

**HAZARD ANALYSIS**  
**Superconducting RF Module Test Facility (SMTF) Project – Phase I**

**Written authorization from AD RSO to relocate beamline shielding must be obtained before any shield blocks can move.**

Phase I of this project is to clear the west side of the MP line to allow for the installation of additional shielding. This will include removing the catwalk on the west side of MP6 and removing concrete shielding from MP and ME that will not be used. Concrete shield blocks that will be used to provide additional shielding along the MC beamline will be staged and relocated as space becomes available. All extra concrete shield blocks will be moved out of the area and either relocated to a temporary staging place outside or to the SBSB or Railhead. The concrete shield blocks are the property of the AD and their final disposition is the responsibility of AD.

The following points must be noted prior to the commencement of this phase of work:

- This HA does not address the electrical hazards associated with the removal of the catwalk. Before the catwalk can be removed, T&M electricians will isolate, de-energize and remove all involved/attached electrical components.
- This HA does not address the removal of the fire protection system(s) attached to or affected by the catwalk. FESS Fire Protection Group will remove all affected systems.
- MP6 floor lead contamination must be cleaned before electricians or FESS will be allowed in the area.
- This HA does not address the moving of NEVIS blocks or steel from the Meson Detector Building (MDB).

Phase I has five steps. The HA is laid out in the order the tasks will likely occur. Priorities may shift so the tasks may be completed out of order. The order of the tasks has no impact on safety.

- 1.) Remove concrete shield blocks from MP pile and temporarily stage them on the west side of the Meson Detector Building (MDB). The blocks that will not be reused inside of the MDB will be transported to a predetermined storage location.
- 2.) Remove the section of catwalk that runs south to north on the west side of the MP6 beamline.
- 3.) Install additional shielding on the east side of MC target pile.
- 4.) Remove the magnets from the MP target pile. (They will either be scraped or stored. Final disposition of the magnets is the responsibility of the AD.)
- 5.) Remove concrete shield blocks from the ME beamline and either use them to provide additional shielding or remove them from the area.

<b>Step/Phase of Job</b>	<b>Safety Hazard</b>	<b>Precautions/Safety Procedures</b>
1.) Remove concrete shield blocks from MP pile and temporarily stage them on the west side of the MDB. The blocks that will not be reused inside of the MDB will be transported to a storage location to be determined by AD.	Inadvertent release or transport of radioactive materials.	The PPD RCT or designee will survey each block prior to it leaving the Meson Detector Building. If the material is found to be radioactive, it will be labeled and an MMR will be completed prior to pick-up by Business Services drivers.
	Possible lead contamination on the top of the concrete shield blocks.	The PPD RCT will use a HEPA vacuum to vacuum the top of the block wall before the first layer is removed. The RCT will dress in Tyvek style coveralls and boot covers, nitrile gloves and a half face respirator with a P100 HEPA cartridge.
	Falling from the top of the shield block wall while attaching rigging.	A safety monitor will be identified and his/her exclusive job will be to watch the riggers on top of the wall and warn them when they get too close to the edge. The monitor will be identified prior to work beginning.
	Injury to personnel from load falling on them or hitting them.	Either barricades or signs stating “Warning – Heavy Rigging in Process – Authorized Personnel Only” will be posted to keep people out of the work area. The crane operator will sound the warning bell on the crane to indicate a load is traveling.
	Injury or equipment damage caused by a load falling or dropping because of inadequately rated, faulty, or damaged rigging equipment.	Proper rigging rated for the load being rigged will be used. Rigging equipment (i.e. slings and eye bolts) will be inspected before using. Use lifting loops in block pockets to rig the concrete blocks. Only FNAL qualified crane operators will be part of the rigging/operating team.

