Safe Work Authorized Procedures-SWAP

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Objectives

By the end of this presentation, each participant should be able to:

- Explain the concept of safe work authorized procedures (SWAP) for confined spaces and other operations
- Give examples of when SWAP can be applied
- Explain when SWAP cannot be used

OSHA Permit Space Regulation

Occupational Safety and Health Administration "Permit-required confined spaces" standard, 29 CFR 1910.146

- **Permit-required confined space (permit space) - a confined space that has one or more of these characteristics:**
  - (1) Contains or has the potential to contain a hazardous atmosphere;
  - (2) Contains a material that has the potential for engulfing an entrant;
  - (3) Has an internal configuration such that an entrant could be trapped…..or
  - (4) Contains any other recognized serious safety or health hazard.
- **1910.146 (c)(7) allows reclassification from a permit space to a non-permit space if the only hazards are non-atmospheric and all hazards are eliminated**

ANSI Consensus Standard

American National Standards Institute, ANSI Z117.1 - 2009 "Safety Requirements for Confined Spaces", Section #4

- Addresses entry into non-permit confined spaces
- Outlines steps (i.e., SWAP) employer must take to ensure employees safely enter and exit non-permit spaces, such as:
  - The conditions, precautions & procedures that must be followed
  - Requirements for employee training on procedures, possible hazards & precautions of the space and when to exit the space
  - Atmospheric testing requirements must be specified
- Affords employees an extra measure of protection when entering spaces with few or no identified serious hazards

Examples Using SWAP

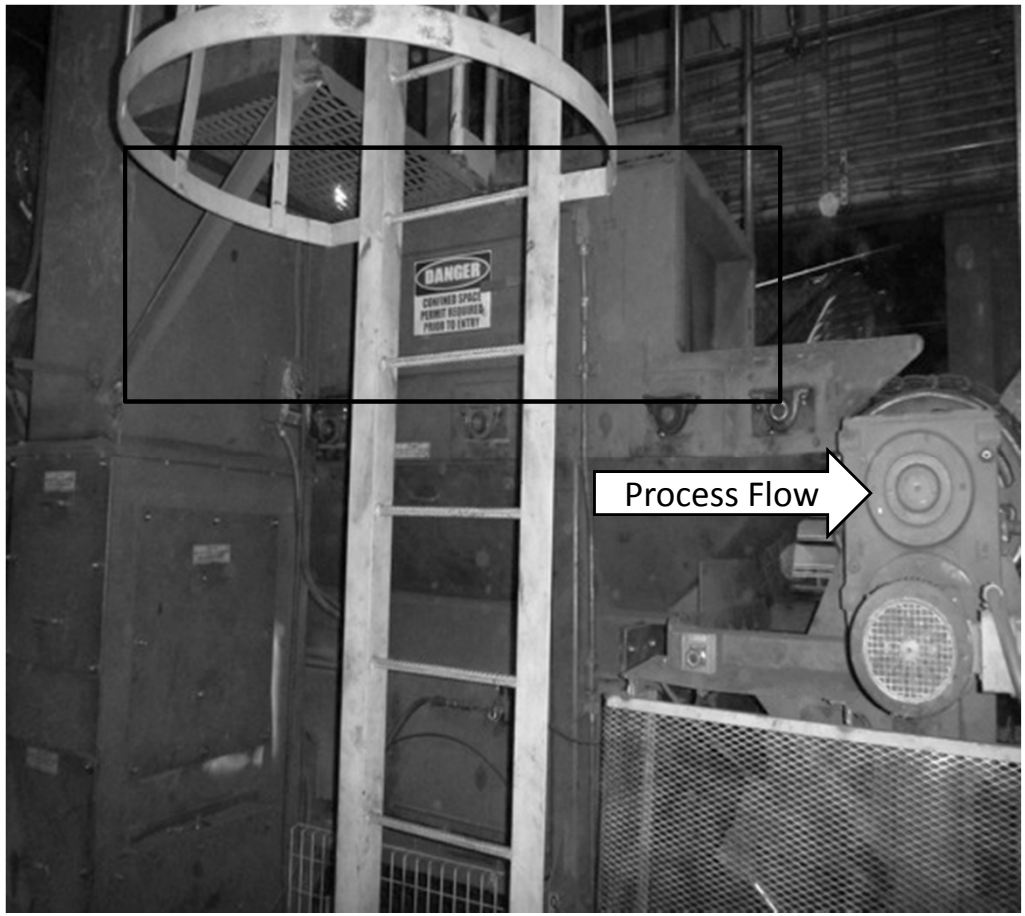
The following are classified as permit spaces; however, they can be reclassified to non-permit spaces by implementing Lockout/Tagout (LOTO) procedures

