

APA Transport Frame Working Group

Justin Freitag

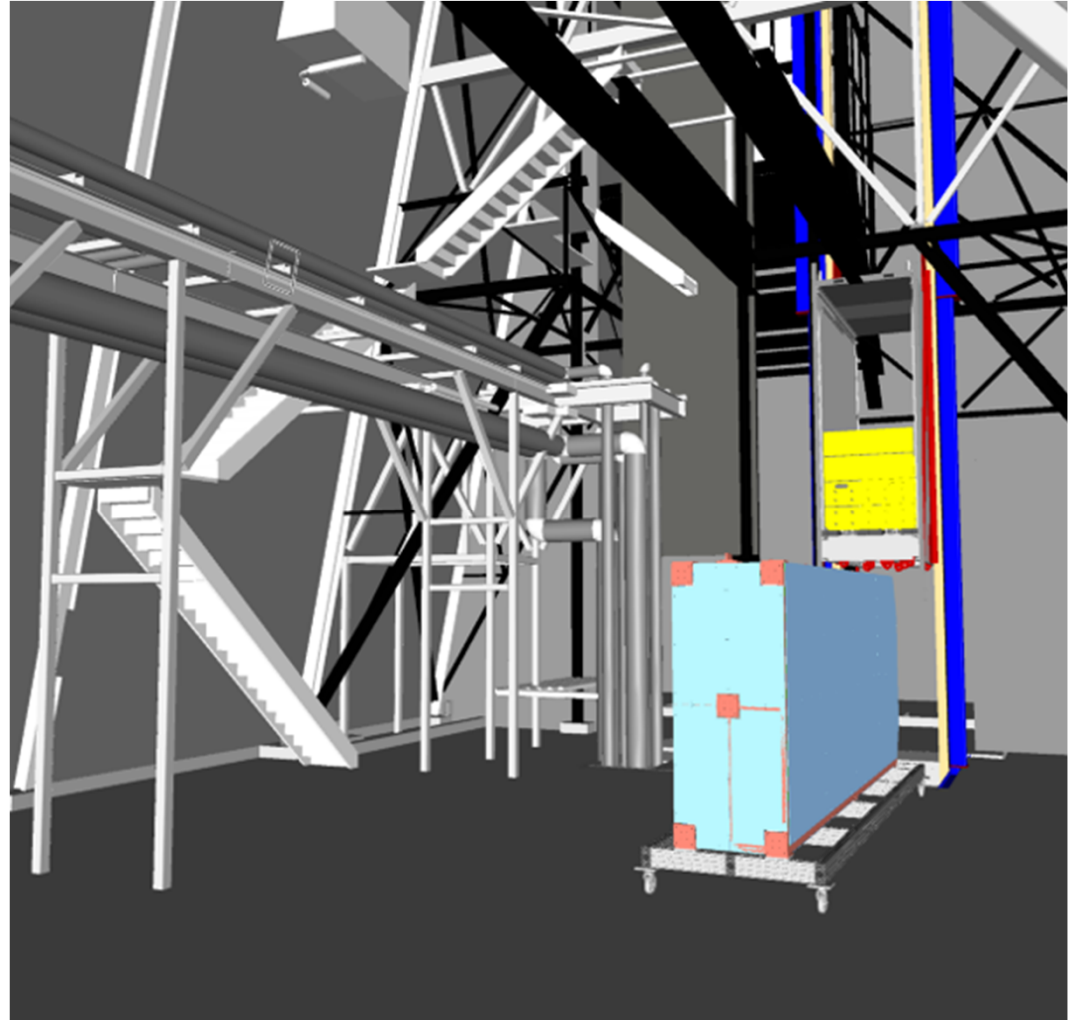
FEA & processes update

Nov. 5, 2019



Ross Headframe Conveyance

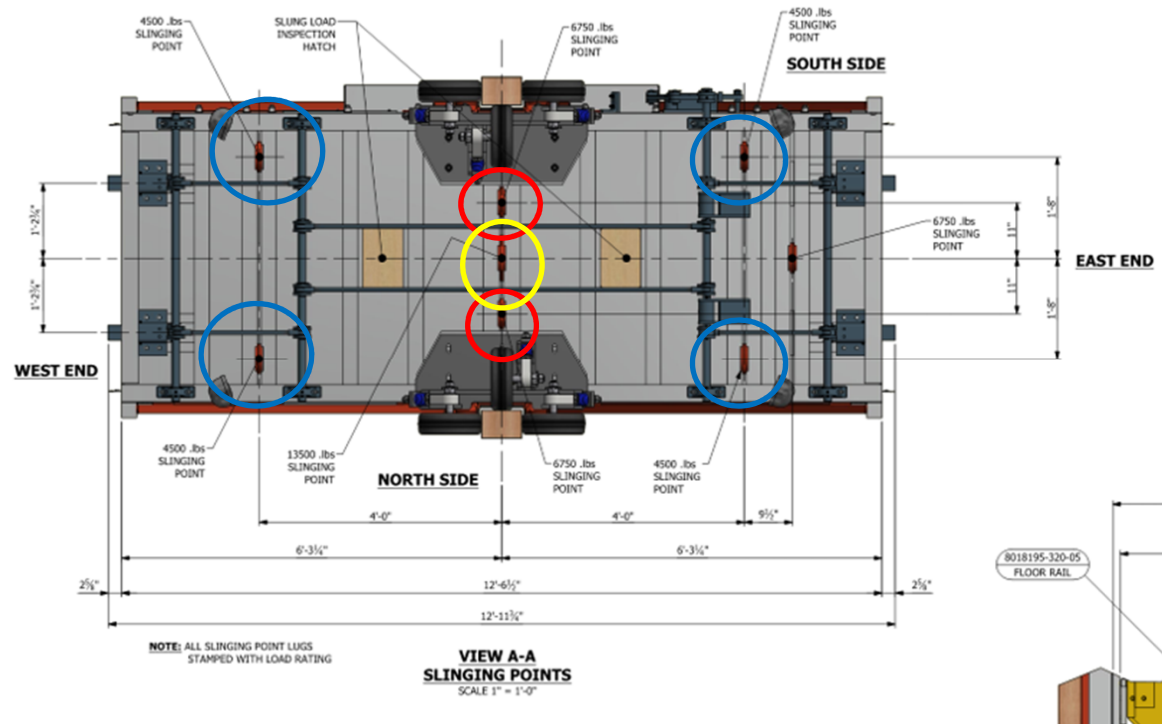
- Sling points to cage
- Transport frame attachment points
- ~~Corner supports with skates for upending loads~~
