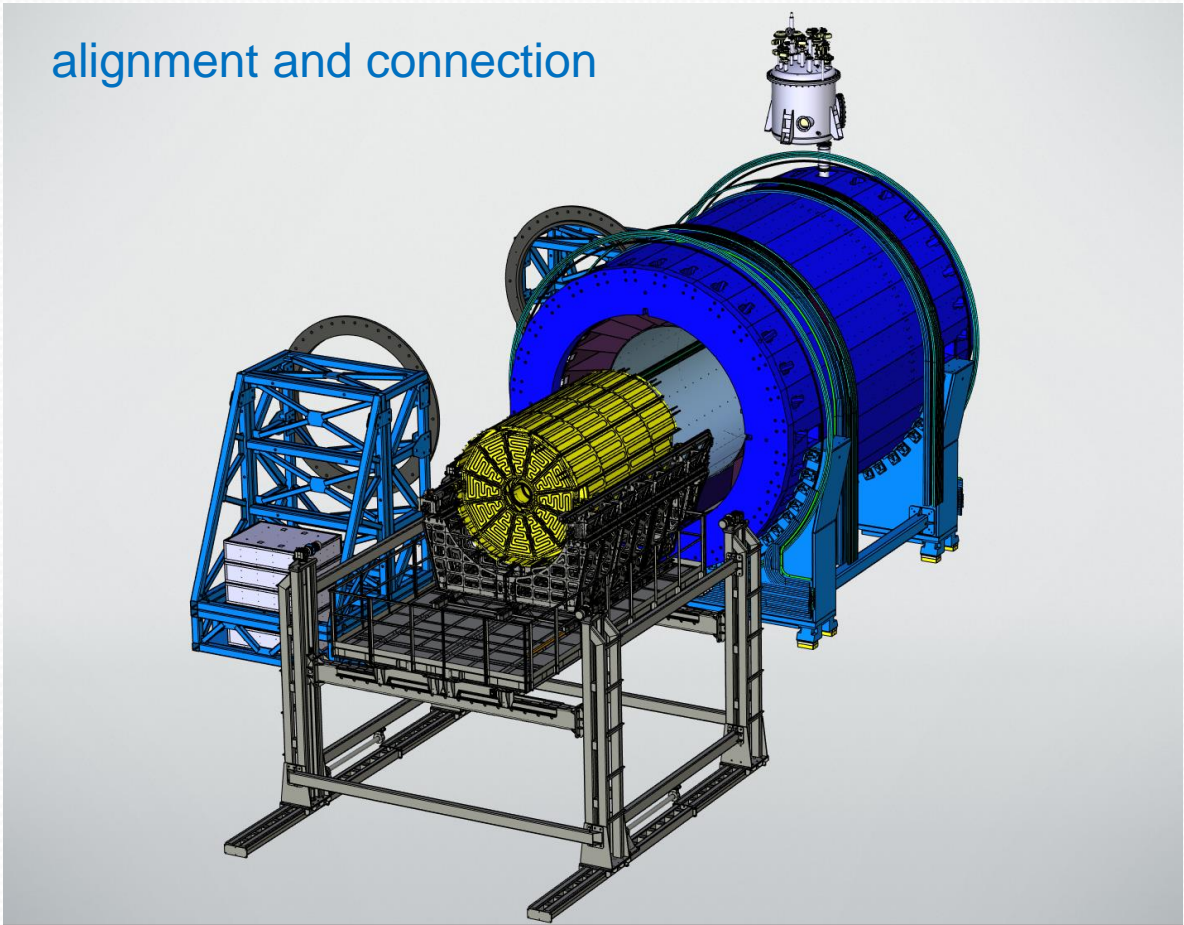
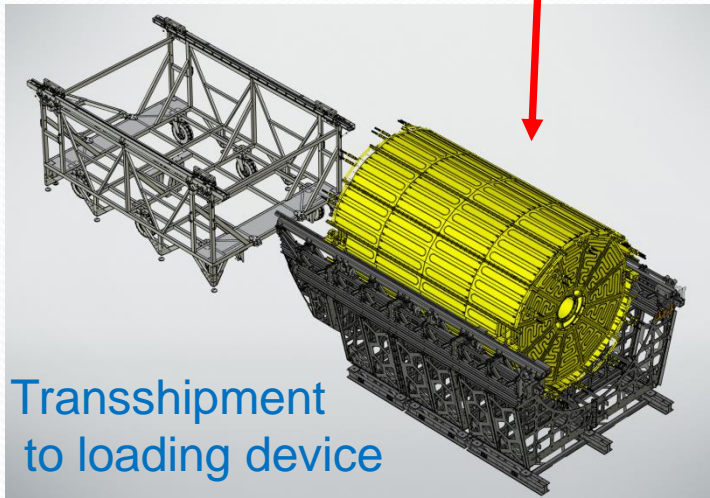


- Installation TPC to MPD concept
- TPC rails:
 - tests results
 - serial rails
- TPC installation tooling:
 - mockup 1:5
 - tooling manufacture status
- Time schedule

