

Fermilab Test Beam Facility Hazard Awareness Training Handout

Version 1.8

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Overview

This document is intended to inform you of some of the more common hazards encountered at the Fermilab Test Beam Facility (FTBF). Please read the entire document and then complete the quiz at the end. Return the completed quiz and signature sheet as indicated. This basic hazard awareness training is required for all personnel who intend to work at FTBF. It is valid for one year.

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I. INTRODUCTION

This training document outlines hazards specific to FTBF. "FTBF" consists of the Meson Detector Building West, including the MT 6.1 and MT 6.2 enclosures. The goal of this training is to advise you of potential hazards and the proper precautions to take to prevent unsafe situations. This training is mandatory for anyone who enters the FTBF area or works at FTBF routinely.

If you find a situation in which you need advice, training, review or a decision in regards to safety or safe operations, you should first go to your immediate supervisor. If you and your supervisor conclude that the matter goes beyond your own group, that you need assistance in resolving it, or that you need to arrange for safety training, you should contact the FTBF Coordinator. If you are unable to reach the FTBF Coordinator, you should reference the contact list posted on each of the doors in the facility. In the event of an emergency, you should **call ext. 3131** from any Fermilab telephone.

Consult the FTBF Emergency Call list for the individuals listed above. <http://www-ppd.fnal.gov/FTBF/#contact>

Environmental Safety & Health (ES&H) materials referenced in this document can be consulted for guidance on ES&H issues. These materials can be found on-line at this URL: <http://esh.fnal.gov/xms/FESHM>

II. PROGRAMS FOR CONTROLLING HAZARDS

The ES&H programs for controlling the hazards that may be found within FTBF generally have three parts: (1) reviews to minimize hazards of new systems; (2) personnel training; and (3) documented operating and safety procedures or guidelines to follow. In addition, work activities performed by Fermilab employees/users shall be reviewed via a Hazard Analysis (HA) before work is started (see [Fermilab ES&H Manual, Chapter 2060](#)). Reviews to minimize hazards in the design, construction, and operation of new systems are conducted by specific review committees or ES&H personnel. If you are involved in an operation that you feel should be reviewed, contact your supervisor or the FTBF Coordinator. Training courses are conducted by supervisors, the FTBF Coordinator, the PPD ES&H Group, or the Fermilab ES&H Section, depending on the specific need. Written procedures and job hazard analyses are usually developed by those doing the work and their supervisors, in consultation with ES&H personnel when necessary.

A list of common hazards at FTBF follows, along with the associated personnel training programs and operating procedures to minimize them.

1. General Industrial Hazards

The FTBF is an industrial space. As such, the proper PPE must be implemented for various situations. In addition to specific PPE requirements listed below, close-toed shoes must be worn at all times within the facility.

Working at Heights

It is common for work to be conducted at elevations above floor level. When working with ladders, a number of rules apply:

- Always use the appropriate ladder for the job. Avoid reaching or leaning from a ladder to complete a task.
- When ladders are not in use, they must be stored in a secure location that will not cause an obstruction to walkways or workspaces.
- The physical condition of ladders and scaffolds should always be inspected prior to use and must be used in accordance with any posted instructions and/or safety precautions.
- Ladders are required to access cable trays. Climbing atop the concrete shielding blocks to access the cable trays is not permitted.

Work from elevated platforms that have no railings requires Fall Protection Orientation [FN000304] training and the use of a body harness and lanyard. Hard hats must be worn whenever someone is working above you or during rigging activities.

NOTE: All areas above the height of the shielding blocks are prohibited during beam-on operations.

Cranes, Forklifts, and Manlifts

Improper use of certain equipment, such as cranes, forklifts and manlifts, can endanger people working in the area as well as material being moved. People operating cranes and forklifts must complete operator training and renew this training every three years. Operators must warn others of approaching loads. Crane operators in the high bay do this by using a bell. All personnel are prohibited from the area near or under any suspended load. Procedures for crane use can be found in the [Fermilab ES&H Manual](#).