- Shot Blast Tunnel
- Cooling Towers
  - Ground Level and Elevated
- Shot Blast Room
- Preheat Oven Room
- Conveyor Pit in Crane Bay (engineered not to be a CS)

Shot Blast Tunnel

Employees enter to conduct inspections, unjam parts, service abrasive blasting nozzles, clean shot and metal material

- **Hazards include:**
  - Shot blast force from abrasives
  - Rotating parts moving the conveyor
  - Entrapment under chain conveyor



Shot Blast Tunnel (cont'd)

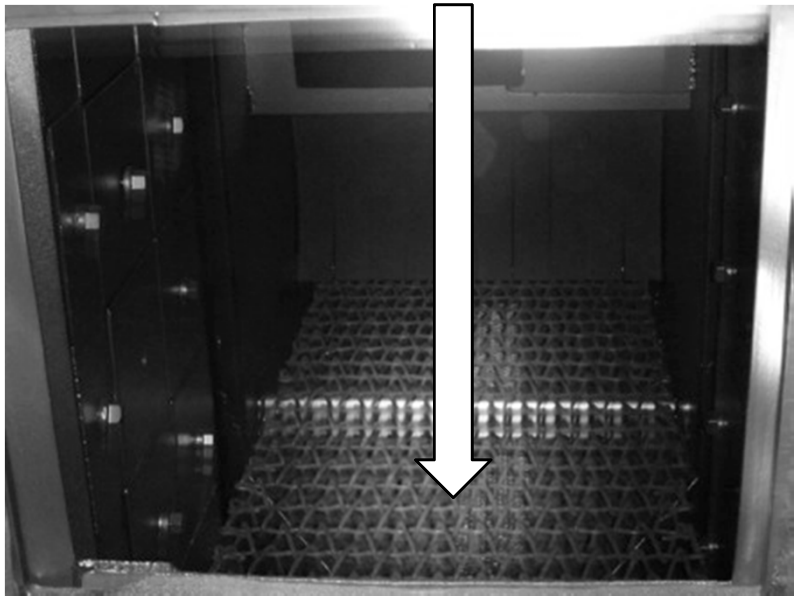
Entry portal - closed

Entry portal - opened

Shot Blast Tunnel (cont'd)

- If employees enter and conduct activities above the chain conveyor the space can be reclassified
- If activity involves below the chain conveyor, it is a full permit entry due to entrapment hazard

Chain conveyor



Start of process flow through tunnel

Shot Blast Tunnel SWAP

- The area supervisor must:
  - Complete and sign a document/form* certifying there are no atmospheric hazards and the non-atmospheric hazards have been eliminated (Lockout is considered elimination)
  - Ensure all required procedures are being followed by employees entering the shot blast tunnel
  - Ensure employees are properly trained and equipped
  - Monitor for non-compliance of SWAP and ensure employees leave area if procedures/conditions are not met

**Requirement of OSHA 29 CFR 1910.146 (c)(7)(iii)*

Shot Blast Tunnel SWAP (cont'd)

- Employees must:
  - Use the buddy system for entering
  - Test the air with a calibrated 4-gas meter prior to entry
  - Follow Lockout/Tagout (LOTO) procedures for the shot blast system and chain conveyor
  - Use approved (for Class II locations) lighting and equipment
  - Use Ground Fault Circuit Interrupters (GFCI) when working with electrical portable tools and lighting
  - Wear required Personal Protective Equipment (PPE)

    Note: N95 dust mask is recommended
  - Inform area supervisor when starting and finishing job

Ground Level Cooling Tower

Employees enter to conduct inspections, clean equipment, make adjustments, remove and replace fan

- **Hazards include:**
  - Electrical energy to fans and other internal equipment
  - Engulfment due to water supply to unit and standing water in catch trays

Ground Level Cooling Tower (cont'd)