Installation TPC to MPD concept

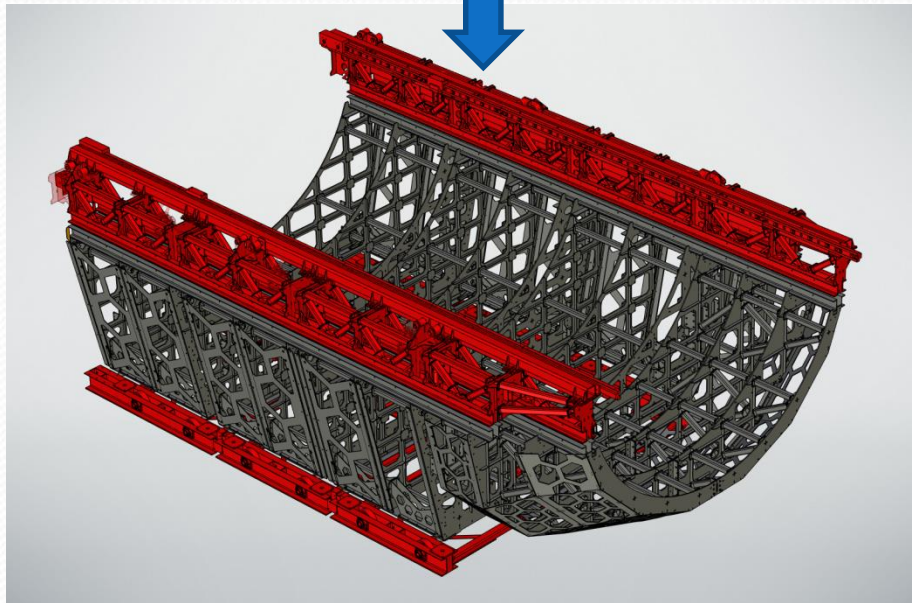


TPC = 5.5 t
Tools = 9 t

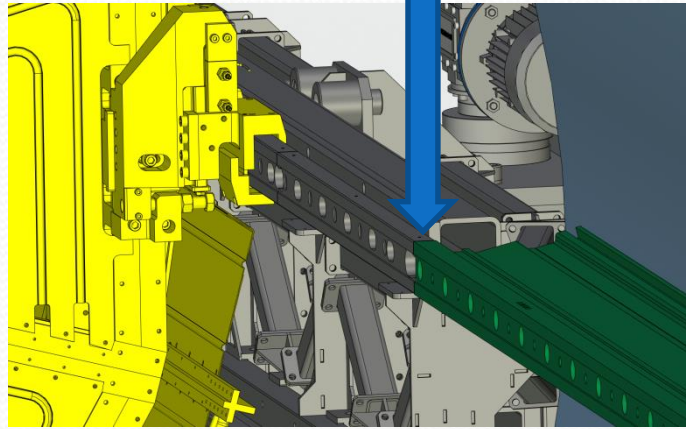


Installation TPC to MPD main moving parts

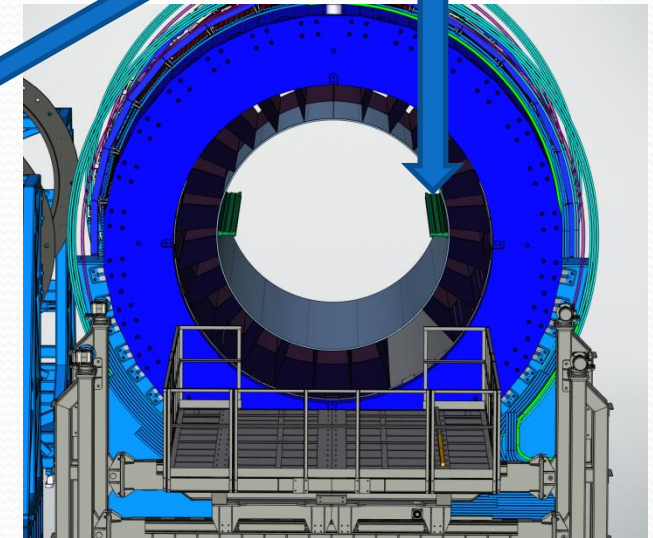
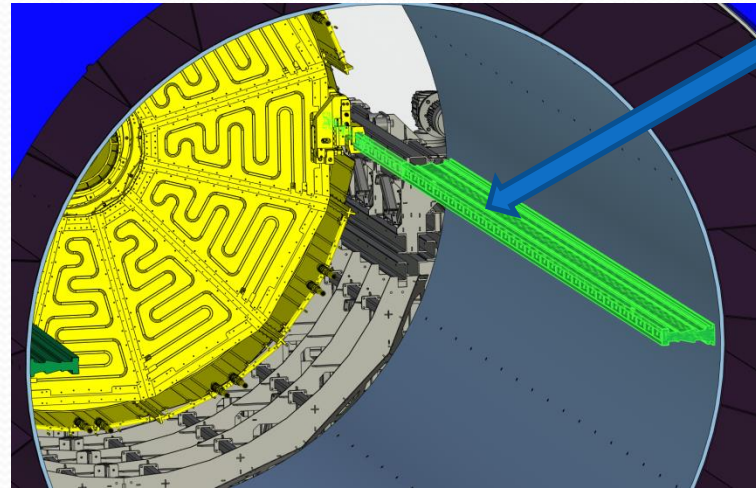
loading device (installation tooling)



