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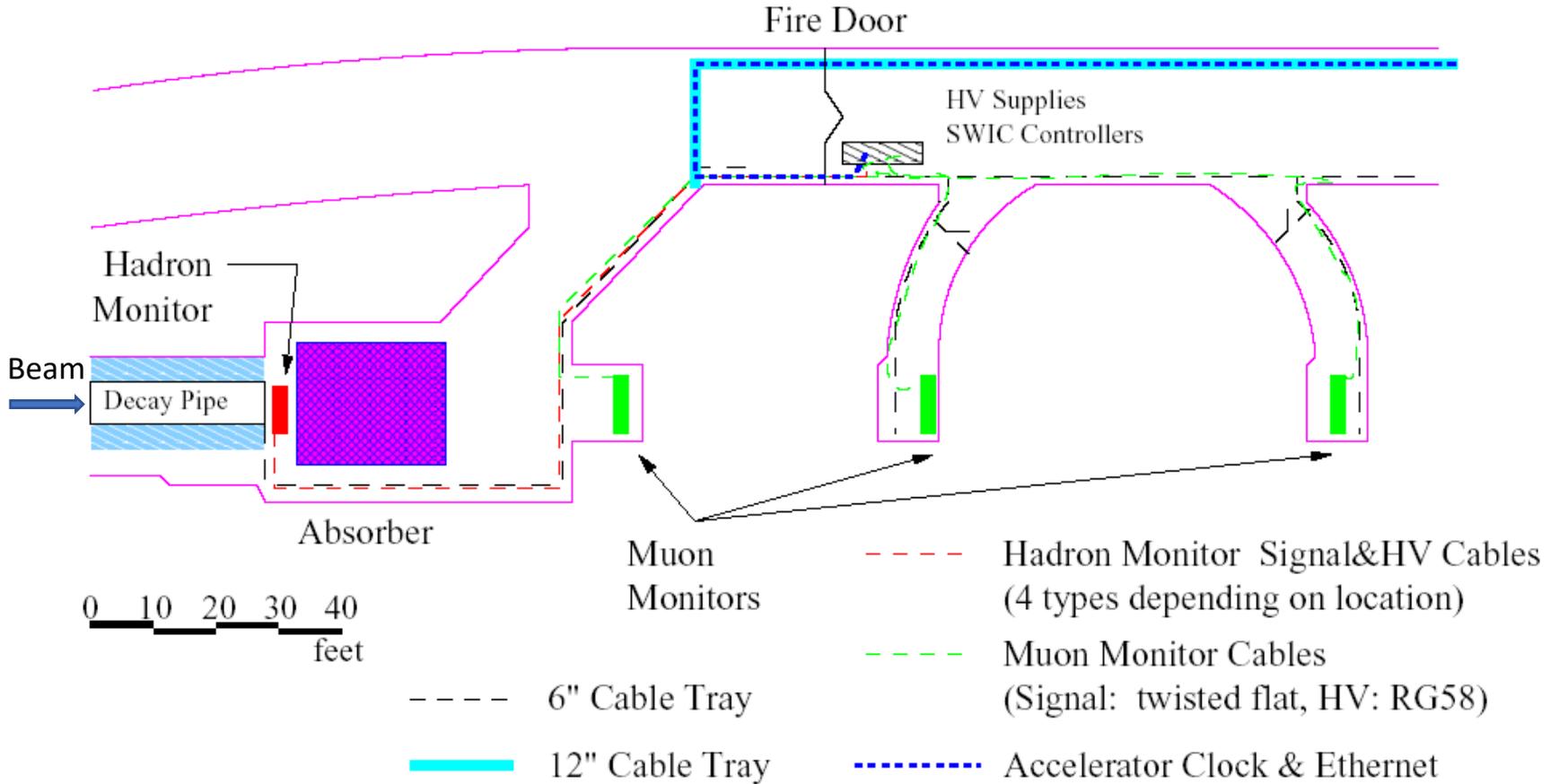
NUMI Hadron Monitor removing and installation

