ProtoDUNE – DSS Installation

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DSS Review

November 7, 2016

Outline

- Installation Tools
- Procedure
  - Staging the beams
  - Mounting the runway beams and hangers
  - Trolleys
  - Bridge beams
  - Survey and adjust beam position

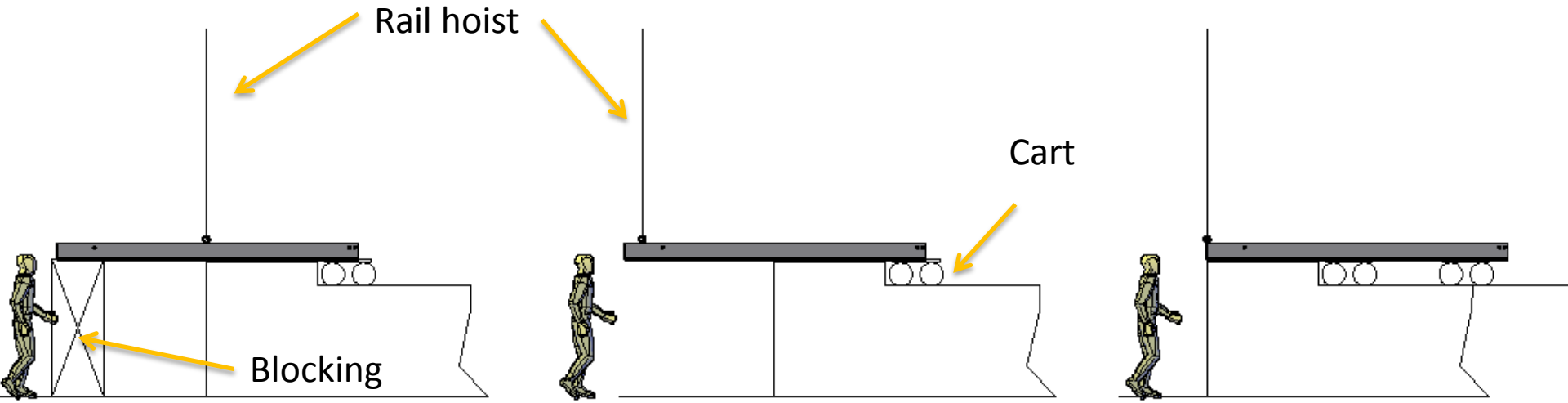
Installation Tools

- Overhead hoist outside the TCO
- 4 Dollies to transfer beam segments
- A Plate to splice the pivoting beam
- 2 lifting tripods that can reach the membrane floor
- Overhead crane
- Scaffolding for access to 9 support penetrations from inside.

Staging the beams

Note: Beam segments are 3.8m long and weight approximately 103 kg

- Lift beam to the TCO threshold with monorail hoist
- Rest one end on the dolly and get the CG inside the threshold.
- Pick up the outside end and push the beam in and rest on a second dolly
- Move the beam bellow the appropriate support penetrations
- Follow the same procedure for the second beam segment
- Splice the beams together