Rails alignment and connection



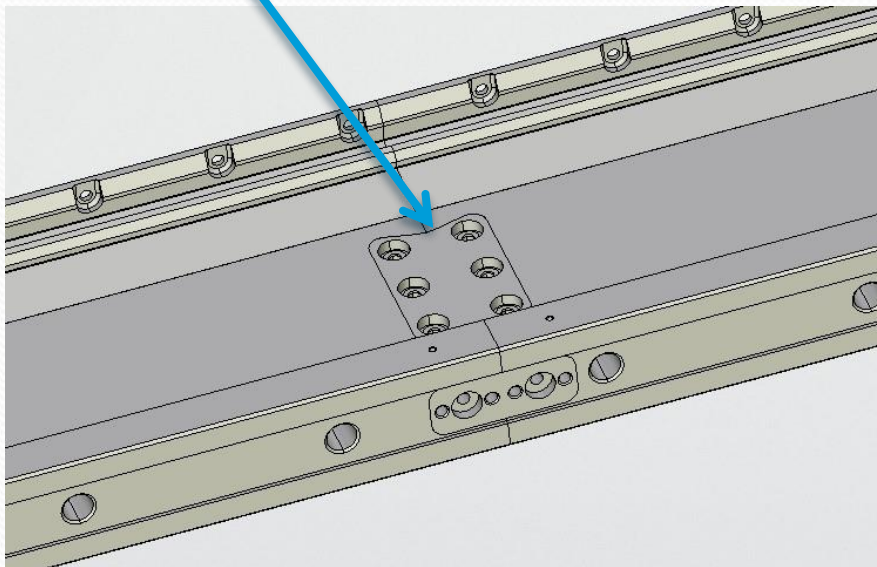
TPC rails



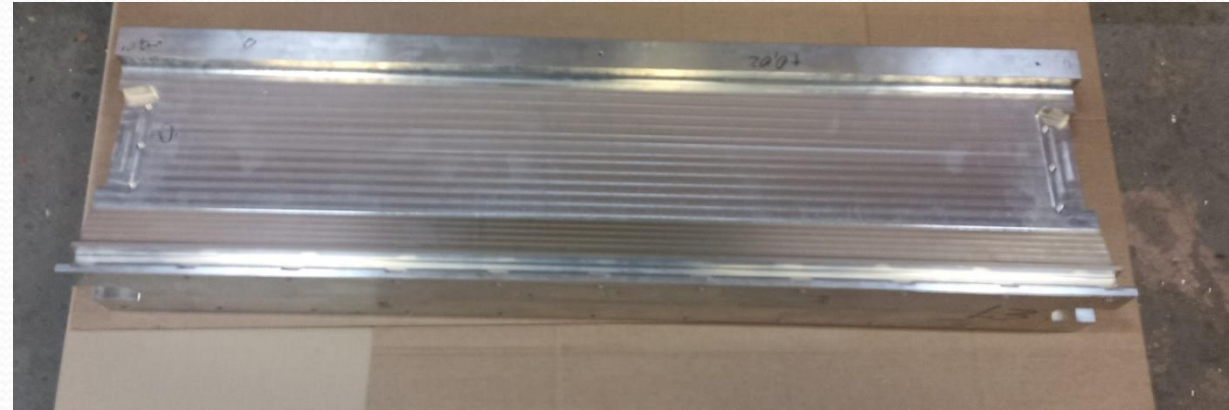
Installation TPC to MPD

TPC Rail

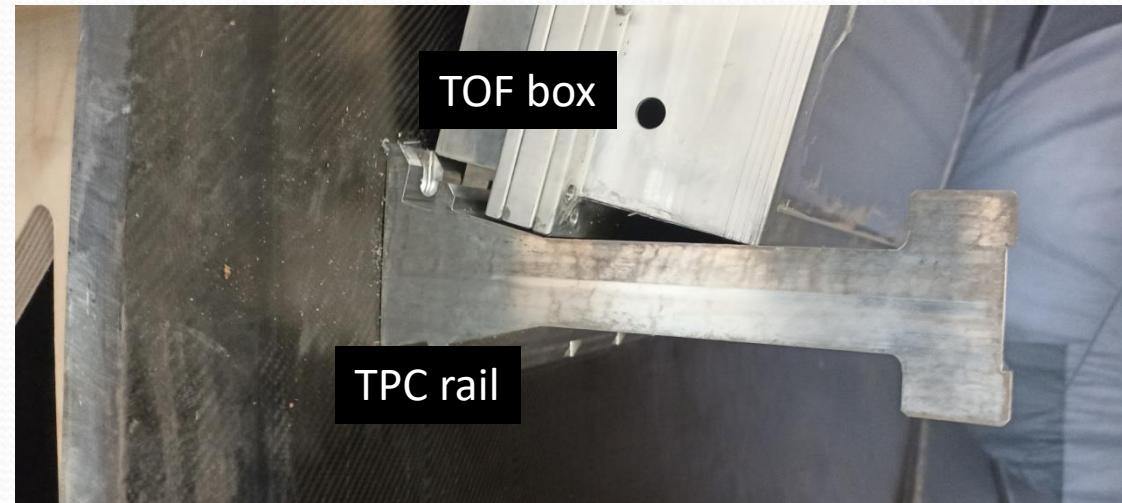
Model of TPC RAIL



TPC rail section prototype for strength testing



TPC rail prototype for test: installation in to MPD



TPC Rail strength test

Test set up