TSD Topical Meeting

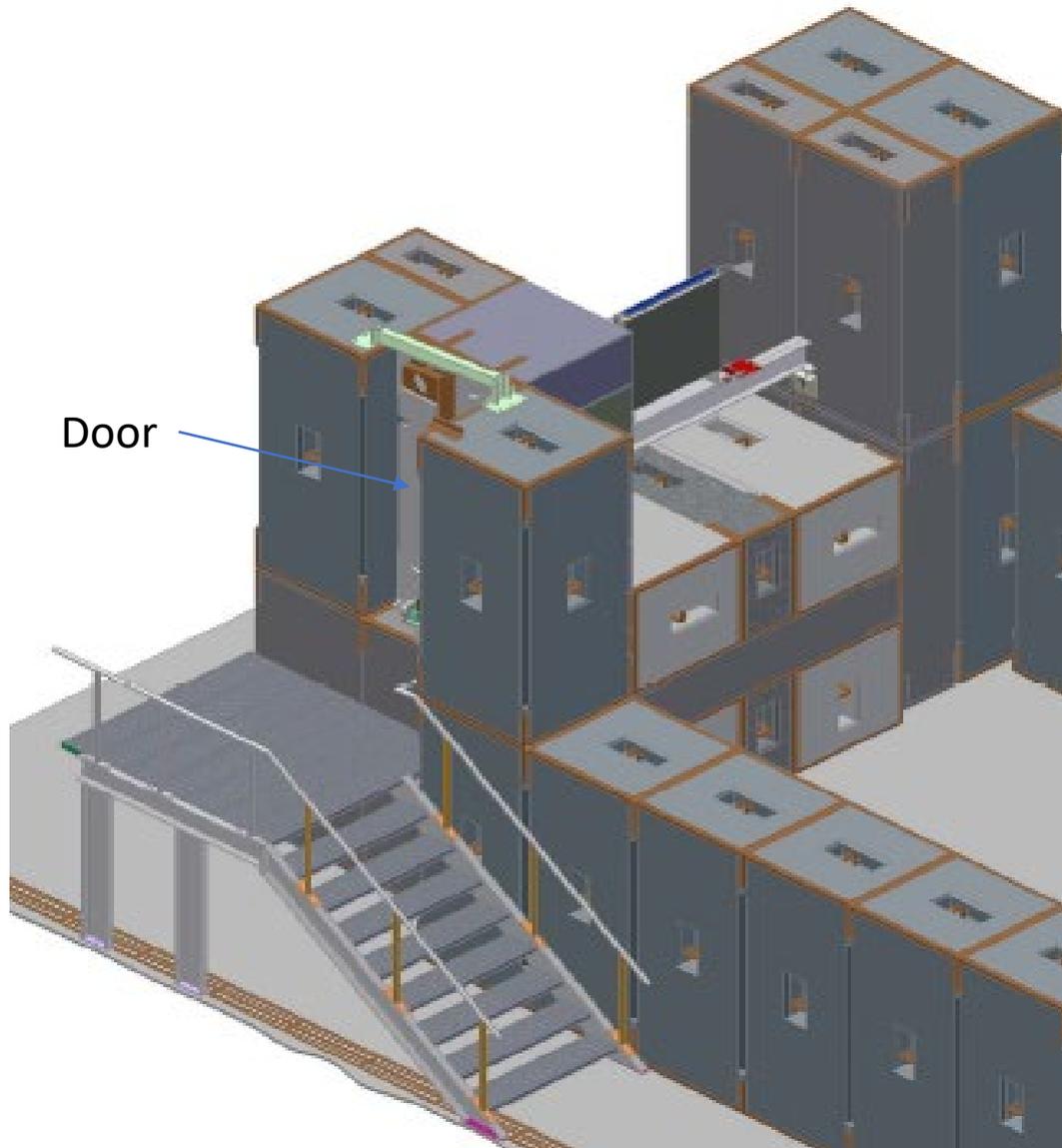
Vladimir Sidorov

18 February 2021

Hadron Monitor location



NUMI Absorber

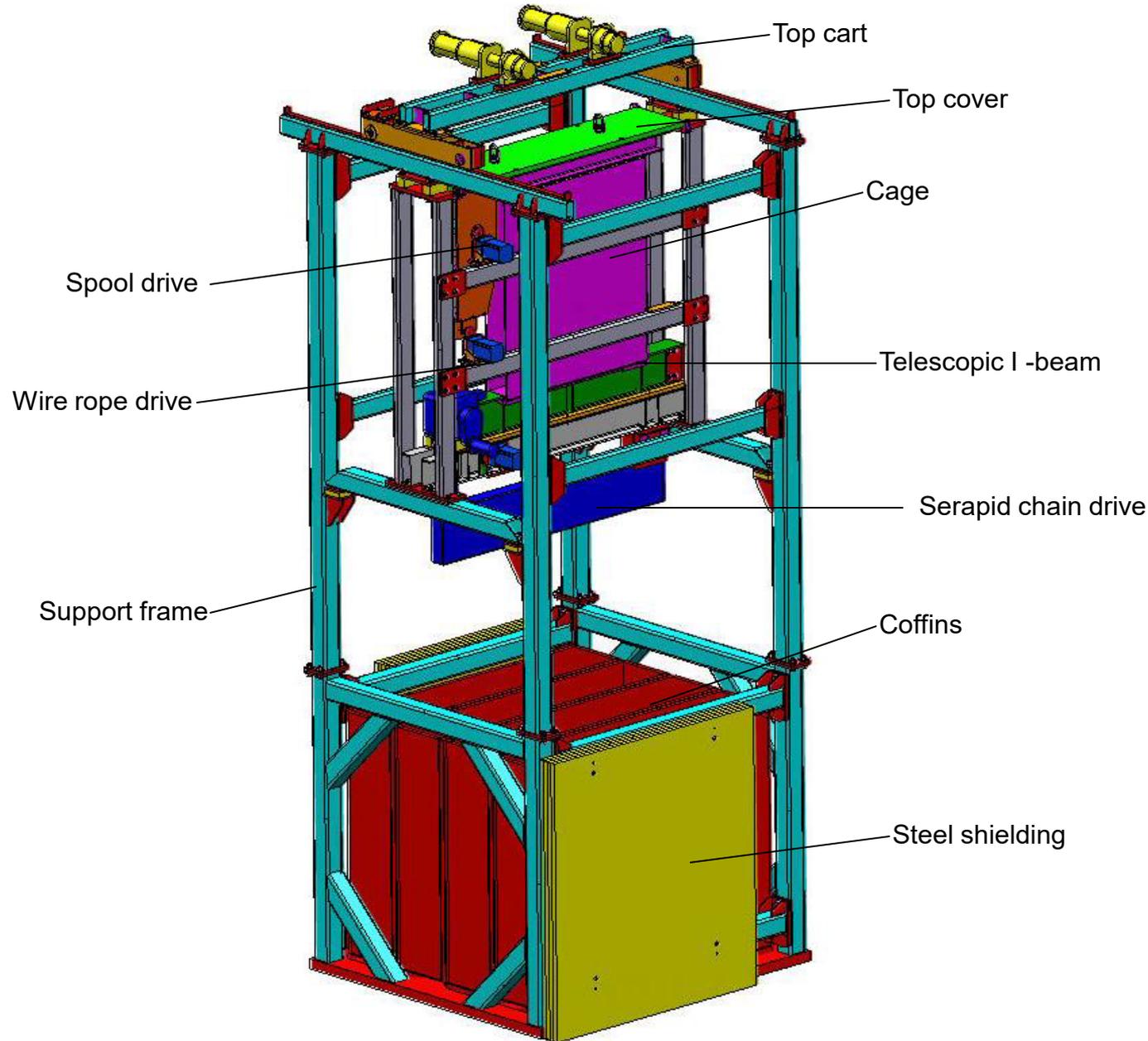


The HM sits downstream of the NUMI decay volume, immediately in front of the beam absorber behind the 6" thick steel door. The aluminum platform and stairs will be removed. The support structure of the HM fixture is mounted above the coffins and bolted to the frame. The special remotely operated mechanisms are assembled in the HM fixture. The telescopic I-beam compensates the open space between the door and I-beam where HM is installed.

First Hadron Monitor Installation



Hadron Monitor Fixture Assembly.



The spool drive is winding the cable and He tubes during the HM removing. The wire rope winch is pulling the HM into the cage. The serapid chain drive controls the HM movement during the removing procedure and pushes the HM into the absorber during the HM installation. The top plate with cage and HM, spool and winch are lifted by two top cart hoists, moved toward open coffin and lowered down into the coffin.

Hadron Monitor removing- installation practice in MAB



Hadron Monitor removing demonstration in MAB

6/17/2009



Removing- Installation fixture major components

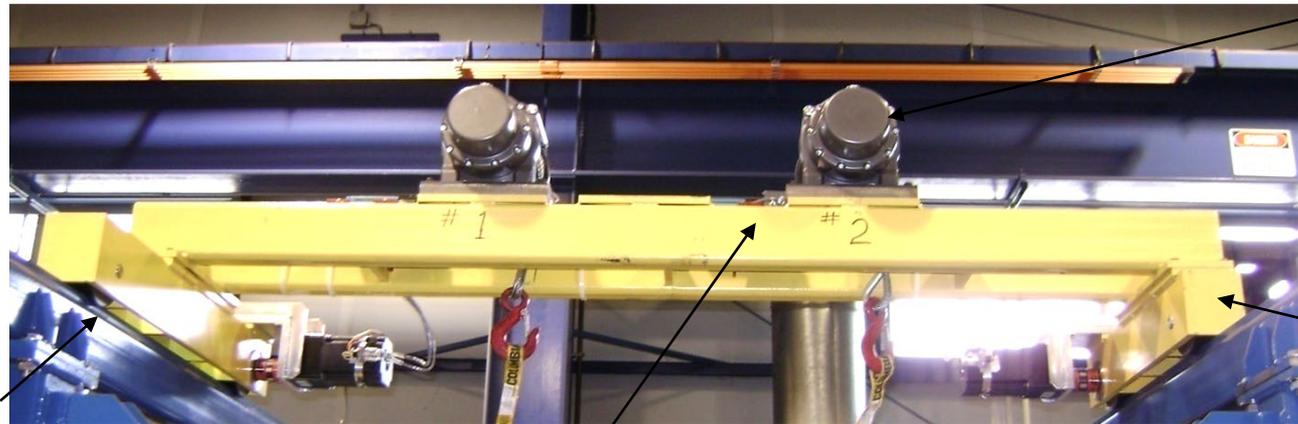
Top Cart.