Machine Shop Equipment and Power Tools

Machines in the area present hazards due to moving parts. Power tool operations present similar hazards. Prior to using tech shop equipment, workers must be trained and authorized by the FTBF Coordinator. This includes a review and signature of the appropriate Hazard Analysis and limits the use to those tools specific to the FTBF. Work with some machines requires the use of Personal Protective Equipment (PPE). Any loose clothing or jewelry that might become entangled must be removed prior to operating these machines. Hair that might become entangled should be covered or tied back. All hammering, drilling, cutting, grinding, and power tool operations require the use of protective eyewear (e.g. safety glasses or goggles) with side shields that fit snugly to the face. In addition to glasses or goggles, grinding operations also require the use of a full-face shield. Some operations may require other forms of PPE (e.g., hearing protection, gloves). Manufacturer's recommended operating instructions are a good source of information on how to operate equipment safely.

Motion Tables

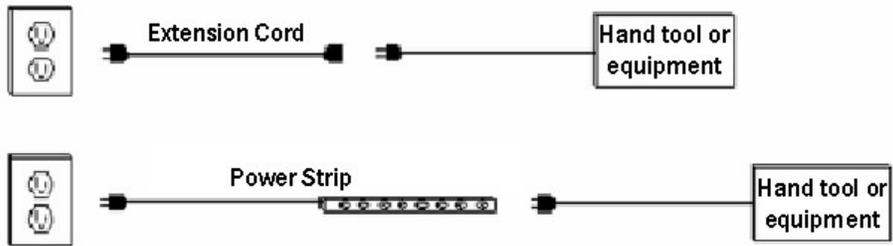
Three motion tables exist within the facility for use within the beamline. A separate article with instructions for their use can be found at the following URL: <http://www-ppd.fnal.gov/FTBF/Facility/Tables.html>. No user shall operate a motion table without reading the instructions.

2. Electrical Hazards

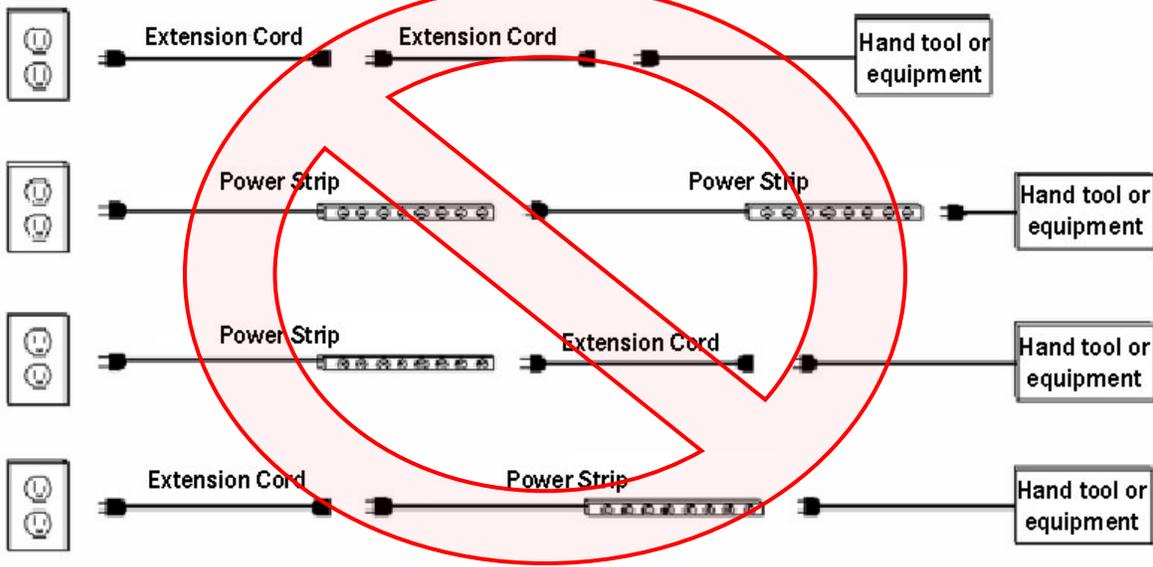
Many FTBF components utilize potentially dangerous high voltages and/or currents. In addition, certain electrical devices/components may retain significant electric charge after their high-voltage sources are removed. These sources of energy can cause electric shock to personnel if work on these devices is carried out improperly. All FTBF personnel are required to have Electrical Safety Orientation [FN00387] training, which is a brief orientation to the Fermilab LOTO program and NFPA-70E for unqualified workers. Users at FTBF are not authorized to operate panel circuit breakers or electrical disconnects. People performing service or maintenance work on or near equipment that could cause them injury if it were to become energized must lockout and tagout that equipment's energy source(s) and must have current Fermilab LOTO Level 2 [FN000212] training. Additional information about LOTO can be found in [section 9](#) of this document.