Mount the hangers and runway beams

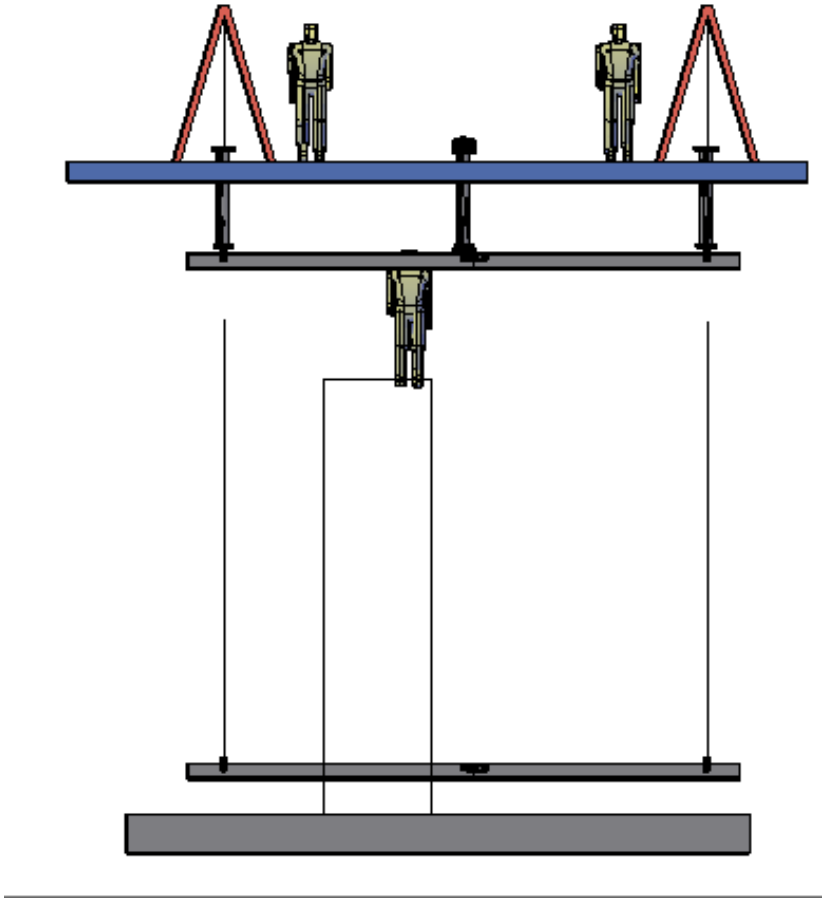
Note: Spliced beam is approximately 7.5 meters long and weighs 206kg

- Rig the center DSS hanger into the center port and seal the flange.
- Put a lifting tripod over the two feed thrus above the beam ends
- Set up access equipment for all three ports.

Mount the hangers and runway beams

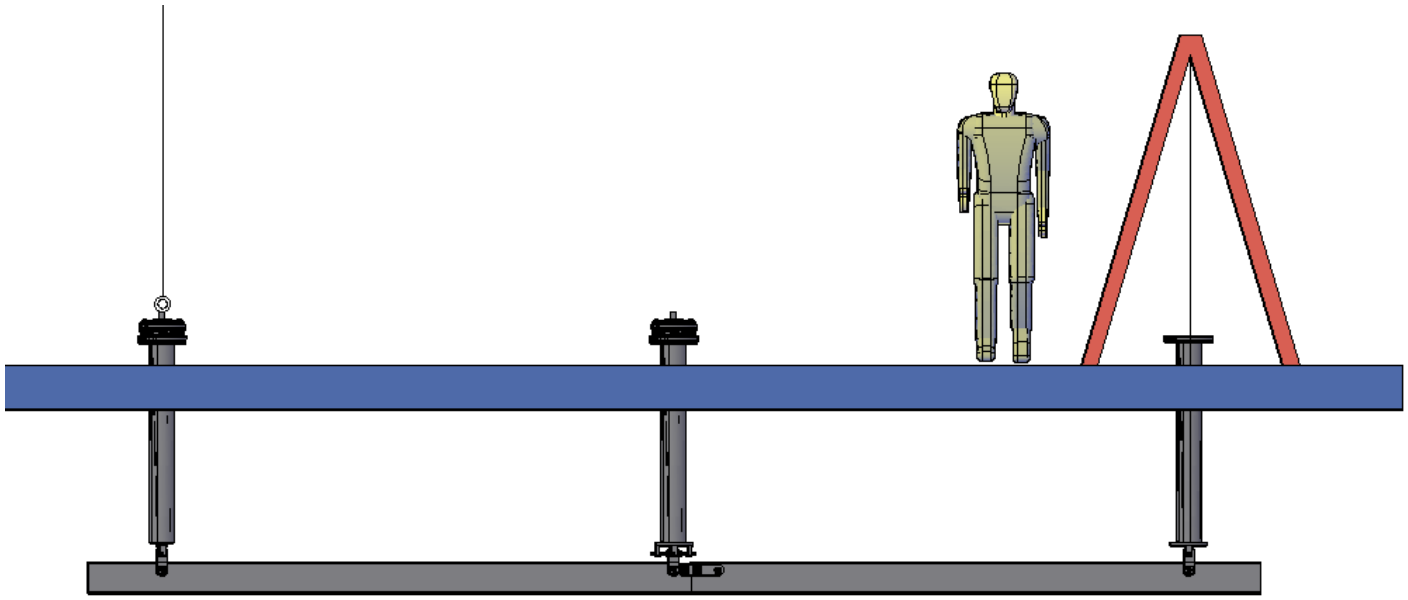
Note: Spliced beam is approximately 7.5 meters long and weighs 206kg