Lower access

Upper fan area

Water trough
1 foot deep

Ground Level Cooling Tower SWAP

- The area supervisor must:
  - Complete and sign a document/form* certifying there are no atmospheric hazards and the non-atmospheric hazards have been eliminated
  - Ensure all required procedures are being followed by employees entering the cooling tower
  - Ensure employees are properly trained and equipped
  - Monitor for non-compliance of SWAP and ensure employees leave area if procedures/conditions are not met

**Requirement of OSHA 29 CFR 1910.146 (c)(7)(iii)*

Ground Level Cooling Tower SWAP (cont'd)

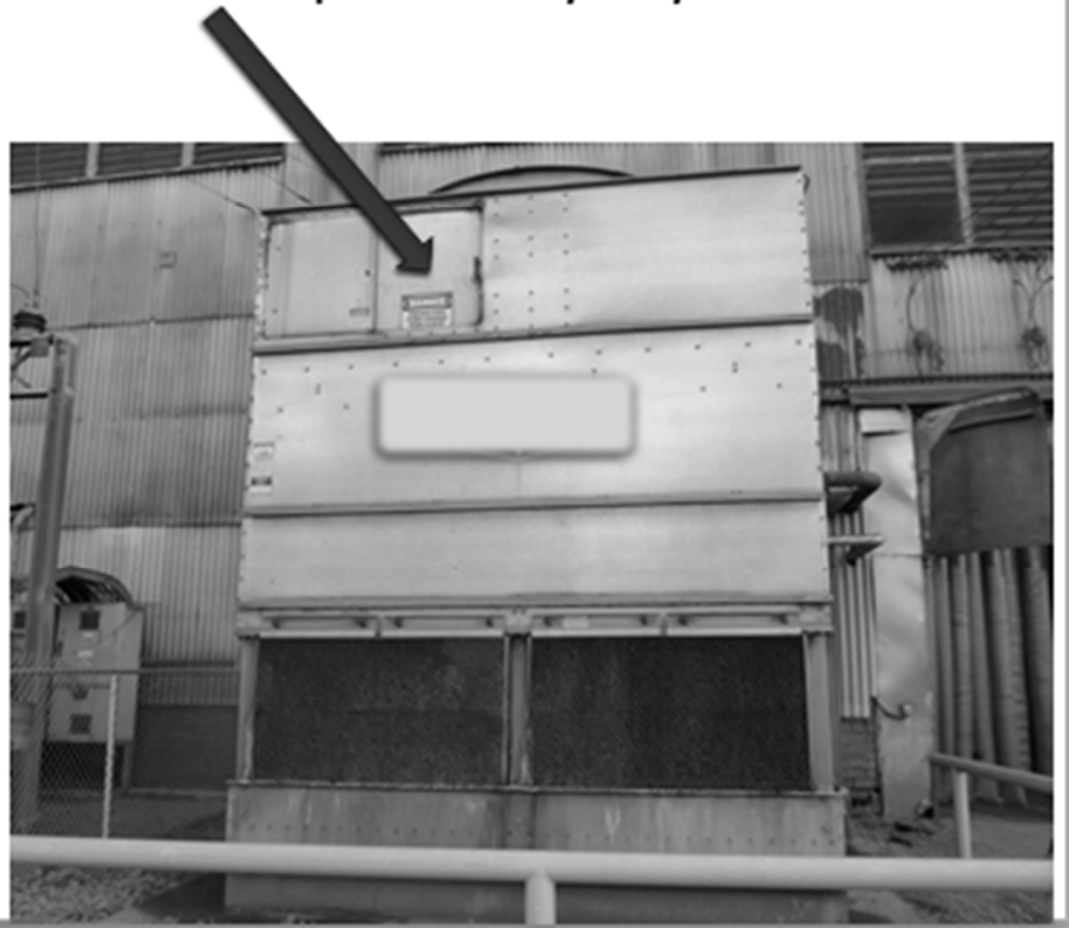
- Employees must:
  - Use the buddy system for entering
  - Wear required PPE

    Note: N95 dust mask is recommended
  - Use GFCI when working with electrical portable tools and lighting
  - Inform area supervisor when starting and finishing job

Elevated Cooling Tower

Employees enter to conduct inspections, clean equipment, make belt adjustments, remove and replace fan

- **Hazards include:**
  - Electrical energy powering fans
  - Engulfment
  - Water supply to cooling grids
  - Water in catch trays