The top cart designed to lift the cage with HM and put it into the coffin.

Two motorized running beams are joined together with a double girder frame.

Two lifting hoists one ton capacity are bolted on the top of the double girder frame.

The cart is running on the support frame runways.



Lifting hoist

Running beam

Runway

Double girder frame

Telescopic I-beam assembly.

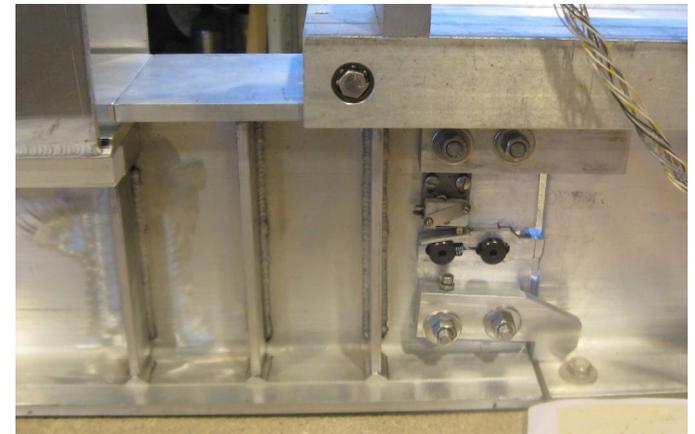
The telescopic I-beam extends the runway for the HM removing and installation.

The I-beam assembly consists from a base and moved parts. The base is welded from

two channels and bolted to the fixture frame. Two L-shape guides are bolted to the top of the base to provide

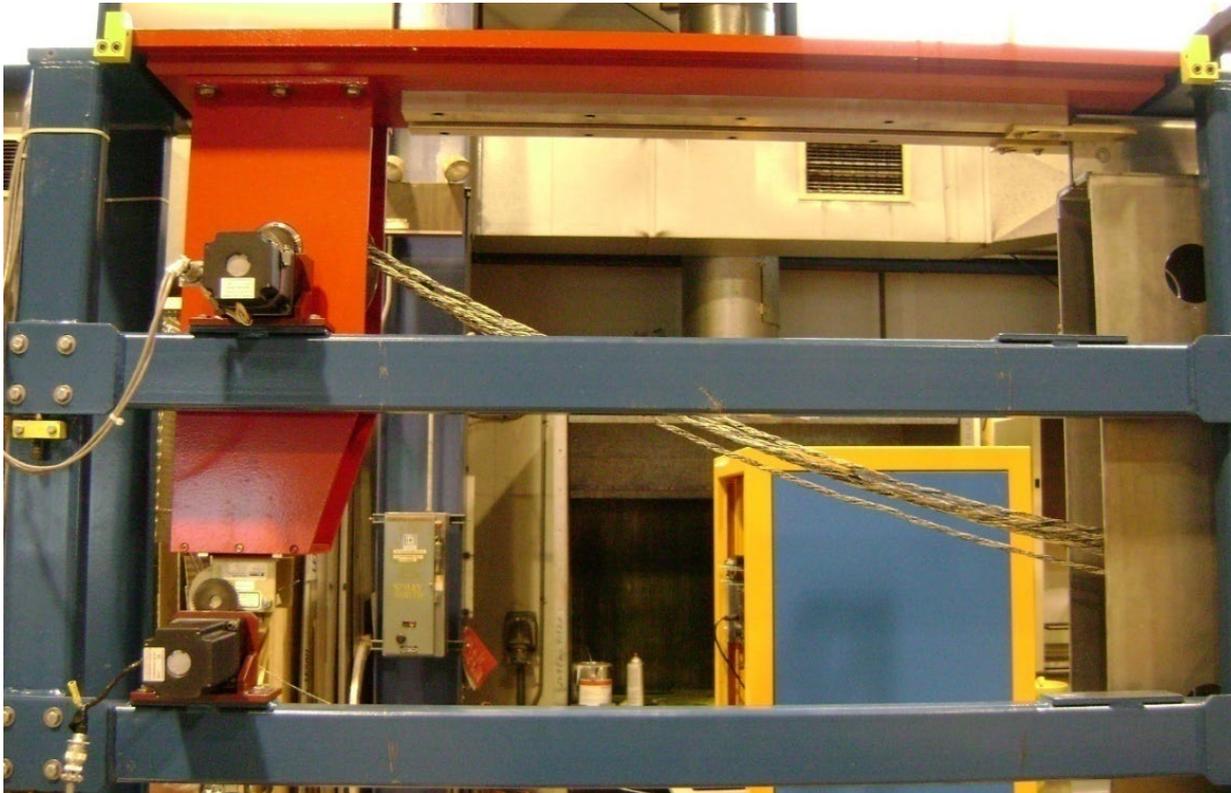
the guidance for the I-beam. The I-beam is moved with a 5/8" ACME screw turned with a step gear-motor

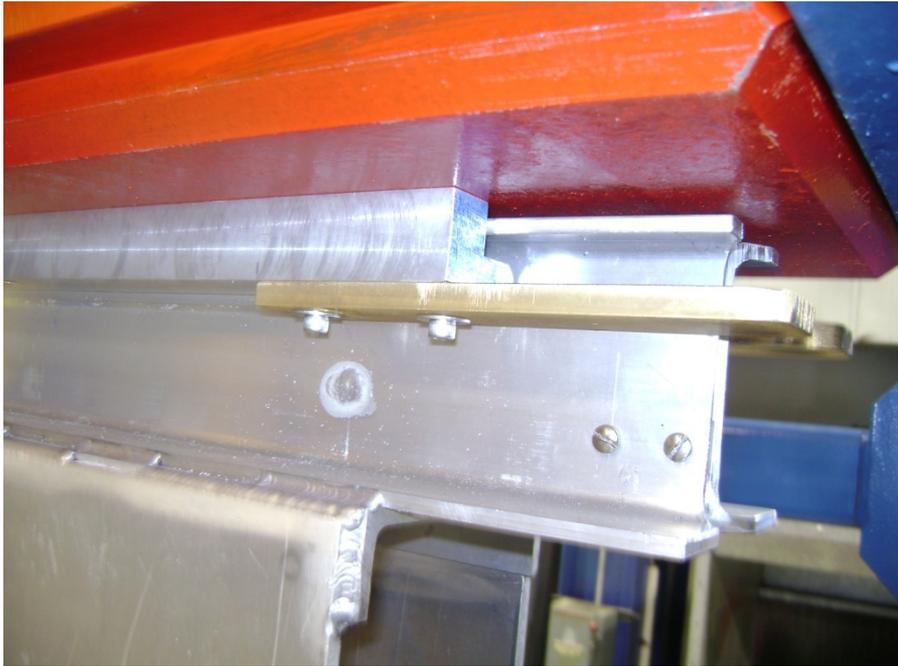
ratio 5. Two limit switches are installed to stop motor in the I-beam end positions . The I-beam stroke is 38" .