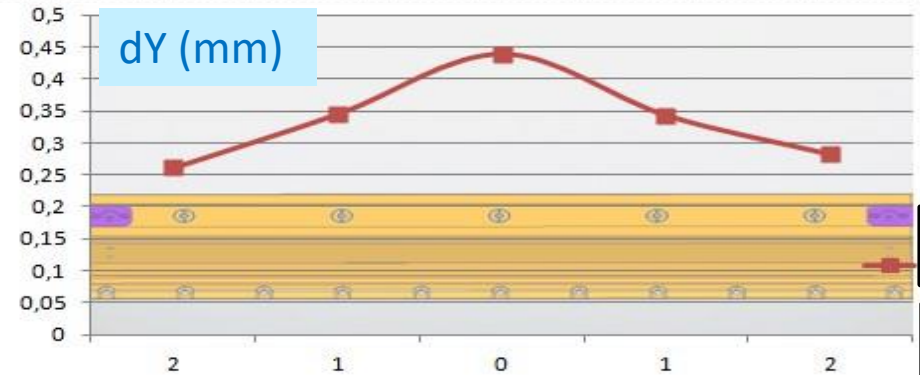


force impact and rail geometry measurements



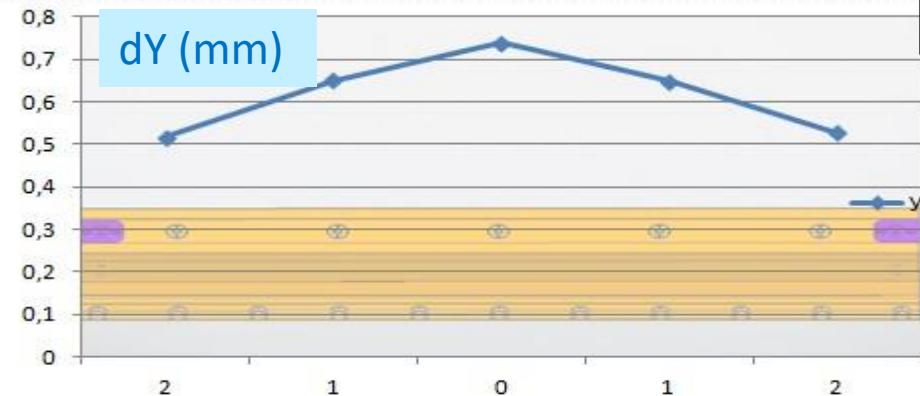
testing stand

Test results (Sagita vs Force)



F=1 ton

Point of measurements



F=2.5 ton

Point of measurements

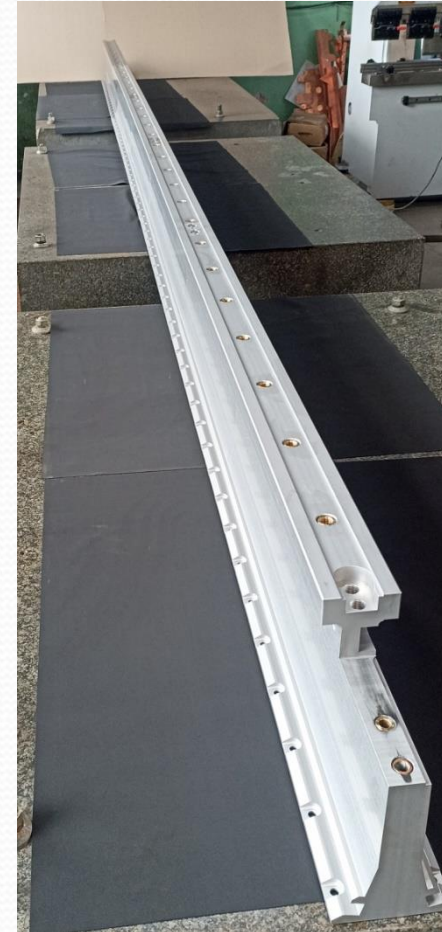
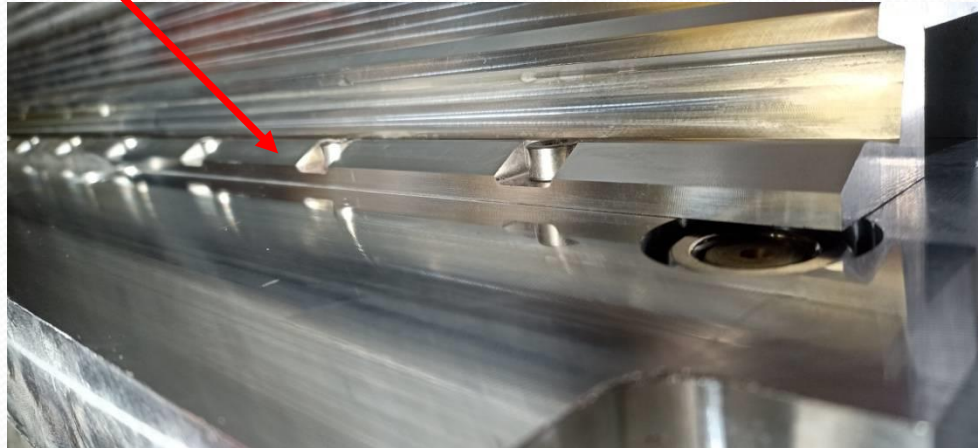
Calculations - 1.7 mm
Actual sagita - 0.76mm