Elevated Cooling Tower (cont'd)

Front view showing entryway to a different cooling tower

Back view showing entryway

Elevated Cooling Tower SWAP

- The area supervisor must:
  - Complete and sign a document/form* certifying there are no atmospheric hazards and the non-atmospheric hazards have been eliminated (Lockout is considered elimination)
  - Ensure all required procedures are being followed by employees entering the cooling tower
  - Ensure employees are properly trained and equipped
  - Monitor for non-compliance of SWAP and ensure employees leave area if procedures/conditions are not met

**Requirement of OSHA 29 CFR 1910.146 (c)(7)(iii)*

Elevated Cooling Tower SWAP (cont'd)

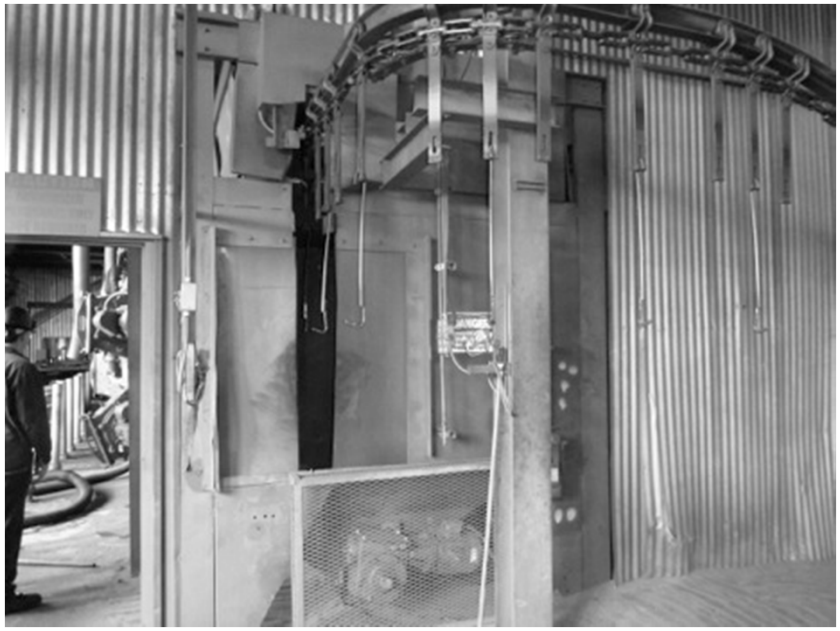
- Employees must:
  - Use the buddy system for entering
  - Wear required PPE
  - Apply LOTO to fans
  - Drain water in catch trays or adequately cover trays
  - Use GFCI when working with electrical portable tools (e.g., drills) and lighting
  - Inform area supervisor when starting and finishing job

Shot Blast Room

Employees enter to conduct periodic inspections, clean equipment, make adjustments, unjam conveyor, replace blast nozzles

- **Hazards include:** moving parts, walking surfaces, hooks and abrasive blasting