Top Plate Assembly

The two inches thick top plate is assembled together with the HM cable spool and the wire rope pulling winch. The torque from motors transfers to the spool and winch with opened spur gears. The top plate assembly is used for the HM removing only. Two L-shape lifting bars and two brass cage guide plates are bolted to the bottom of the plate and two lifting hoist hooks hooked the top plate eye bolts.





L-shape bars and cage guide brass plates.



Top plate with lifting hoists hooks.

Serapid Chain

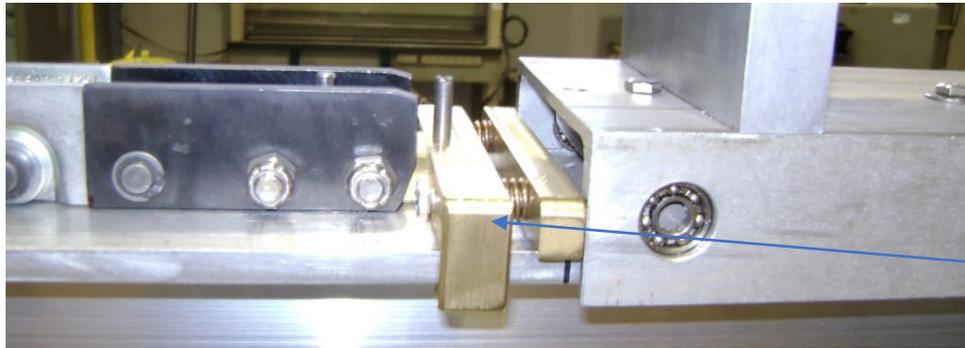
The serapid chain controls the HM movement during removing operation and push the HM into the absorber during installation. The chain is running on the top of the I-beam flange. The chain stroke is 132". The brass guide block with plunger is connected to the end of the chain.