TPC Rail fastener testing

Rail production

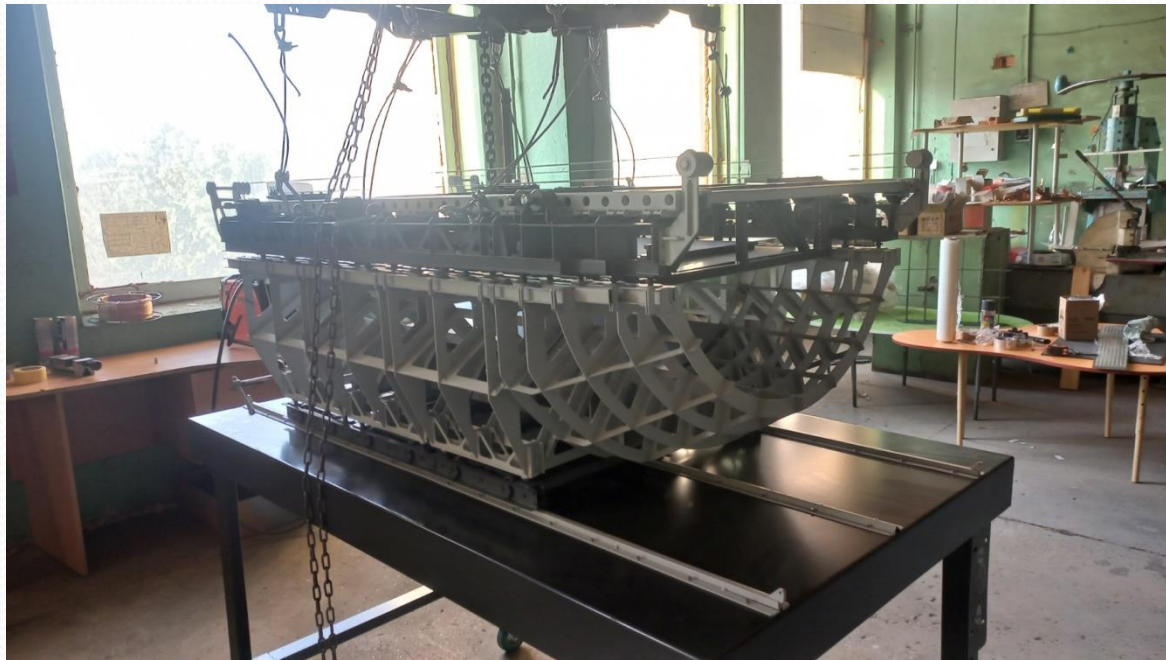


titanium fasteners:
test at designed load ($F=1,5\text{ t}$)
with safety factor $\times 2$, Total $F=3\text{ t}$



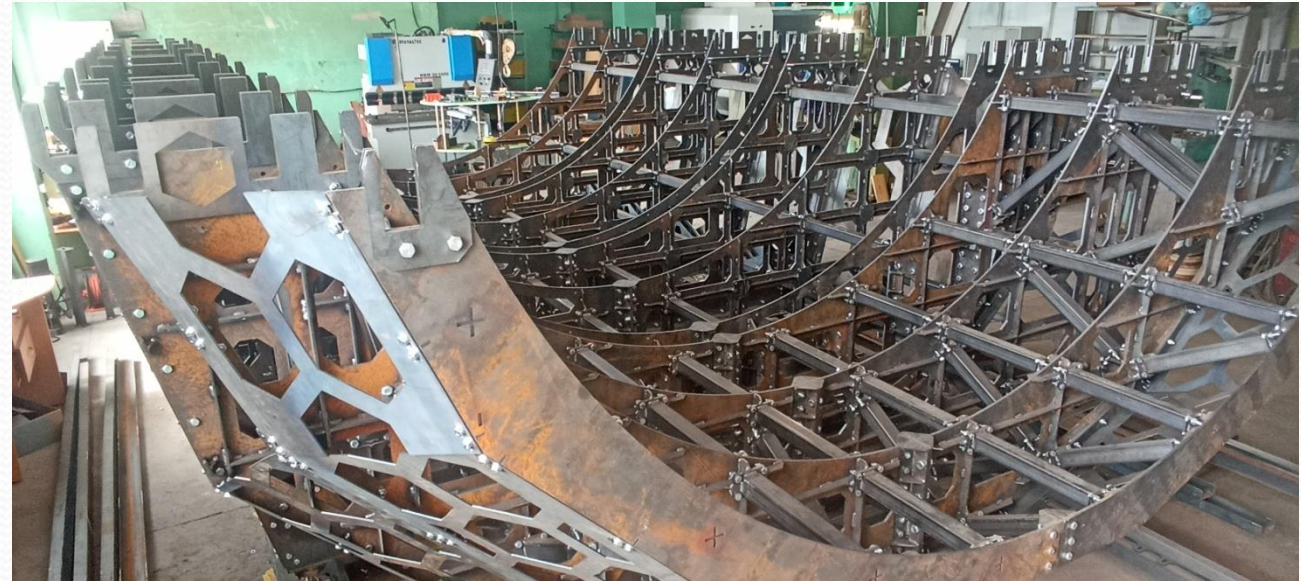
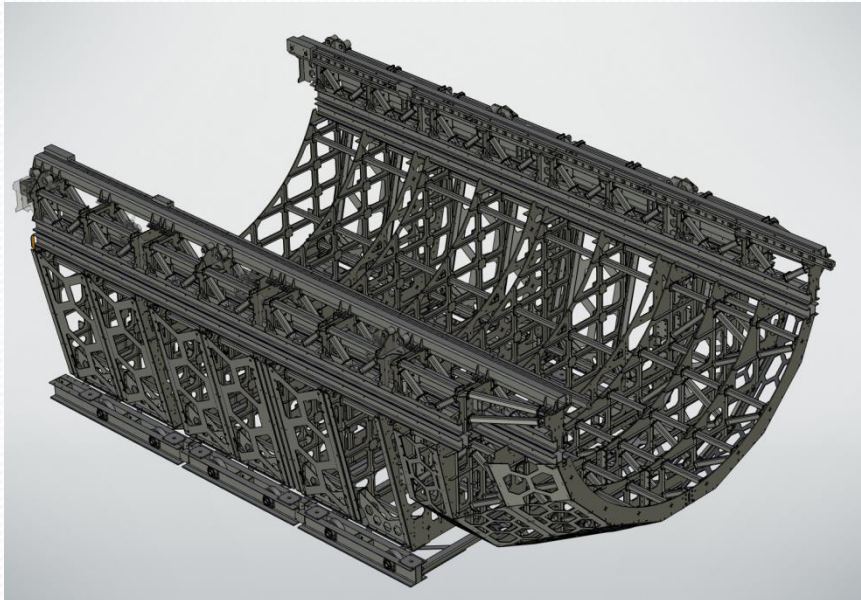
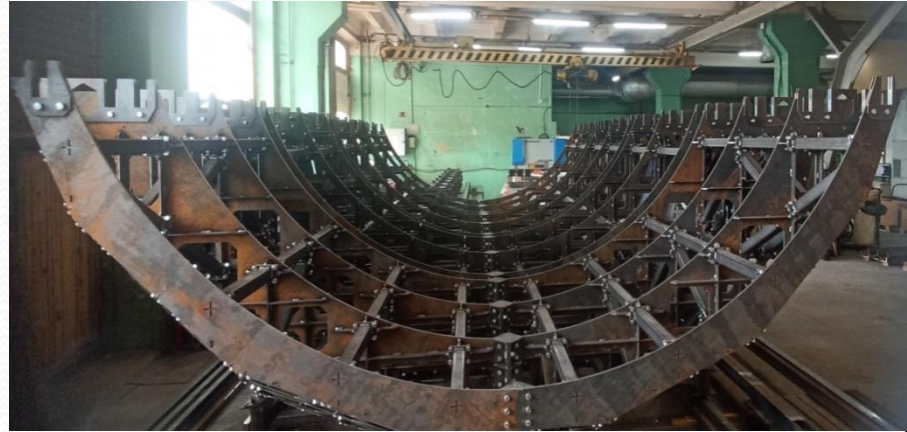
TPC to MPD installation tooling mockup 1:5