- Utilize hoist in Ross headframe, will be working with SDSTA to verify feasibility
- Guides for limiting rotation within shaft during lowering



Ross Headframe Conveyance

Sling Points to cage

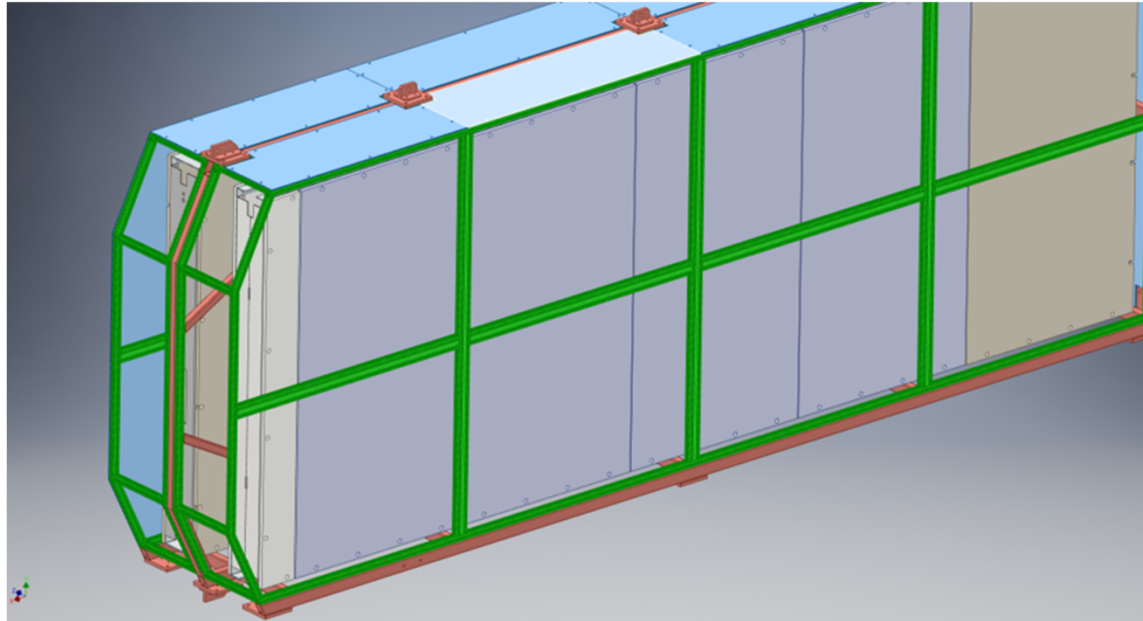
- Preferred connection to at least 2 points
- Low profile spreader bar attachment at top of APA frame may be feasible