A common electrical hazard is 'daisy-chaining' of extension cords and power strips. Extension cords and power strips are designed to be used individually and not connected to others in series. This can become a fire hazard by creating an over-current condition. Below are examples of acceptable and unacceptable usages of extension cords and power strips. These are examples of configurations found onsite at Fermilab, however acceptable and unacceptable configurations are not limited to the examples. Contact the building manager or the FTBF Coordinator if you have any questions.

Acceptable combinations of extension cords and power strips.



Unacceptable (Daisy-chain) combinations of extension cords and power strips.



3. Radiation

The FTBF contains areas where radiation hazards associated with accelerator operations are present. Radiation fields can also be found near activated accelerator components and radioactive sources. The work room behind the beam dump is off-access during beam operations. Radiation dosimeter badges are required when working with radioactive sources and in any posted radiation area. Temporary badges are available from the Communications Center (on the Ground Floor of Wilson Hall, x4251). Quarterly radiation dose reports for people who have permanently assigned badges can be obtained through your local RSO.

People working at FTBF must have current General Employee Radiation Training (GERT) [FN000241], as a minimum. If they enter radiation areas or work with radioactive sources or materials they must have the more advanced Radiological Worker training, instead of GERT. All items removed from the beamline area are assumed to be radioactive and must be checked for radioactivity by the person(s) removing them. In addition, potentially activated or contaminated items must be surveyed by an authorized person prior to them being taken off the Fermilab site. Contact the Particle Physics Division Radiation Safety Officer to request such a survey. Only personnel who have current Radioactive Source Training [FN000048] and Radiological Worker Training [FN000470 & FN000471] can sign out radioactive sources from the designated FTBF "source monitors." The names of the source monitors are posted on the radioactive source storage box.

If a female radiological worker knows or suspects she is pregnant, she can notify the Fermilab Medical Office in writing and consult with the Occupational Medical Director and a radiation safety staff member to discuss options for minimizing her prenatal radiation exposure. This notification is voluntary and can be arranged with the assistance of the PPD Radiation Safety Officer.

Further information regarding Fermilab standards for radiological work can be found in the [Fermilab Radiological Control Manual](#).

4. Chemicals & Flammables/Combustibles

Small amounts of chemical materials, such as epoxies and solvents, are used or stored in certain areas. If handled incorrectly, some of these materials may become harmful. All hazardous (e.g., flammable, corrosive, reactive, or toxic) materials that are not in use must be stored in specially designated cabinets. Flammable liquids, such as acetone, must be stored in a Flammable Liquids Cabinet (see photo to the right). Rags or Kim Wipes used in the application or cleanup of such solvents must be collected and disposed of specially. Contact the PPD Environmental Officer or Waste Coordinator for assistance. Material Safety Data Sheets (MSDS's) containing information on all of these and other materials within FTBF facilities can be found at http://www-esh.fnal.gov/owa_user/msds_search.html. Additional information regarding chemical hazard communication is outlined in [Chapter 5051](#) of the *Fermilab ES&H Manual*.



As a general practice, the use of combustibles within the FTBF should be limited. If there are questions regarding the combustibility of building materials (cables, foam board, plastics, etc), please obtain a sample of the building materials and contact the FTBF Coordinator. There is a system in place to test these materials. All combustibles, such as cardboard or wood, should be removed from the beam enclosures.

5. Compressed Gas/Pressure Vessels

Some FTBF detector systems and operations utilize compressed gases and pressure vessels that may become hazardous if ruptured or handled improperly. All gas cylinders must be properly regulated while used and capped while stored. They also must remain protected from falling down at all times, for example by securing them to a storage rack or other solid object. Only trained personnel should handle compressed gasses. You can find the Fermilab Compressed Gas Training [FN000213] here: http://www-esh.fnal.gov/pls/default/class_sched.html. Additional requirements and procedures regarding compressed gas systems and pressure vessels can be found in [Chapter 5031](#) of the *Fermilab ES&H Manual*.

