



Underground Safety Training

Objectives

- Review the project specific hazards and procedures
- Review the emergency procedures
- View the training video for the operation of the OCENCO M-20 self-rescuer

Specific Hazards

- Material handling in shafts
- Air quality (smoke, fumes and vapors)
- Fire
- Magnetic Field

Material Handling in Shafts

- Only authorized personnel are allowed to operate shaft cranes
- Do not utilize the below ground shaft area for storage
- All personnel must keep clear of the bottom of shafts at all times

Air Quality

- Potential Points of exposure
 - Build up of cutting and welding smoke
 - Chemical spills
 - Compressed gases
- Plan for protection in the Hazard Analysis
 - All compressed gases and chemicals must be approved by the SSO before going underground
 - Monitoring the air, if necessary
 - Increase airflow with portable fans
 - Use portable air filters to eliminate smoke
 - Personal respirator, if necessary

Fire

- Housekeeping is a priority
 - Keep walkways clear and fire doors closed
- Keep fire loading under control
 - Only approved flammables and combustibles allowed underground
- Debris and trash must be removed daily

Magnetic Field

- The Near Detector will have a magnetic field when the coil is energized
- When the coil is energized all employees in the area will be notified by signage and a blinking red light
- People with pacemakers, other medical electronic devices, ferromagnetic metallic surgical implants and coronary stents must stay out of the delineated (red line) area
- In addition, no metallic tools are allowed along the east side of the detector

Sample MINOS Sign



Occupancy Requirements

- MI-65
 - During Maintenance/Installation – 50 Personnel
 - Carrier Tunnel – 4 Personnel
 - During Normal Operations – 8 Personnel
- MINOS
 - During All Operations – 26 Personnel

Note: The twelve stories of stairs in the MI-65 shaft may be the only exit from the underground.

PPE/Work Clothing Requirements

- In the MI-65 and MINOS underground
 - Hardhats at all times due to falling pieces of shotcrete.
 - Shoes that are completely closed and low heeled.
 - Carry a flashlight at all times.
- Additional PPE may be required for specific work or inspection activities.
 - Check Hazard Analysis.

Access Control Procedures

- Key access is required.
- The “two person rule” applies to entry and occupancy in underground areas.
 - Essentially, we do not want anyone working (physical work) alone underground. An individual can enter or leave by themselves when there are other persons underground in their areas.
- Entrants must check in at the entry control panel.
 - Remove an entry pass card, place your Fermi ID on the panel, keep the entry pass with you while underground, upon leaving take your Fermi ID and replace it with entry pass card.

Additional Required Training

- Entering interlock areas (*Target Hall, Pre-Target, Carrier Tunnel, Muon Alcoves, Absorber Hall, and Decay Pipe Walkway*)
 - Controlled Access
 - Rad Worker
 - LOTO 2 (Only for access to Pre-Target, Target Hall, & Carrier Tunnel)
- All other areas (*MI-65 and MINOS Service Building, Absorber Access Tunnel, Near Detector Hall, and Target Hall Support Rooms*)
 - GERT
 - Rad Worker (Target Hall Mechanical Support Room Only)

Access To MI-65

- The service building requires an AC 4 key
- Elevator access key is checked out and returned through the Main Control Room. One access key per person.
- Interlock enclosure (*Target Hall, Pre-Target, Carrier Tunnel, and Decay Pipe Walkway*) access key is located in the Main Control Room
- Place LOTO lock on MI-65 group lock box in MCR for 13.8 Kv transformer prior to entering the interlock enclosure

Access To MINOS

- The service building requires key # A5BB19
- Elevator access key is checked out and returned through MINOS Control Room located on the 12th floor Wilson Hall NW
- One access key per person
- Interlocked Areas (*Absorber Hall, Muon Alcoves, and Decay Pipe Walkway*) access key is located in the Main Control Room