Ross Headframe Conveyance

Transport frame attachment points

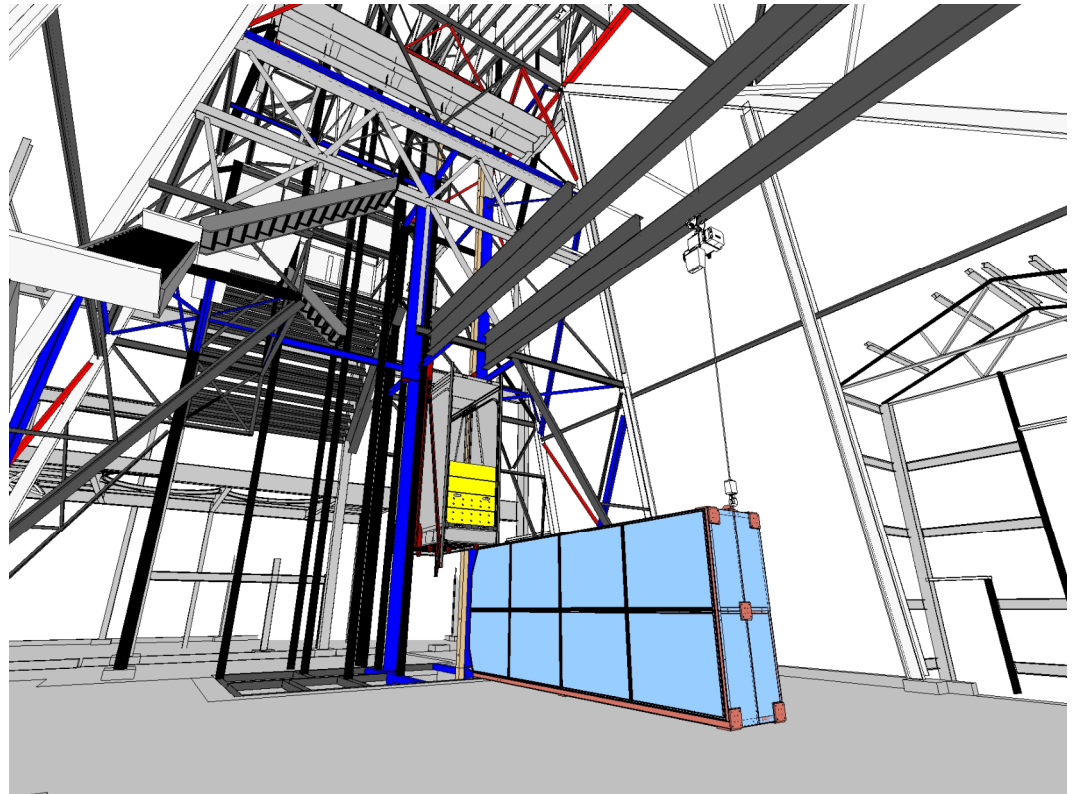
- All load orientation cases accounted for?
- Safety factor adequate?
- Will be looking at safety files from protodune APA approval as a template
- **Goal is to have University of Minnesota safety approval ASAP such that we can mfg and ship in time for Feb.**