Chain
drive



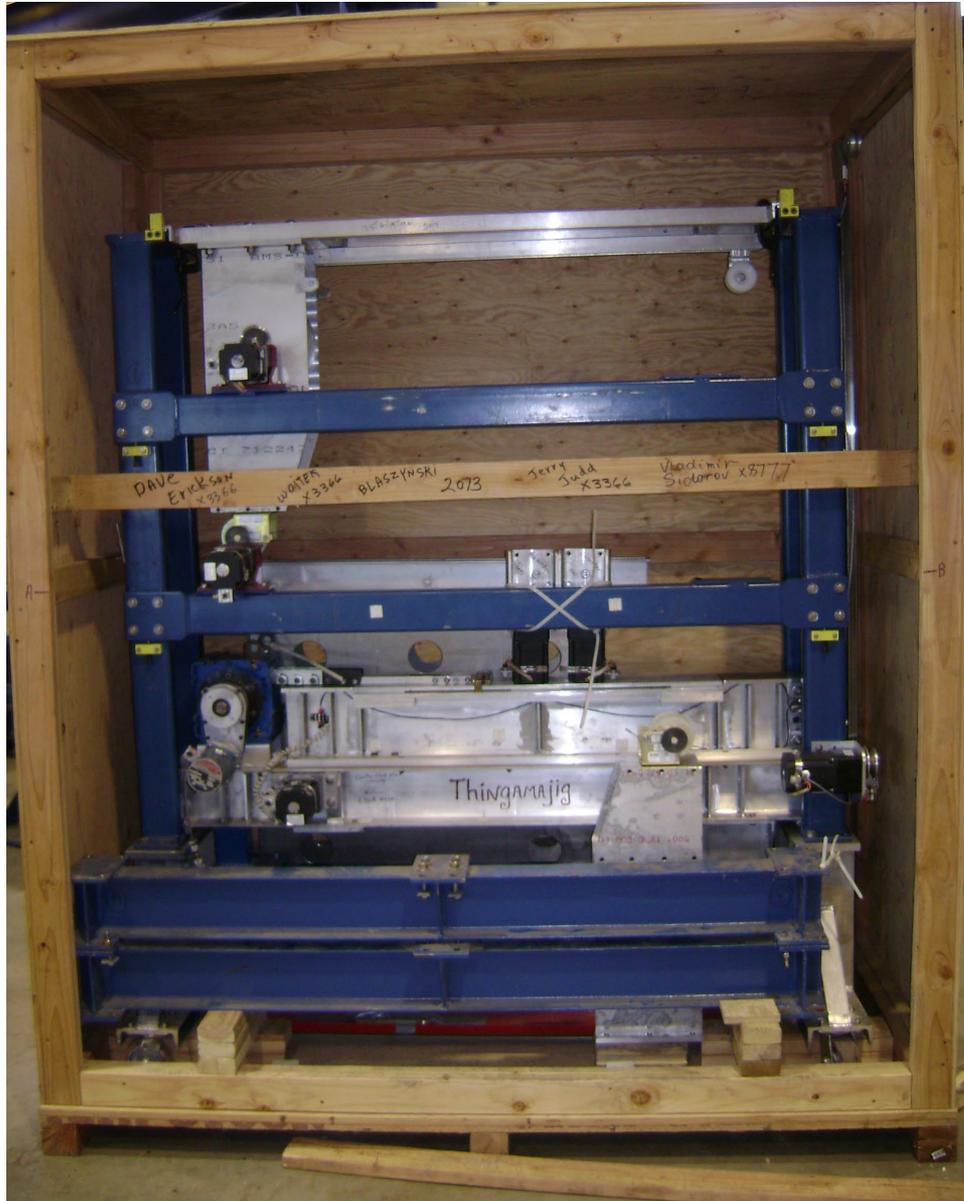
Chain

Chain Magazine

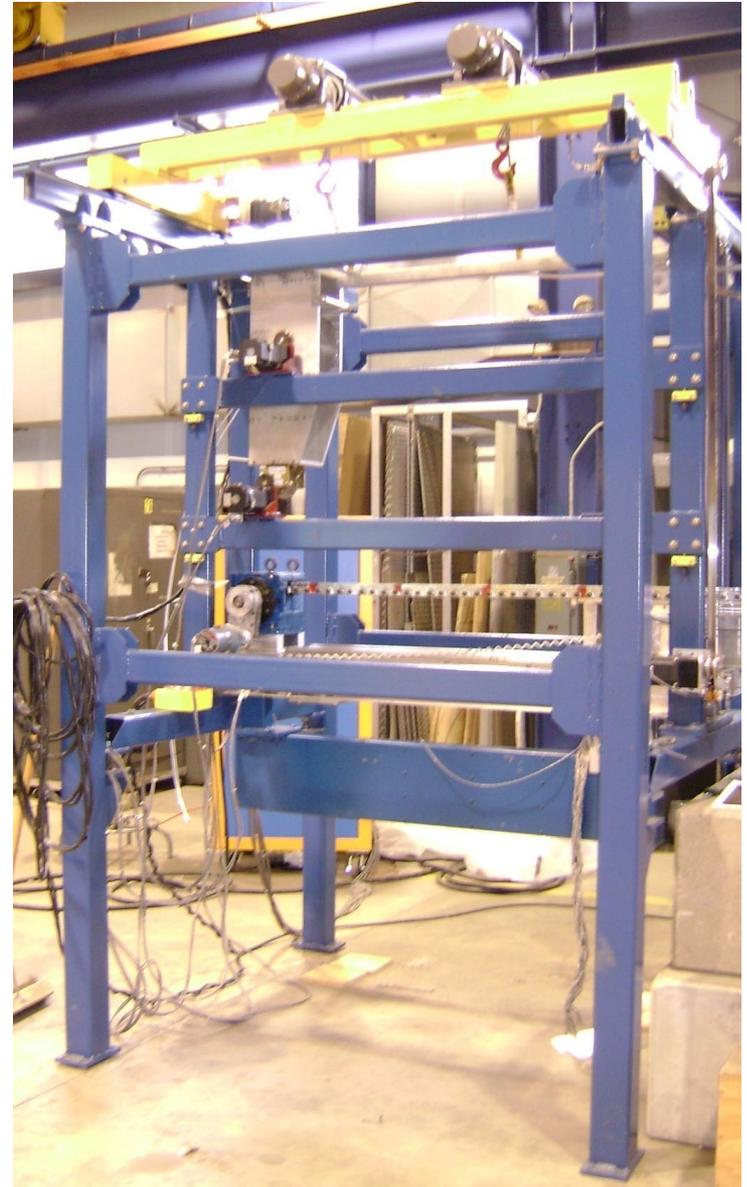


Guide block

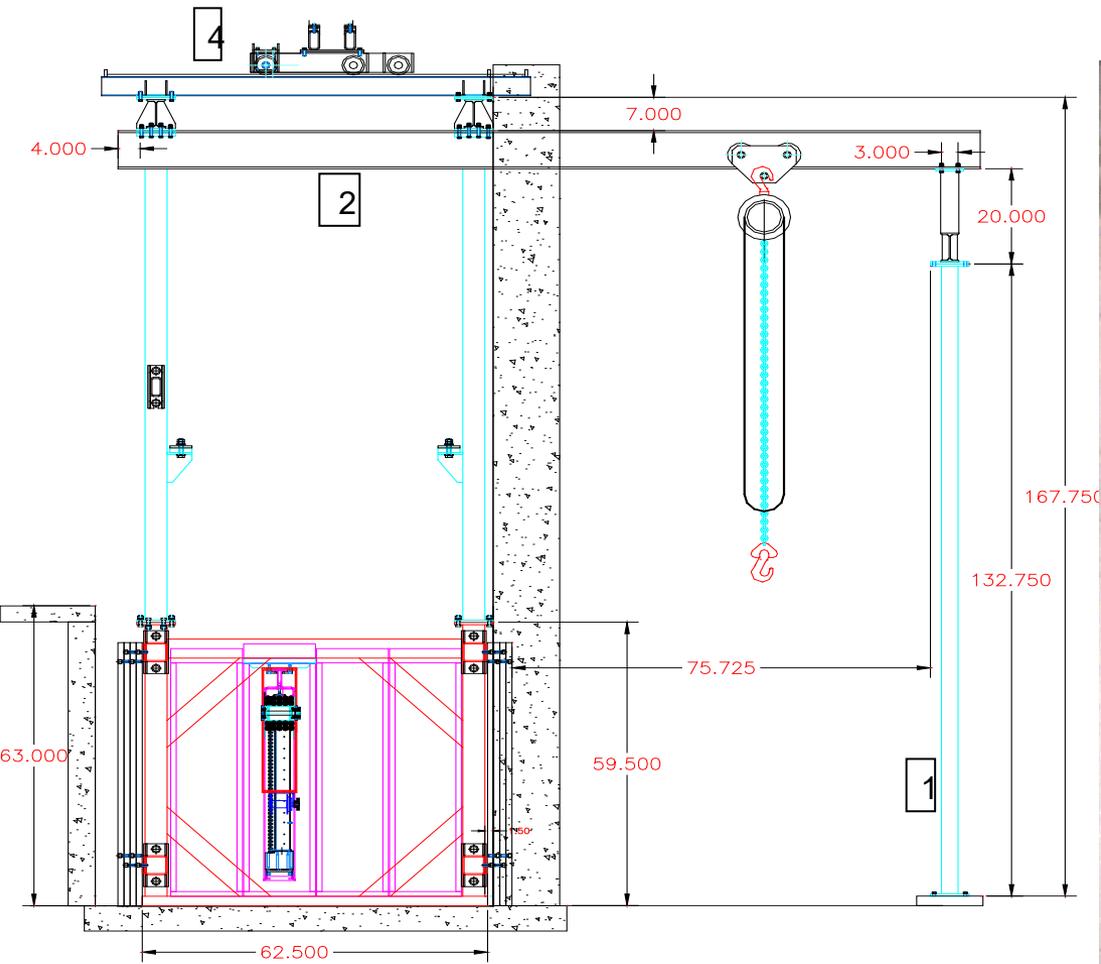