6. Controlled Access Areas

Controlled Access is the normal mode of access during brief down-times of accelerator operation when it is expected that the beamline area interlocks will be maintained. Controlled Access is made by following the Fermilab Controlled Access training and procedures, along with the FTBF controlled-access procedure. Additional training is required before you can participate in a controlled access. The Controlled Access training can be scheduled with the ES&H section: http://www-esh.fnal.gov/pls/default/class_sched.html. The FTBF specific controlled access training can be scheduled with the FTBF coordinator.

There may be areas at FTBF posted "NO ACCESS." No entry to these areas should be attempted without explicit permission from FTBF Coordinator.

7. Emergencies

The following list summarizes the proper responses to the two different audible alarms that warn you of certain hazardous conditions at FTBF facilities:

- **Steady Alarm** - This is a fire alarm and it means that smoke or fire has been detected in the area. Leave the area via the nearest exit and go to the designated assembly point, which is across the street from the west side of the building.
- **Sitewide Emergency Warning System (SEWS)** - This is a verbal communication system broadcast throughout all areas of the laboratory. It is used to notify personnel when hazardous conditions exist and what protective actions to take. It is very important that you respond to its warning tones and messages and that you follow the transmitted instructions. If the nature of the message indicates severe weather, promptly go to the designated shelter area, which are the bathrooms of the FTBF.

When evacuating any area, proceed directly to the designated assembly point/shelter and wait there until the 'all clear' signal is given. If you must leave and can't wait for the 'all clear', tell your supervisor or Emergency Warden. Rescue attempts will be made by the Fire Department if someone is unaccounted-for and believed to be in an unsafe area (e.g., burning structure, oxygen deficient area). If you notice that a fellow worker is missing during an emergency, immediately report this to an Emergency Warden or Fire Chief.

Call ext. 3131 in the event of an emergency situation, such as personnel requiring medical treatment for any reason. Stay on the phone until the emergency operator indicates that s/he has all of the necessary information, including your name, location and nature of the emergency. Do not attempt to bandage another person or clean any bodily fluids from another person's injury.

8. Environmental

An accidental release of some materials (e.g., oil, gasoline, diesel fuel) from certain equipment could become harmful if it is not promptly contained. Such a release can be considered harmful if it can potentially cause adverse effects to people or the environment. If you know or suspect that such a release has occurred or will occur, **call ext. 3131** to report a spill emergency. Designated personnel are trained to execute procedures designed to minimize the spread of accidentally released materials. In addition, the following materials are prohibited from disposal in trash cans and dumpsters:

All hazardous (e.g., flammable, corrosive, reactive, toxic) materials; degreasing agents (e.g., freon); uncured epoxy; ethylene glycol ("anti-freeze"); fluorescent light bulbs; oils; paints; pesticides; radioactive material, radiation signs and labels; scrap metal; NiCad, lead/acid, and lithium batteries; any free liquids (regardless of chemical nature).

Contact PPD ES&H personnel or the FTBF Building Manager for information about the proper disposal of these items.

9. Miscellaneous

The following describes some additional hazards and work rules which exist within FTBF:

- Only Lockout/Tagout (LOTO) Level 2 trained personnel are authorized to work on equipment that could become hazardous to them if that equipment were unexpectedly energized. LOTO requires the use of a designated red lock and a DANGER tag to isolate the hazardous stored energy source (e.g., electricity, gravity, springs, etc.). Additional information about LOTO can be found in [Chapter 5120](#) of the *Fermilab ES&H Manual*.

NOTE: The term "configuration control" applies to the lockout and tagging of equipment that could not jeopardize worker safety. The application of "configuration control" locks does not require LOTO Level 2 training or procedures and should be implemented with a (non-red) padlock and a CAUTION tag.

- Smoking at FTBF is permitted only outdoors. You must remain 15 feet from any entrance.
- Alcoholic beverages are prohibited within FTBF.
- Since janitorial personnel do not service some areas within FTBF facilities, you must clean up after yourself.
- It is always preferred that people not work alone, especially in the beamline area. When this is impractical, workers should at least insure another person, such as their supervisor, is aware of when and where they are working, and they should make arrangements to periodically check-in with that person. This is especially important for work during off-hours. Also note that for some types of jobs, explicit "two-man rule" requirements may exist.
- **Nothing** must be attached to or suspended from overhead sprinkler pipes.
- No foods or beverages are allowed in MT6.1 or MT6.2 areas.
- All new visitors working at Fermilab must register with the Users' Office (WH1E, ext. 3111) upon their arrival.

