CDF-II PROC - 406

Moving a Central Arch in or out of the Central Detector

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Purpose:

This procedure lists the steps to follow in order to move a central arch in a safe manner.

Revision Control:

Hand Revision	Date	Section(s) Modified	Approval
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Approval

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CDF Co-Project Manager Date

1. Controlled Copies of the Procedure

There will be four controlled copies of these procedures. They will be located in:

- CDF Department Office Library
- CDF Control Room
- The CDF web page at
  http://www-cdf.fnal.gov/cdfsafe/cdfproclist.html
- and at ADMIN.CDF / ES&H / PROCEDURES

2. Procedure

Step 1. Identify personnel required in order to move the arch.

Task Manager: Will insure that all personnel under his direction have performed their equipment checks and insure that they are located in their designated area prior to the move. The task leader will assign duties to each member of the team. The task leader is in charge of the move and is thus responsible for the equipment and personnel involved. The arch will not move without this person present.

Workers: Will be positioned on and around the arch. They are responsible for making sure that there are no obstructions (cables, hoses, and electronics) in the arches intended path. Each worker will be assigned a specific area to watch by the task leader.

Hydraulic Pump Operator: A person qualified to operate this device which moves the arch. This operator will take direction from any member of the team in order to STOP the move. However, only the task-manager can initiate one.

On a typical move, there will be **6** people involved. They are:

- Task Manager
- Pump Operator
- Worker stationed on top of the arch to guide the cable tray and gas hoses and look for potential interferences up high.
- Worker stationed inside the arch to move the push pull bracket
- Workers (2) , one on each side of the arch to look for stray cables and interferences

Step 2. Prerequisites

- All Personnel must have access training appropriate to the location of the work.
- One of the workers must be trained in CDF Procedure 415
- Hard Hat
- TLD Badge
- Safety Glasses if near the high pressure hydraulic hoses
- Gloves if handling the lead block covers from source drives

Step 3. Prepare the area

Make sure that the area in which the arch will move is free of debris. Sweep around the rails and inspect under and between the Hillman rollers to look for loose debris. Similarly, check overhead for potential obstacles.

Step 4. Complete the following Checklist

1. Turn off lower arch power supplies
2. Unplug power cables at the arch. There are 2, one for 60hz and one for 400hz power
3. Shut off manual valves for Electronics Cooling Water and disconnect SS lines from the arch and cap them as specified in procedure 415.
4. Inspect interface between transporter and detector to make sure there is no gap
5. Remove lead block covers from source drives (if installing arch)
6. Remove lateral shim packs
7. Unbolt clamps which hold arch in place
8. Check that cables routed on the side of arch are properly dressed
9. Remove wooden protective board from bottom phototube covers as well as bolts (if installing arch)
10. Inspect inside the ID of the arch to make sure there is no debris. Any foreign objects left will puncture a chamber when the arch comes in close proximity to the solenoid.

Step 5. Moving the Arch

- Install beam under arch. The positioning of it (in front or inside of arch) will depend on which way the arch is to be moved.
- Make sure that arch rack power supply cables are clear of the beam
- Install push-pull hydraulic cylinder on top of beam.

  Note that the floors are not always level, keep a chock available for Hillman rollers in the event that the arch starts to roll unassisted.
- Reposition the beam as necessary in order to move the arch the desired distance.

Step 6. Lifting the Arch

Warning, keep hands clear of the elevated arch. Loss of finger(s) could result

- Hook up hand pump to pancake jacks on the outside of the arch
- Pump jack until Arch is elevated. Arch should begin to lift at about 1500 PSI.
- Once arch is elevated, move shims with arch to prevent the arch from tipping in the event of a jack failure

Step 7. Lowering the Arch

- Slowly lower arch on shim packs by opening valve on jack.

Step 8. Final Operations

Arch being Installed

- Ensure it is up against the stops and that the bolt clamps are installed
- Install lateral shims
- Have qualified Water technician reconnect ECW lines and initiate water flow following procedure 415.
- Reconnect the 60hz and 400hz power cables.
- Have qualified electronics technician turn on the power to the lower arch rack power supplies that had been switched off for the move.
- Remove the beam and hydraulic equipment

Arch in the “Out” position

- Install lead covers on source drives
- Remove the beam and hydraulic equipment
- Install wooden protective covers over bottom row of phototubes

3. Checklist

Pre Arch Move Checklist

- Turn off lower arch power supplies and unplug power cords at the arch
- Shut off manual valves for Electronics Cooling Water and disconnect SS lines from the arch as defined in procedure 415
- Inspect interface between transporter and detector to make sure there is no gap
- Remove lead block covers from source drives (if installing arch)
- Remove lateral shim packs
- Unbolt clamps which hold arch in place
- Check that cables routed on the side of arch are properly dressed
- Remove wooden protective board from bottom phototube covers as well as bolts (if installing arch)
- Inspect inside the ID "bore" of the arch to make sure there is no debris. Any foreign objects left will puncture a chamber when the arch comes in close proximity to the solenoid. (if installing arch)

Post Arch Move Checklist

Arch being Installed

- Ensure it is up against the stops and that the bolt clamps are installed
- Install lateral shims
- Have qualified Water technician reconnect ECW lines and initiate water flow as defined in procedure 415.
- Have qualified electronics technician reconnect power cables and turn on power to lower arch-rack power supplies that had been switched off for the move.
- Remove the beam and hydraulic equipment

Arch in the "Out" position

- Install lead covers on source drives
- Install wooden board on lower arch quadrant to protect now exposed phototubes
- Remove the beam and hydraulic equipment

4. Deviations from the Procedure

The procedure must be followed as written. Deviations from this require the approval of responsible engineer.

5. Qualified Operators and Training

Task Manager: Person must be experienced in rigging physics equipment and meet with the approval of the responsible engineer.

Qualified Task Managers are

Dick Worland
John Voirin

Hydraulic pump operator. This operator is expected to understand how this equipment is to be installed and used.

Qualified pump operators include

Dick Worland
John Voirin
Craig Olson

Workers need formal training. They will typically come from those CDF technicians which routinely handles rigging operations. They must have appropriate access training, and lift training if required.

6. Training Materials

A copy of this procedure. There are no other special training materials for this procedure.

7. List of Trained People for this procedure

8. Supporting Documentation and Reference Material

CDF procedure 415