Fixture storage box



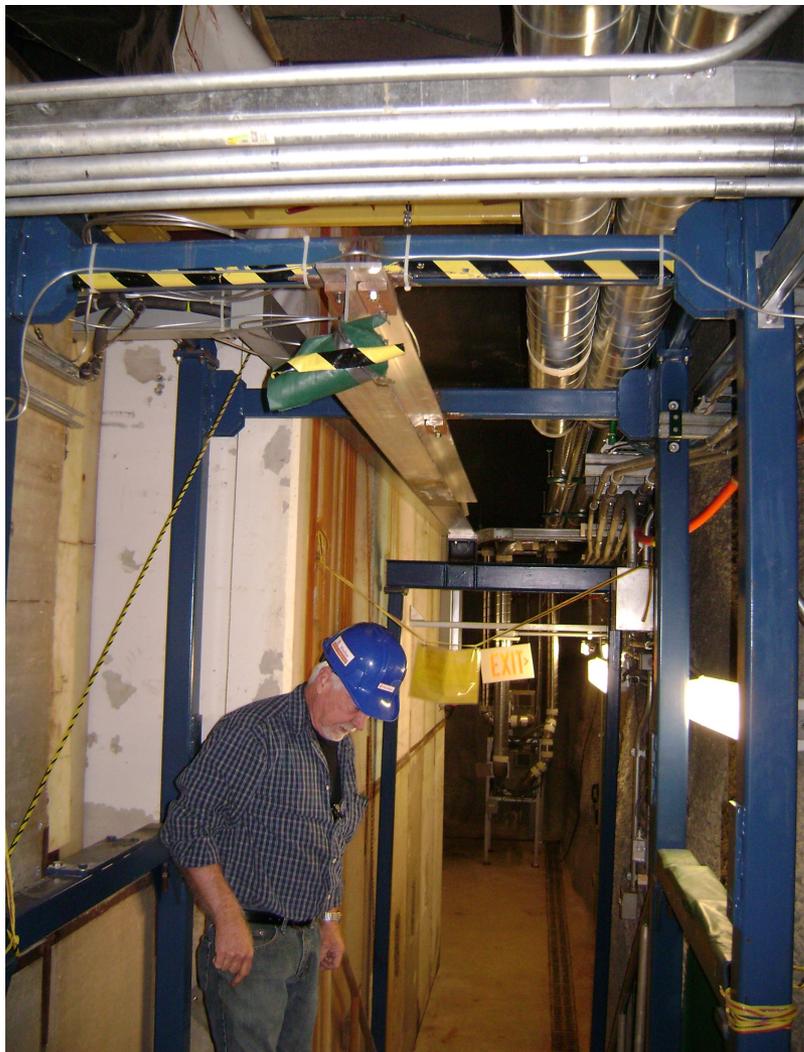
Fixture assembly



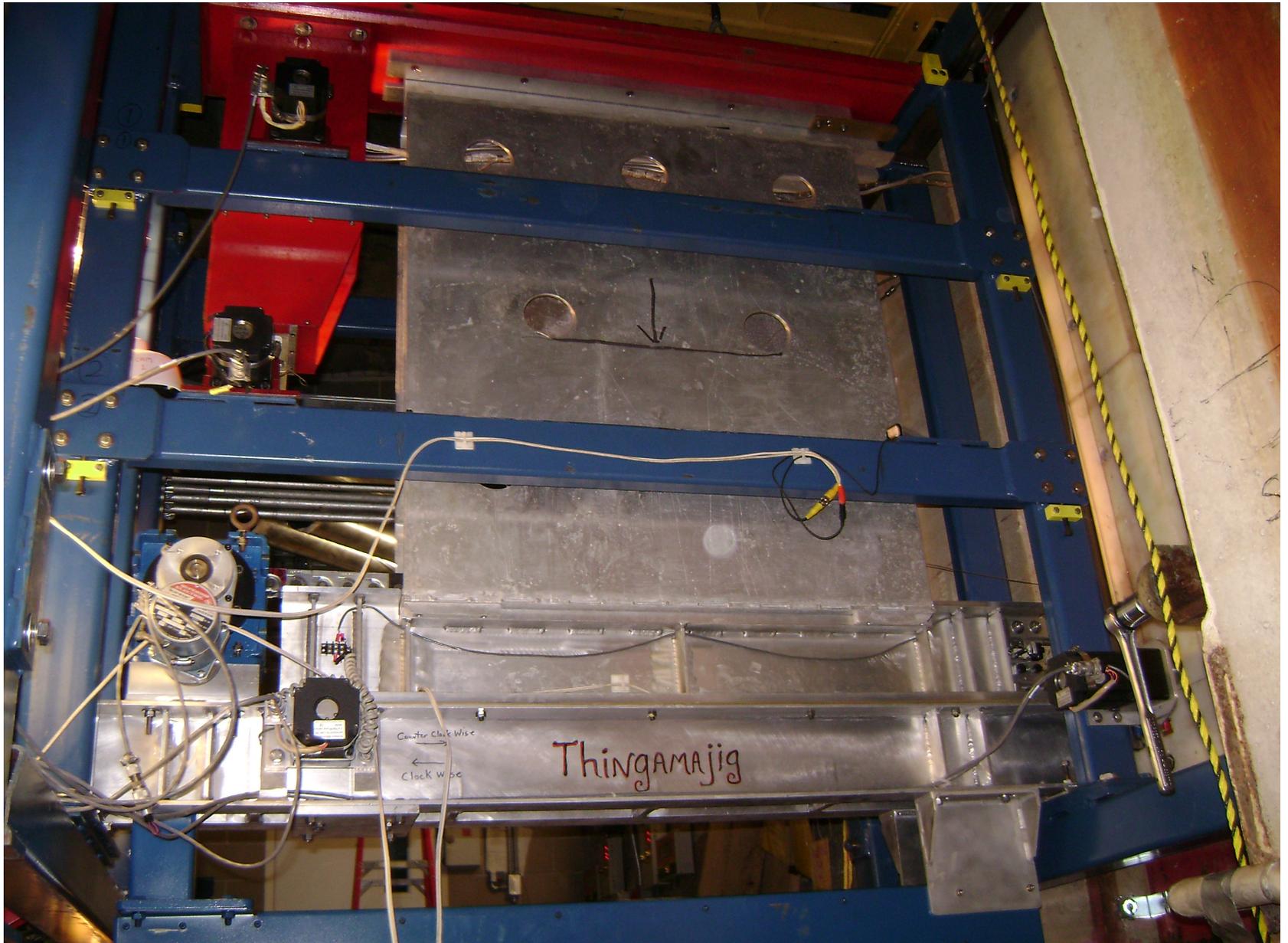
Lifting hoist support structure.