Visitor Access Requirements

- All underground visits and escorts must be approved by the Division SSO
- Limited to two visitors per escort
- Visitors must receive training
 - Review and sign the Visitor Safety Briefing
 - Receive field training on self rescuer
- Visitors must be escorted 100% of the time

Elevator Usage

- Underground access is provided by elevators in MI-65 & MINOS shafts.
- There is a fireman's elevator next to the access elevator in the MINOS shaft. It is used by the fire department in the event of an emergency.
- Close both the interior & exterior doors upon entering and exiting the elevator
- Press **green** button to go up or down

Elevator Usage

- If elevator becomes disabled while in transit call 3131, using the telephone in elevator
- A descent device is located on the ceiling. Instructions are posted. Do not use unless instructed by Fire Department

Underground Utilities

- Laboratory telephones are located throughout both the MI-65 & MINOS underground areas
- Emergency generators operate within 20 seconds after permanent power shuts down (elevators, every third light, shaft cranes and passageway ventilation will be powered)

Emergency Management

- When first entering the underground you should become familiar with:
 - All emergency walkways and exits in your area
 - Location of telephones
 - Location of self rescuers
 - Self rescuers will be stored in marked containers in both shaft areas
 - Location of fire extinguishers
 - Mounted on walls near the shafts

Emergency Management

- Types of potential emergency situations
 - Fire/Explosion
 - Smoke
 - Loss of permanent power
 - Loss of ventilation system, lighting, elevator or fire detection

Emergency Management

- If you have to call an emergency in due to an injury or any other emergency where the alarms have not sounded, immediately call 3131.
 - Give your name.
 - Give your location(state you are underground).
 - Give the nature of the emergency.
- Verify all the information is understood.
- Evacuate immediately if necessary.

Emergency Management

- MI- 65 Site
 - Primary emergency egress is the stairwell
 - Secondary emergency egress is the elevator
- MINOS Site
 - Primary emergency egress is the access elevator
 - Secondary is the MI-65 elevator or emergency stairwell

Emergency Management

- Emergency evacuation of underground
 - Upon hearing fire alarms or other notification declaring an emergency, immediately go to the shaft area and evacuate
 - Utilize the emergency passageways during evacuation to shaft (Equipped with independent positive pressure ventilation system)
- After evacuating to surface report to the service building parking lot and check in with your supervisor or Fire Department

Emergency Management

- Alternate means of emergency egress
 - MI-65
 - If the stairwell and elevator are blocked, take the Decay Pipe Walkway to the MINOS shaft.
 - If the stairwell, elevator and Decay Pipe Walkway are inaccessible then proceed through the Carrier Tunnel to the Main Injector
 - MINOS
 - If the elevators are inaccessible, then proceed through the Decay Pipe Walkway to the MI-65 shaft, continue to the Main Injector if necessary.
 - Always notify the Fire Department (call 3131) before proceeding in the Decay Pipe Walkway

Tornado Emergency

- Personnel located underground shall remain underground, as directed, during the emergency
- Personnel in the MI-65 or MINOS Service Buildings shall proceed to the Tornado Shelter
 - The MI-65 shelter is the interior hallway between the electrical and fire protection rooms
 - The MINOS shelter is the small interior mechanical room located on the north end of the service building

Self Rescuer

- OCENCO M-20 SCSR
 - A compressed oxygen, self-contained self-rescuer (SCSR)
 - It will instantly provide breathable air independent of the surrounding atmosphere when donned correctly
 - To be used for escape use only and lasts 15 to 20 minutes.
 - You must take the Ocenco M-20 SCSR with you whenever you enter the Decay Pipe Walkway

When Self Rescuer is Used

- When a fire or explosion creates excessive smoke or carbon monoxide
- Whenever you have difficulty breathing due to air contaminants

Note: Self rescuers are stored in marked containers next at the bottom of the MI-65 and MINOS shafts. Additional rescuers are located at the fire door leading to the Absorber Hall

Self Rescuer

OCENCO M-20 Self-contained Self-rescuer Training Video



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