- functionality check
- search for problematic processes
- production optimization

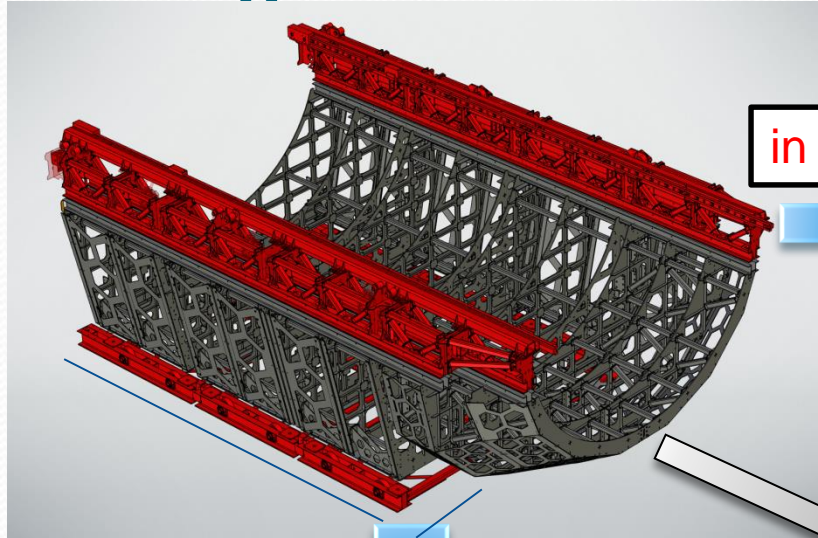


Tooling for Installation TPC to MPD loading device

new design of the power frame



Tooling for Installation TPC to MPD loading device



in production



ready



ready

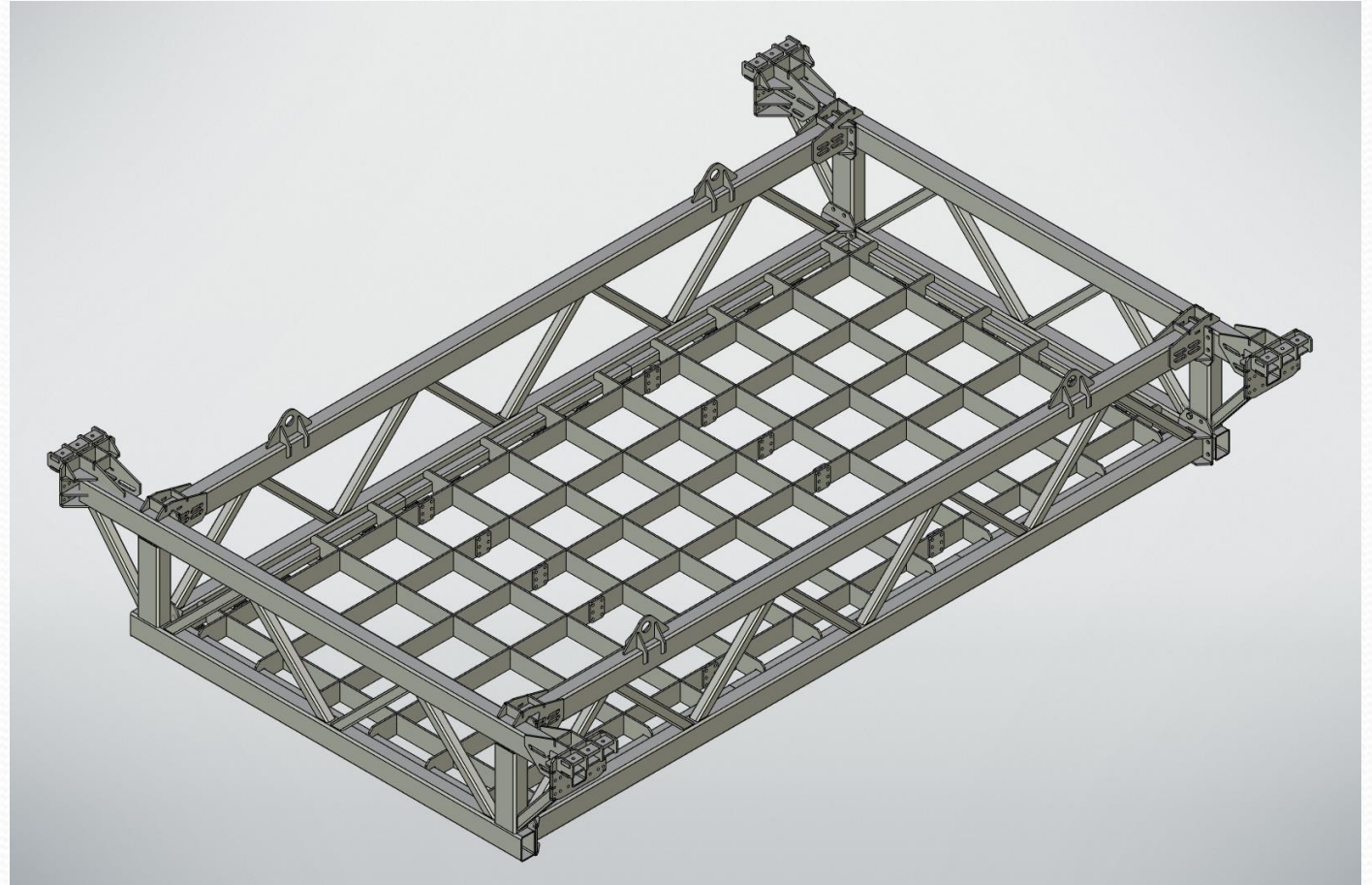
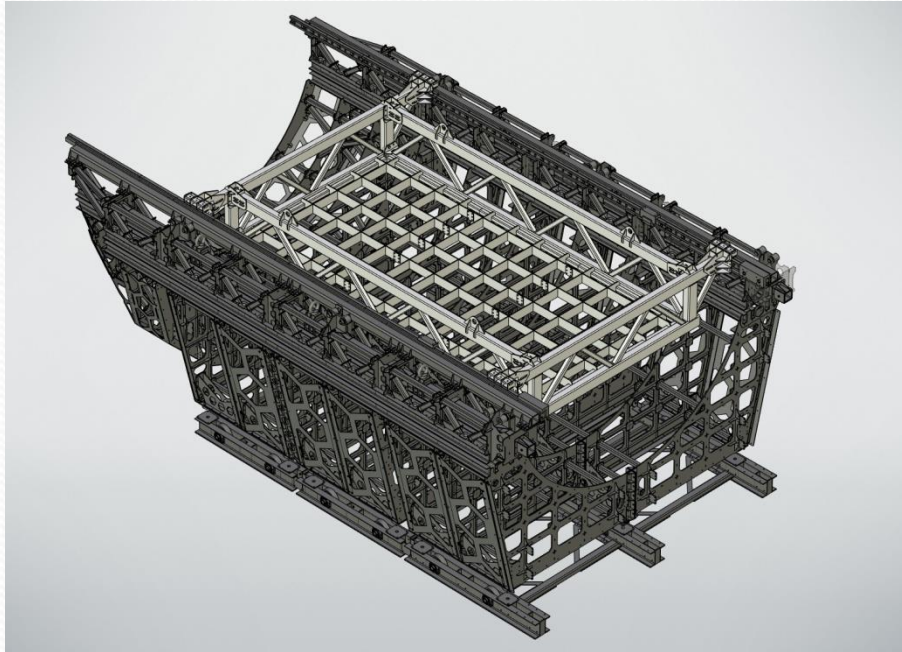