- Connect the lifting gear to the beam ends and lift the beams into position.
- Connect the beam to the central DSS hanger



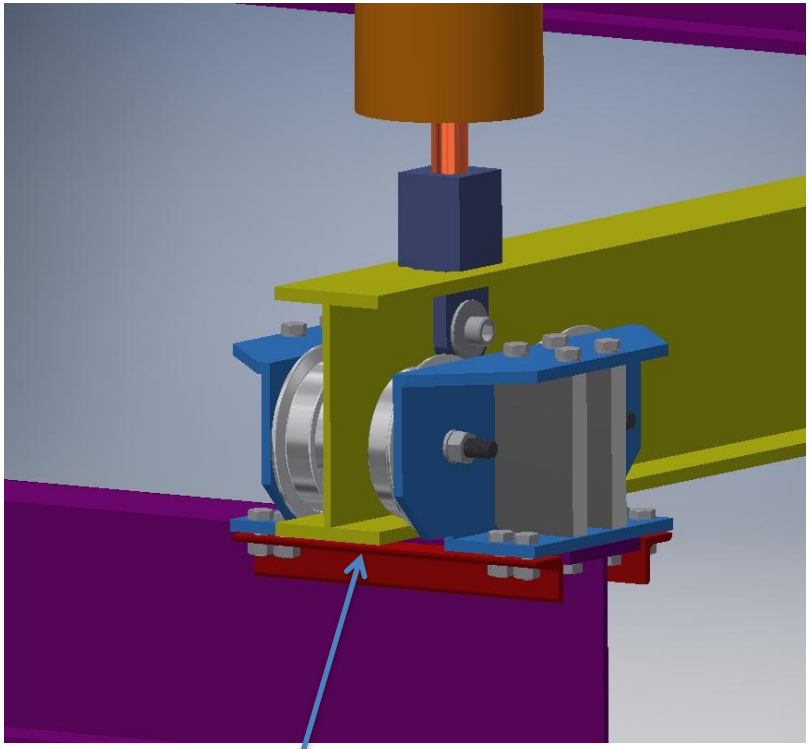
Mount the hangers and runway beams

- Remove the lifting hook and lifting tripod from the north end of the beam and keep the beam steady.
- Rig the DSS hanger into the north feed thru and connect the clevis
- Repeat for the south point
- Repeat for the remaining runway beams



Mount the beam trolleys

- Remove trolley stop and slide 5 trolleys onto the beam
- reinstall the trolley stop
- Repeat for three beams