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Corner supports with skates for upending loads

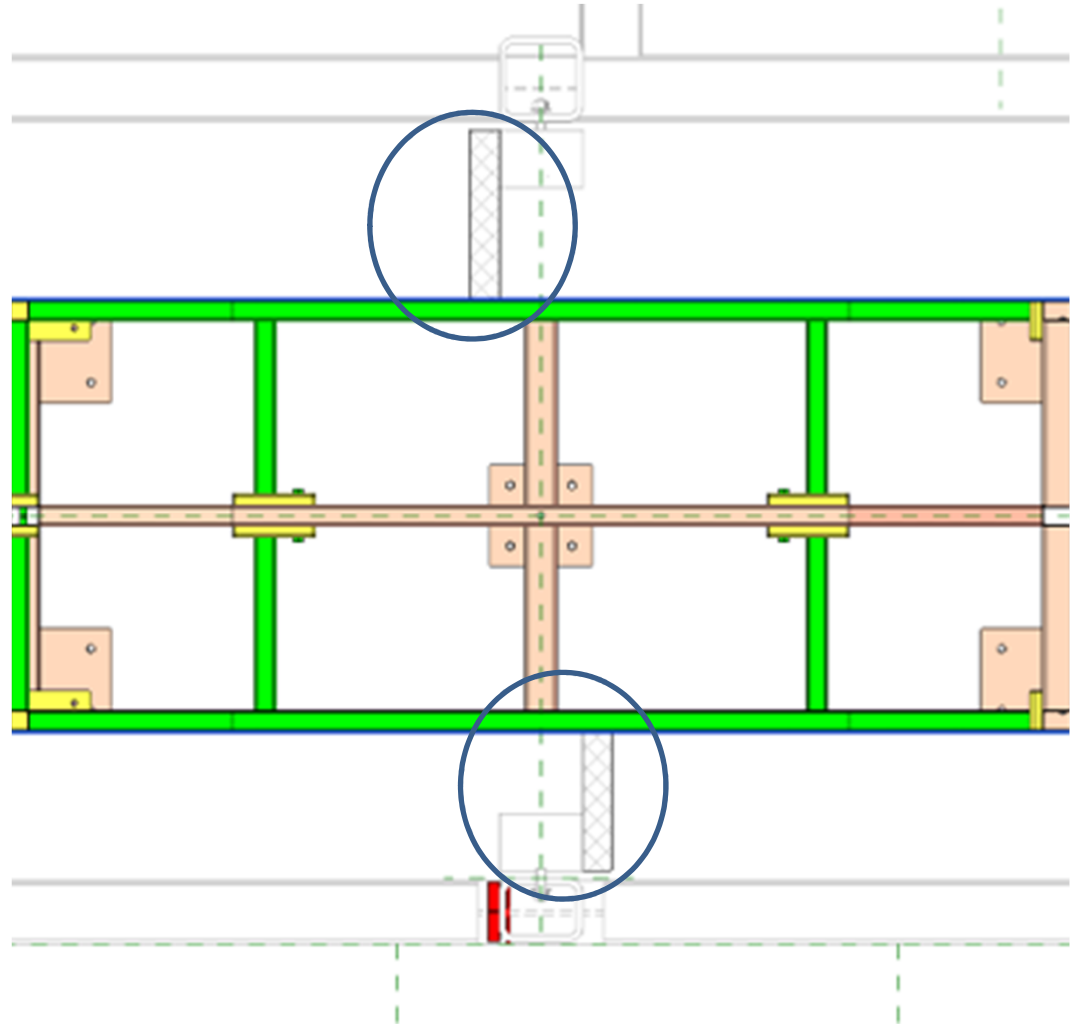
- Mounted on both sides to accommodate upending at headframe and unloading at brow?
- Low profile, heavy duty skates bolted directly to frame?
- Other hoisting methods