Tooling for Installation TPC to MPD



loading device

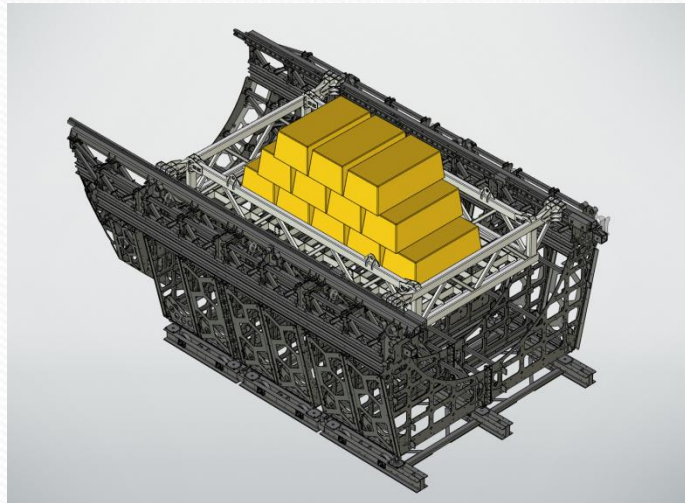
weight simulator for tests - in production



Tooling for Installation TPC to MPD

loading device tests

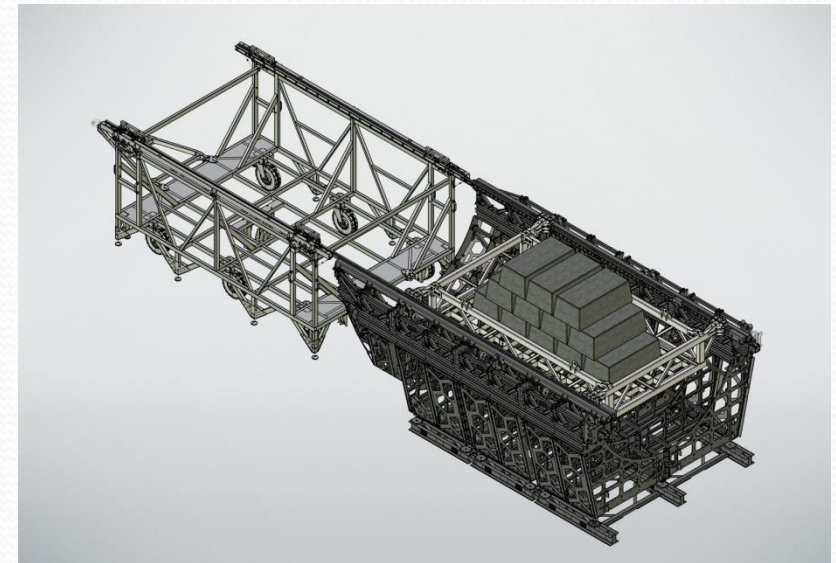
loading device with weight



lifting



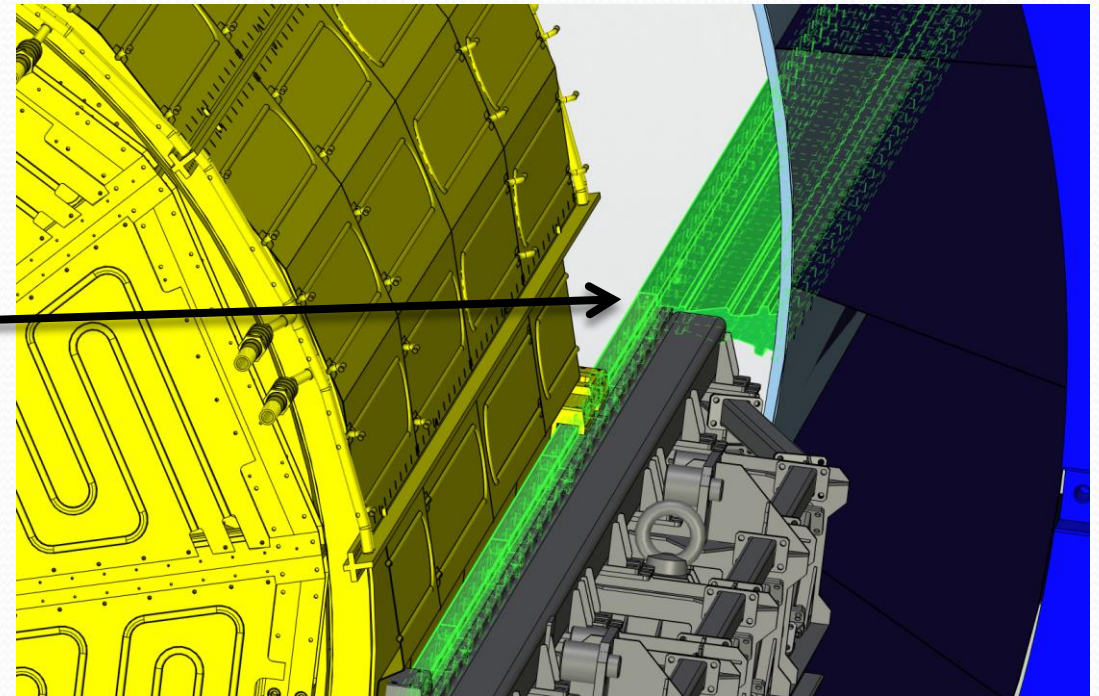
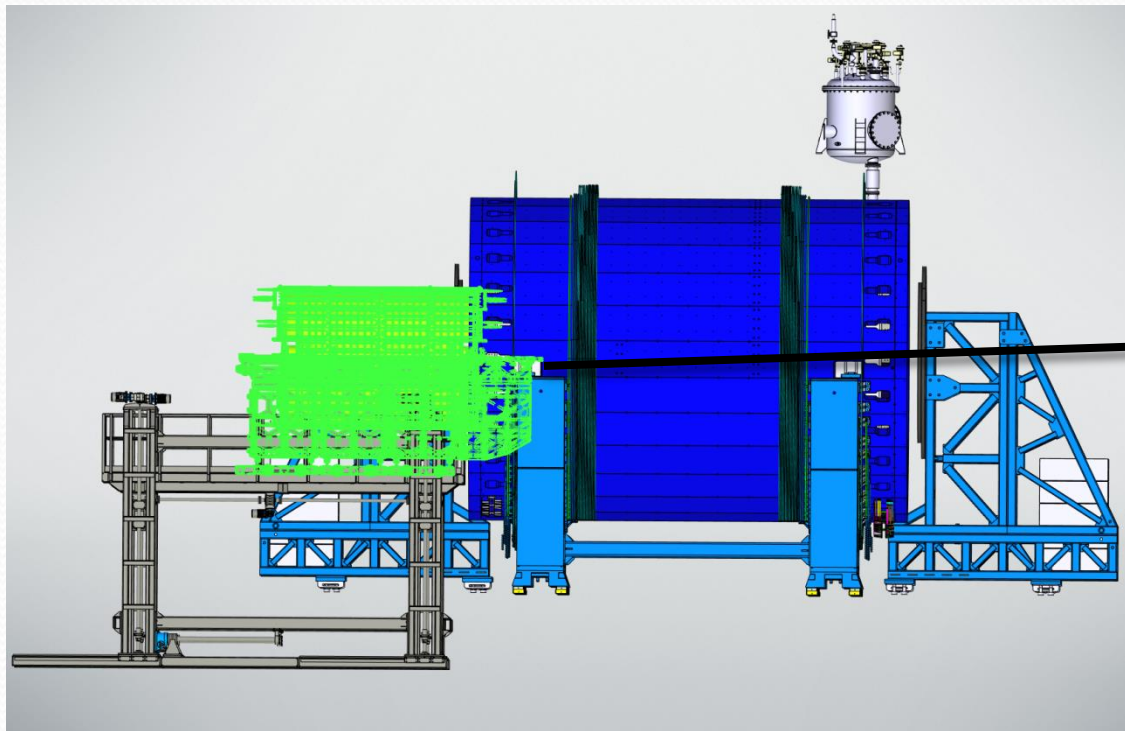
moving the weight simulator



Tooling for Installation TPC to MPD loading device tests (continue)

Full control of rails connection and TPC movement

rails connection



Time schedule

Integration TPC to MPD:

TPC rails delivery to JINR **May 20 2024**

Rails installation to ECAL support structure **May 30 2024**

Tooling for installation TPC to MPD:

Tooling manufacture: **June 2024**

Tooling tests: **July 2024**

Delivery to JINR: **October 2024**

TPC installation to MPD

March 2025

**Thank you for
attention!**