III. FTBF HAZARD AWARENESS QUIZ

Print

Name: _____ I.D.#: _____ Date: _____

FOR EACH QUESTION BELOW, CIRCLE THE BEST ANSWER, AFTER READING ALL THE CHOICES:

1. What should you do if you find an unsafe situation?
 - a. ignore it
 - b. immediately inform the Fire Department
 - c. stop work and immediately inform your Supervisor or ES&H personnel
 - d. call the Main Control Room
 - e. none of the above

2. What should you do in the event any person at the FTBF requires medical treatment?
 - a. call ext. 3131
 - b. use a first-aid kit
 - c. call the FTBF coordinator
 - d. call the Main Control Room
 - e. panic

3. Which PPE article is required at all times within the FTBF?
 - a. hard hat
 - b. close-toed shoes
 - c. radiation dosimeter
 - d. gloves
 - e. tyvek suit

4. Which of the following rules applies to working with ladders?
 - a. always use the appropriate ladder for the job
 - b. ladders must be stored in a secure, non-obstructive location when not in use
 - c. the physical condition of ladders and scaffolds should always be inspected prior to use and must be used in accordance with any posted instructions and/or safety precautions
 - d. ladders are required to access cable trays; climbing atop concrete shielding blocks to access cable trays is prohibited
 - e. all of the above

5. Which of the following actions requires specific training prior to being performed?
 - a. work from elevated platforms (Fall Protection Orientation)
 - b. work with tech shop equipment (Tech Shop Safety)
 - c. operation of cranes, forklifts or manlifts (Operator Training)
 - d. handling of compressed gases (Compressed Gas Cylinder Safety)
 - e. work on equipment that could become hazardous if equipment were unexpectedly energized (LOTO 2)
 - f. all of the above

6. What are users required to complete prior to operating a motion table?
 - a. controlled access training
 - b. crane/forklift/manlift operator training
 - c. reading motion table instructions provided on the FTBF website
 - d. a written request to the FTBF coordinator
 - e. all of the above

7. At FTBF, what should you do if you hear a sitewide severe weather alarm?
 - a. continue working
 - b. go home
 - c. promptly exit to the assembly area outside
 - d. promptly go to the designated shelter areas, which are the FTBF bathrooms
 - e. promptly go to the MTest control room

8. Where can you store a FLAMMABLE liquid (e.g. ethanol, acetone) overnight?
 - a. in a special cabinet designated for flammable liquid storage
 - b. in a toolbox
 - c. it's ok to leave in your work area
 - d. anywhere, as long as it's labeled
 - e. b & c

9. Which of the following statements is FALSE?
 - a. accidental release of some materials (e.g. oil, gasoline, diesel fuel) could become harmful if it is not promptly contained
 - b. the FTBF Building Manager or PPD ES&H personnel should be contacted for disposal of potentially hazardous or unknown chemicals
 - c. one should call ext. 3131 if it is known or suspected that hazardous materials have been spilled or released
 - d. hazardous, potentially hazardous or unknown materials, such as batteries or Kimwipes used with a solvent, may be disposed of through trash cans and dumpsters

10. Radiation dosimeters are required to be worn when:
 - a. making a controlled access
 - b. working with radioactive sources
 - c. in any posted Radiation Area
 - d. all of the above

IV. Signature Page and Training Record

This training is not valid unless the following information is completed:

"I have read the document "**FTBF Hazard Awareness Training Handout**" and understand the hazards present at FTBF facilities. Also, I agree to follow all of the listed work rules and emergency procedures."

Print your name: _____ Fermilab ID #: _____

Division/Section/Affiliation: _____ Department/Group: _____
(Home institution if a User)

Fermilab Phone #: _____ Mail Station: _____

E-mail address: _____

Your Signature: _____

Today's Date: _____ (This training will expire two years from this date)

If not completing training online, please complete this form and return to:

Angela Sands, MS 355

-----FOR ADMINISTRATIVE USE ONLY-----

TRAIN group assignment: _____

Authorization: _____
(Must be signed by PPD ES&H personnel)