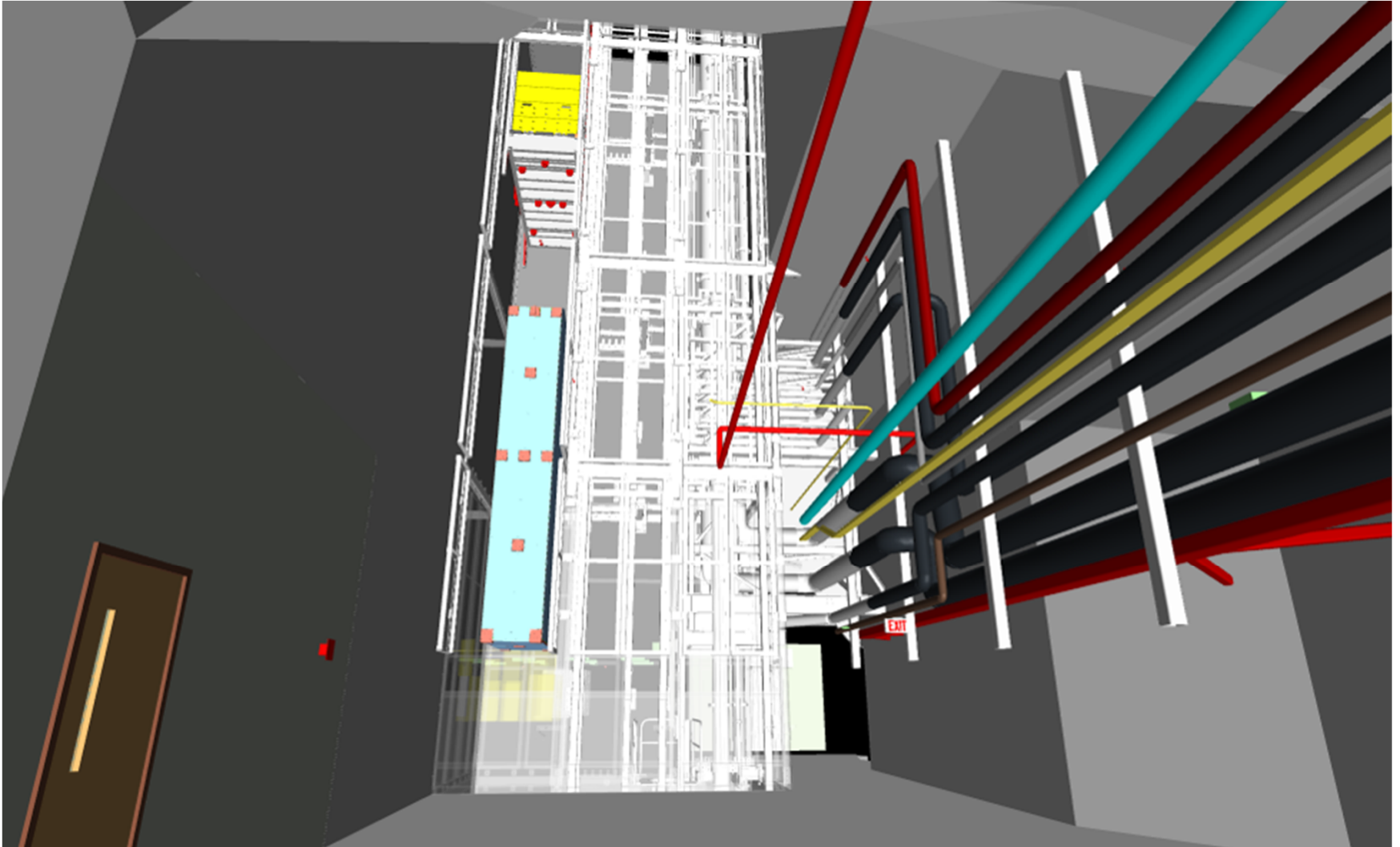
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Guides for limiting rotation within shaft during lowering

- Could be as simple as 2 plates attached to frame



Ross Brow Conveyance



Ross Brow Conveyance

Need to fully develop:

- Offloading conditions
 - Hoist requirements to pull APA out of shaft and shift horizontally **work in progress**
- Rolling on side without spine ok? **Yes for short distances**