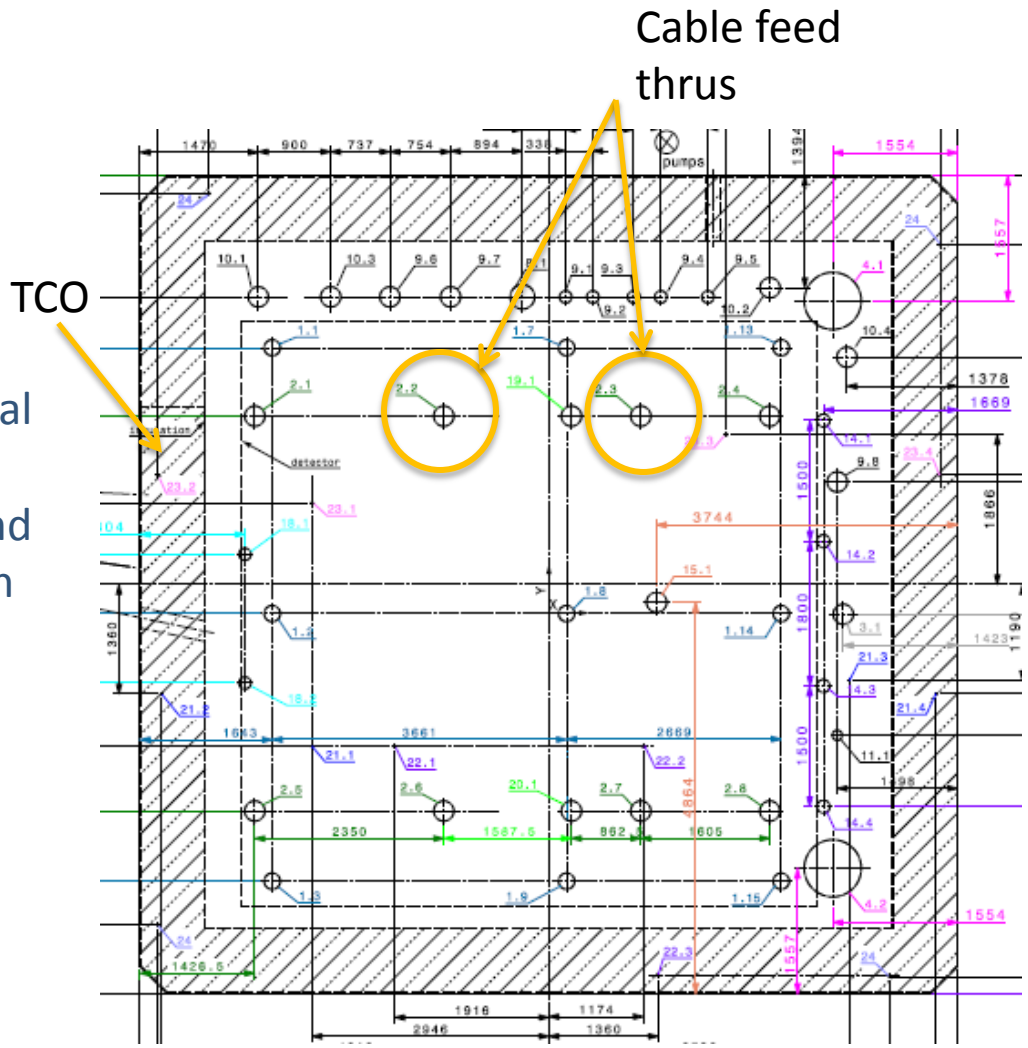


Trolley stop location

Mount the bridge beams

Note: Spliced beam is approximately 7.7 meters long and weighs 212kg

- Deliver the south drift APA beam through the TCO and place below the north drift cable feed-thrus.
- Set up access to the three trolley mount points
- Assemble and temporarily splice the beam segments and the central trolley
- Using the tripods, lift the beam and mount the central trolley and then the end trolleys
- Slide the beam towards its final position
- Repeat for the other 4 bridge beams



Survey and adjust the DSS connection location

Note: Must provide appropriate survey target mount points

- Move all beams into their final position and temporarily pin the “yellow” and “purple” flange
- Survey all the TPC and APA mount points
- Calculate adjustments needed to restrictor plates
- Monitor adjustments as they are made
- Resurvey and remove pins
- Load test per testing plan