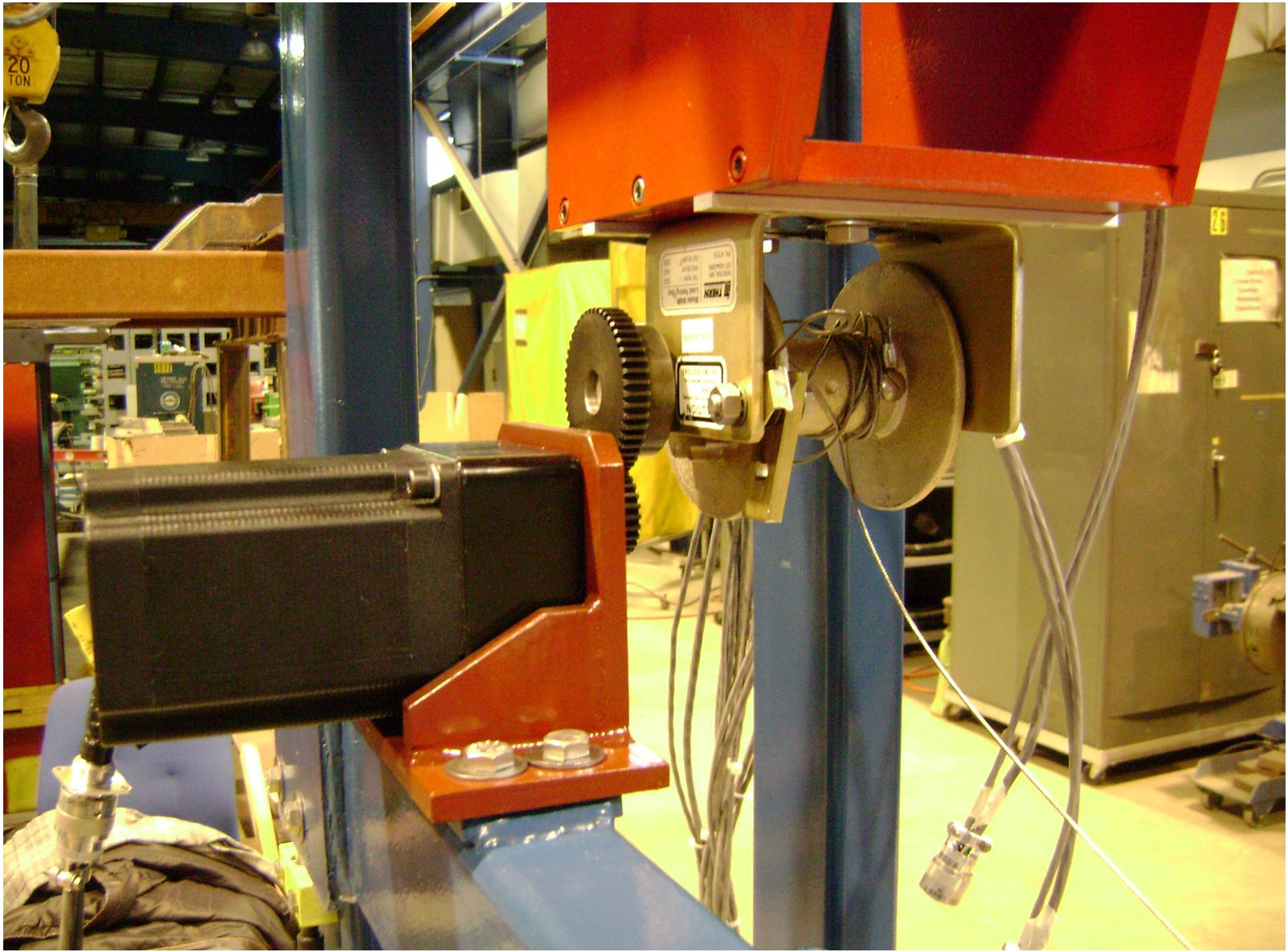


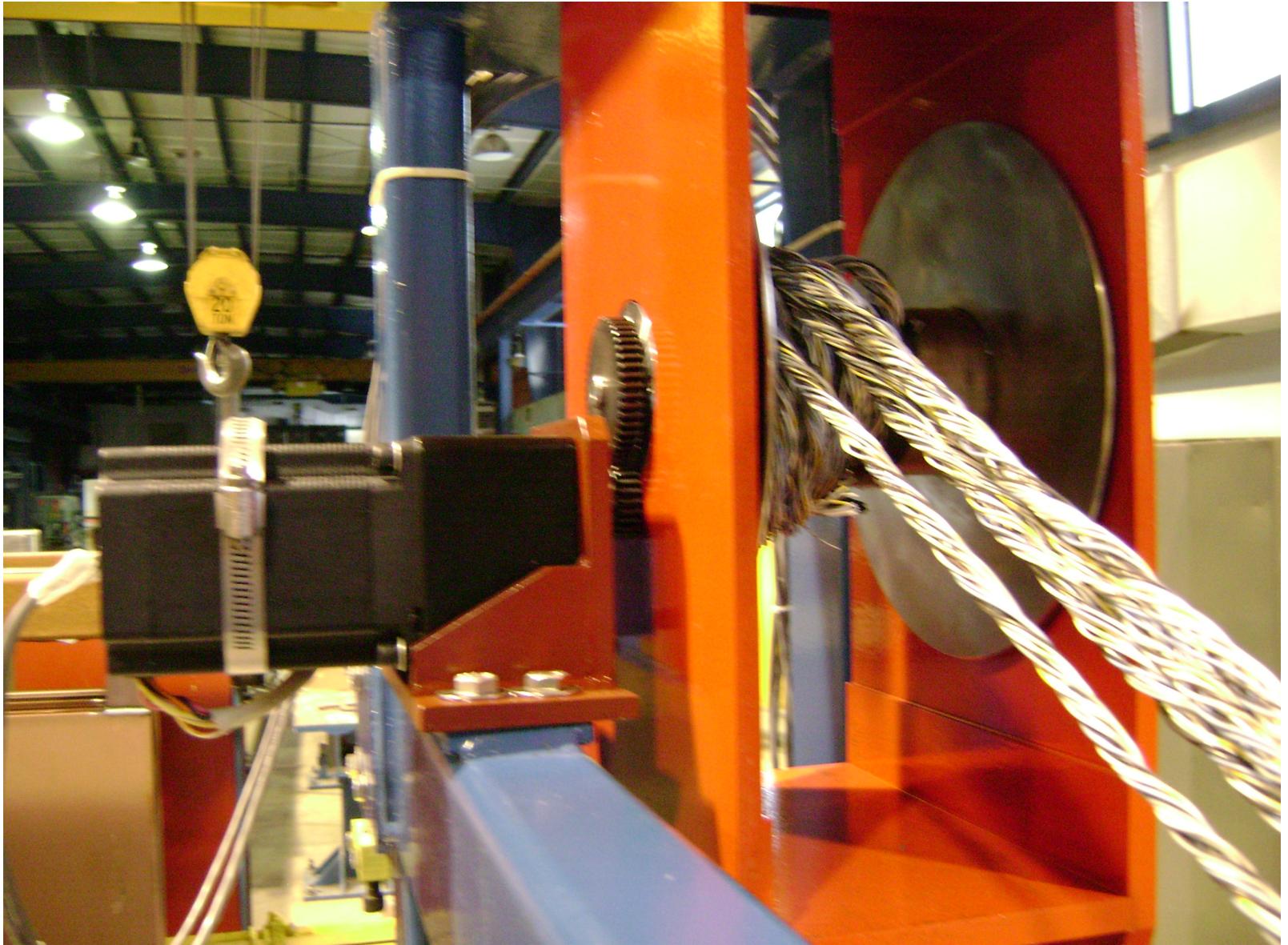
Fixture installation preparation



Fixture is installed in the front of the absorber door







Hadron Monitor moving into the coffin practice



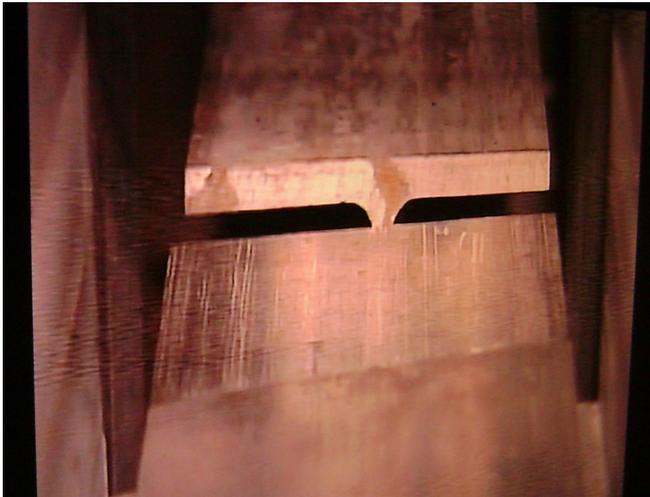
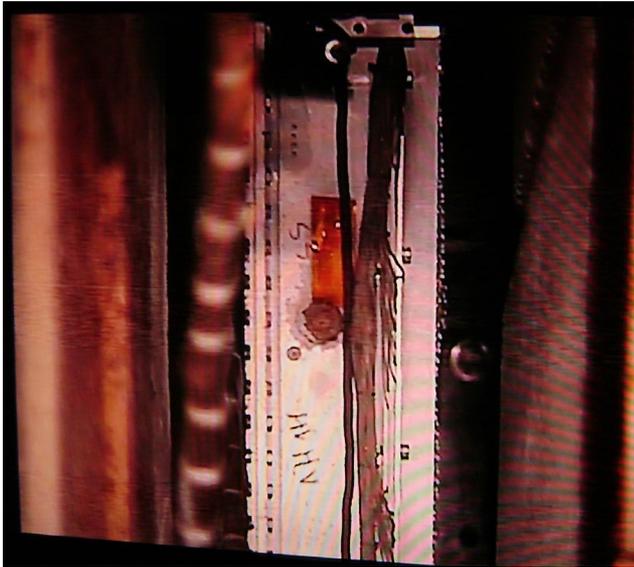
Cabinet with monitors and cameras control