Step/Phase of Job	Safety Hazard	Precautions/Safety Procedures
	Injury or equipment damage caused by a load falling or dropping because the threaded eye-bolt pulls out of the block during transport.	Coil bolt and threads used on any block over 2,100 pounds will only be used for positioning the concrete blocks on cribbing and not for transporting. After the blocks are positioned on the cribbing, a sling will be placed around each block and used for transport.
	Injury or equipment damage caused by a load falling or dropping because it is unbalanced.	Measure for center line of load. Secure load at quarter points from center with rigging. Lift load slowly to see that the load is level and that the rigging is at the center of gravity. Lift load 6 inches above the floor and check the load for safe travel.
	Injury or equipment damage caused by a load falling, dropping or being suspended because of a crane malfunction.	Perform visual and operational checks before using the crane. Only FNAL qualified crane operators will be part of the rigging/operating team.
	Pinching extremities between the load and the floor, wall or another block.	Keep extremities away from the load as it is being hoisted or lowered into position. Use guide line where feasible.
	Limited head clearance for load creates potential for load to hit obstructions.	A spreader bar is needed to hoist and travel over the MC pile with any block that is longer than 7½ feet.
2.) Remove the section of catwalk that runs south to north on the west side of the MP6 beamline.	Injury to personnel from load falling on them or hitting them.	Either barricades or signs stating “Warning – Heavy Rigging in Process – Authorized Personnel Only” will be posted to keep people out of the work area. The crane operator will sound the warning bell on the crane to indicate a load is traveling.
	Electric shock from power lines connected to the catwalk.	VERIFY with Leon Beverly that all affected electrical components have been de-energized and removed.

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	Possible damage to fire protection systems that are supported by this section of the catwalk.	VERIFY with FESS Fire Protection Group that all fire protection equipment has been removed and that no other fire protection systems will be adversely affected by the removal of this section of catwalk.
	Possible spread and/or personnel exposure to lead contamination from the MP6 floor.	VERIFY with PPD ES&H that the MP6 floor has been cleaned and is no longer considered contaminated above the FNAL Lead Clearance Standard.
	Injury or equipment damage caused by the walkway portion of the catwalk falling after the bolts are removed between the walkway and the support columns.	Remove one section of the walkway at a time. Using slings, rig the section to be removed to the crane so that it is supported. Remove the bolts while standing on secure sections of walkway. Move out of the way before the section of walkway is rigged out. Repeat until all the walkway sections are gone. Place signs stating "Catwalk Closed to all Non-Authorized Foot Traffic" at all points of entry to the catwalk.
	Injury or equipment damage caused by the support columns falling after the walkway portions are removed.	Using slings, rig the support columns to the crane to provide support while they are unsecured. Repeat until all support columns are gone.
<p>3.) Install additional shielding on the east side of MC target pile.</p> <p>4.) Remove the magnets from the MP target pile.</p> <p>5.) Remove concrete shield blocks from the ME beamline and either use them to provide additional shielding or remove them from the area.</p>	Inadvertent release or transport of radioactive materials.	The PPD RCT or designee will survey each block and/or magnet and/or piece of equipment prior to it leaving the Meson Detector Building. If the material is found to be radioactive, it will be labeled and an MMR will be completed prior to pick-up by Business Services drivers.

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	Possible spread and/or personnel exposure to lead contamination.	Step by step, items removed will be evaluated by the PPD ES&H department for the potential to spread lead contamination. As needed, concrete shield blocks and/or magnets and/or pieces of equipment will be decontaminated by the PPD ES&H Department or other qualified lead workers.
	Falling from the top of the shield block wall while attaching rigging.	A safety monitor will be identified and his/her exclusive job will be to watch the riggers on top of the wall and warn them when they get too close to the edge. The monitor will be identified prior to work beginning.
	Injury to personnel from load falling on them or hitting them.	Either barricades or signs stating “Warning – Heavy Rigging in Process – Authorized Personnel Only” will be posted to keep people out of the work area. The crane operator will sound the warning bell on the crane to indicate a load is traveling.
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The following precautions should be taken during each step/phase of the job.

- Hard hats will be worn when there is a credible overhead or head bump hazard.
- Safety Glasses will be worn when there is a potential for debris to be scattered from objects being moved.
- Leather or cloth gloves will be worn when there is a credible hazard to the rigger or crane operator’s hands.

