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C-A OPERATIONS PROCEDURES MANUAL

1.21 Cable-Pulling Safety Procedure

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Hand Processed Changes

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Collider-Accelerator Department Chairman Date

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1.21 Cable Pulling Safety Procedure

1. Purpose

- 1.1 This document defines the policy for assembling cable-pulling teams. This policy addresses safety issues associated with pulling cable.

2. Responsibilities

- 2.1. The Head of the Facilities and Experimental Support Group shall designate the Lead member of the cable-pulling team for cable pulls managed by the Experimental Support and Facilities Division.
- 2.2. The Maintenance Coordinator for the Accelerator Division shall designate the Lead member of the cable-pulling team for cable pulls managed by the Accelerator Division.
- 2.3. Group Leader - It is the responsibility of Group Leaders to ensure that all members of their group who participate in a cable pulling team are trained in this procedure.
- 2.4. Work Planners - Proper work planning shall be used for each cable-pulling job. All Work Planners shall be trained in this procedure.
- 2.5. Cable pullers – All cable pullers shall be trained in this procedure and shall be responsible for its' implementation.

3. Prerequisites

- 3.1. Cable pulling entails lifting heavy objects. Cable pullers must be able to lift at least 50 pounds, be able to climb, and be able to perform other physical activity. Cable pullers should have stamina, strength, and coordination, and must be unafraid of heights.

4. Precautions

- 4.1. All personnel shall ensure their own safety by following the standards, safety rules, and the training they receive. Working on or near energized sources is not permitted unless a valid working hot permit has been issued. The probability of a mistake occurring is very high in situations where cables are being pulled and systems are energized. As per [BNL ES&H Standard 1.5.1](#) all conductors are to be considered energized unless known to be otherwise and secured in a safe fashion. This concept shall be applied to all disconnected and connected cables. If any part of a job appears unsafe to a worker, it is their duty to discontinue work and to inform their supervisor, manager, ESH Coordinator or C-A ESHQ Division Head of the unsafe condition.

5. Procedure

Caution:

Installing cables inside a building can be hazardous and requires extra safety precautions.

The cable-pulling team should identify potentially hazardous areas before work. The presence of electric power cabling and electrical equipment is probably the most common hazard faced by cable pullers. Treat all circuits as if they were live (energized), even after these circuits have been turned off. Cable pullers must be especially careful in situations where electrical circuits or equipment may be contacted blindly, as when fishing conduits or walls. Metal fish tape should not be used if the exit point is unknown.

Other sources of potential hazard include dust and debris when working in floor and ceiling systems, exposure of optical fibers or glass fibers to the skin and eyes, asbestos, and chemical hazards (fire-stop materials for example).

Keep floors clear of debris; for example, cut cable ties, wire scrap, etc. in order to prevent dangerous working surfaces. Follow standard radiation safety practices such as performing activation checks of materials exposed to beam before removal from the work area and ensuring training qualifications are up-to-date.

The following section defines the safety related procedures that shall be followed by all C-A Department personnel working on cable-pulling jobs.

- 5.1. Training — All cable-pulling personnel and Work Planners at C-AD shall be trained in this procedure.
- 5.2. Job Planning – The Work Planner of Systems Specialist for the cable pull job shall:
 - 5.2.1. Determine methods to be used in placing each type of cable.
 - 5.2.2. Identify and obtain appropriate cable pulling tools, equipment and supplies.
 - 5.2.3. Identify working surface hazards, especially for outdoor work and ensure adequate hazard controls are used to prevent slips, trips or falls.
 - 5.2.4. Identify safe locations for accessing and pulling the cable.
 - 5.2.5. Determine the staffing required and assign tasks to team members.
 - 5.2.6. Provide proper communication as needed.
 - 5.2.7. Follow [BNL heat stress management requirements](#).

- 5.3. Safe Work Practices – Cable Pullers shall:
 - 5.3.1. Consider all conductors to be energized unless properly secured. Working hot is not permitted unless a valid permit is in force.
 - 5.3.2. Ensure the cable-pulling job underwent proper work planning.
 - 5.3.3. Use drinking water frequently in hot environments.
 - 5.3.4. Before work begins, clearly mark the work areas to restrict access to authorized personnel only.
 - 5.3.4.1. Safety cones, yellow tape or folding A-frame signs may be used.
 - 5.3.4.2. Remove warnings when work is complete.
 - 5.3.5. Never leave work areas unattended or without a barrier and warning sign if they present a hazard (e.g., open floor systems).
 - 5.3.6. Examine all work tools to ensure they are in safe working condition (e.g., the handles to hand tools should be free of splinters or other surface damage that could injure a cable puller's hands).
 - 5.3.7. Carefully follow all manufacturers' instructions when mounting, securing and using potentially dangerous mechanical equipment for cable-pulling such as winches, cable wheels and cable brakes.
 - 5.3.7.1. Do not set up or operate manufacturer's equipment without first receiving adequate training from the Work Planner or his designate.
 - 5.3.8. Lift heavy equipment correctly, bending at the knees and keeping back straight.
 - 5.3.9. Hard Hats shall be worn for work that has serious potential for falling or flying objects, electric shock & striking of the head.
 - 5.3.10. Wear eye protection when working in a crawl space, above a dropped ceiling, or above eye level and looking up at the work.
 - 5.3.11. Wear protective foot ware such as steel-toe slip resistant sneakers or shoes.
 - 5.3.12. Wear protective gloves when performing any work that has potential for hand or forearm injuries.

5.3.13. Wear well-fitting cloths to protect against minor cuts and materials that could irritate the skin, like fiberglass. Do not wear loose fitting cloths that could get caught on tools or surroundings.

5.3.14. Job Wrap Up – Cable Pullers and Work Planners shall:

5.3.14.1. Label new cables where appropriate.

5.3.14.1.1. Cables should be labeled so that installers can identify them for termination.

5.3.14.2. Clean up the job site.

5.3.14.2.1. Prevent development of safety hazards.

5.3.14.2.2. Pick up pull strings or pull ropes immediately after use.

5.3.14.2.3. Collect and dispose of removed sheath, wire scrap and pieces of cable ties.

5.3.14.2.4. Store significant amounts of cable (>\$1000 value) and cable reels in a secure area when pulling is complete.

5.3.14.2.5. Dispose of all personal items (e.g., luncheon materials, paper cups or water bottles).

5.3.14.2.6. Replace floor and ceiling tiles and remove safety-cones, yellow tape or other warning devices that were used to control access to the work area.

5.3.14.2.7. Store tools, equipment and unused materials properly at the end of the workday.

5.3.14.3. Job documentation – Group Leaders or their designates shall update building drawings where appropriate. After an installation is complete, the Group Leader or his designate must provide the following information so that drawings can be updated:

5.3.14.3.1. Show what types of cables were installed.

5.3.14.3.2. Document the origination point and termination point of each cable.

5.3.14.3.3. Show clearly the pathway used (e.g., conduit, cable tray).

5.3.14.3.4. Describe the application planned for the installed cables.

5.4. Safety Inspections

5.4.1. It shall be the responsibility of the Work Planner to routinely inspect the physical areas under their control in a cable pull. This inspection shall include determining if cables are appropriately installed, and if the job site is cleaned up.

6. Documentation

None

7. References

None

8. Attachments

None