Hadron Monitors removing



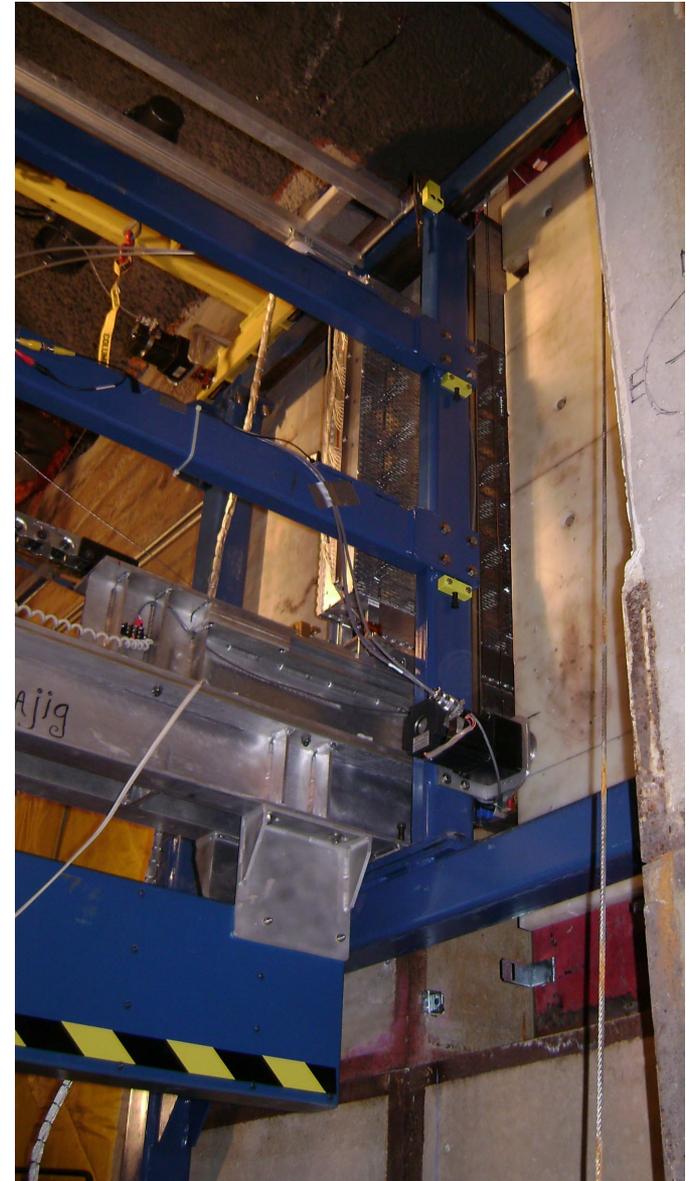
Hadron Monitor removing details



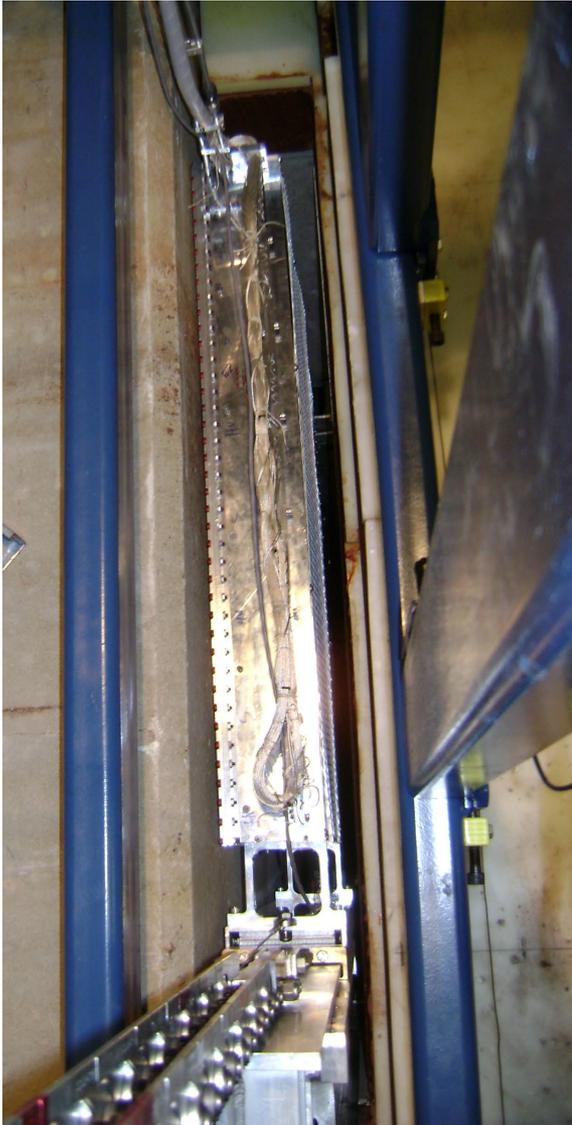
Hadron Monitor installation preparation



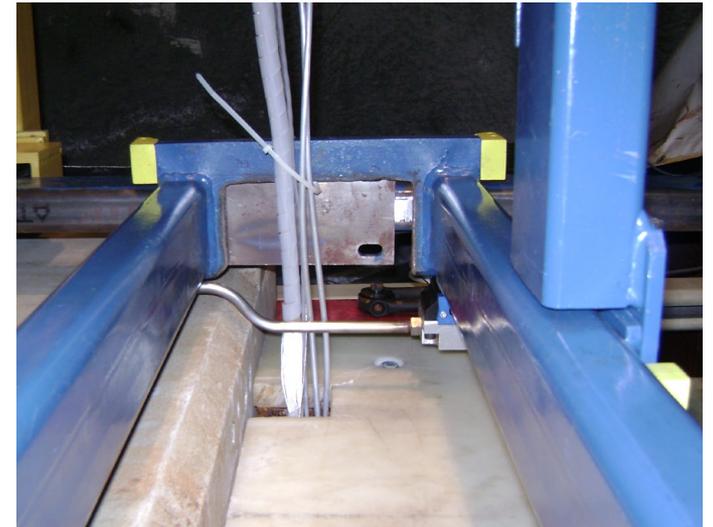
New Hadron Monitor installation



New Hadron Monitor installation



Door closing



First Hadron Monitor replacing team