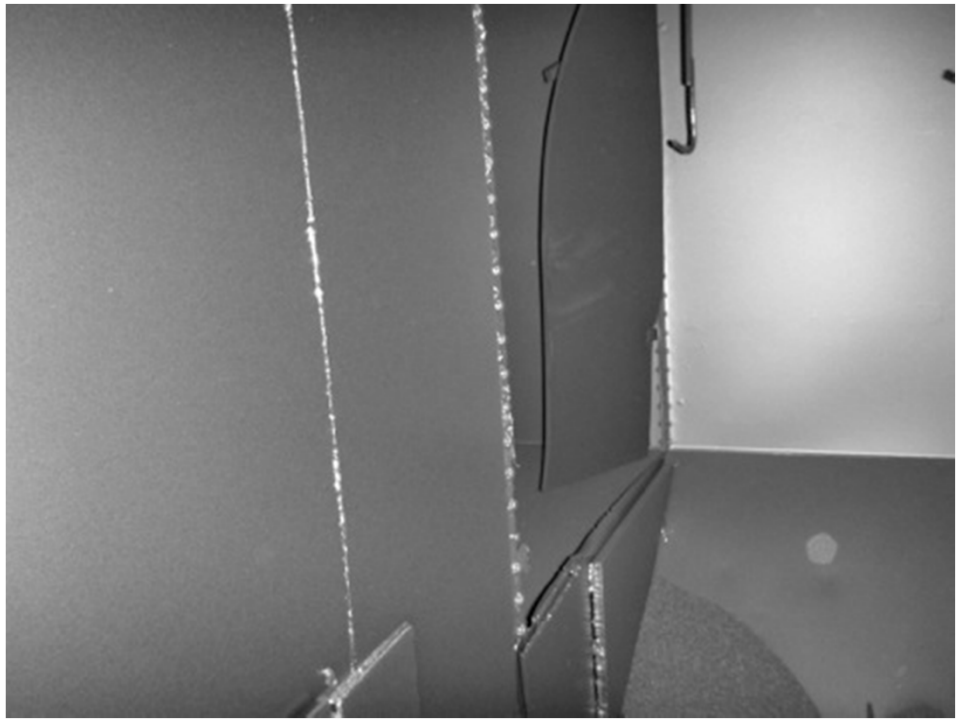
Conveyor hooks inside blast area



One entry door into confined space

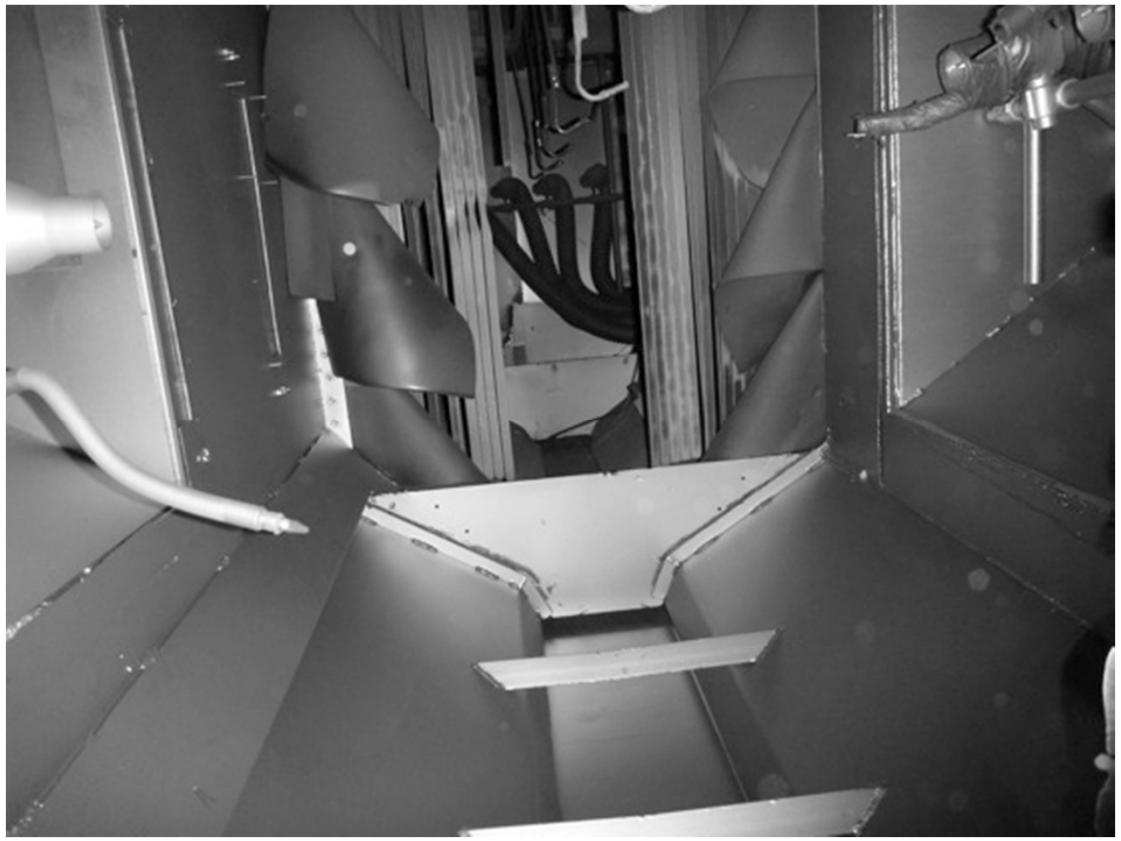
Shot Blast Room (cont'd)

Conveyor hooks and inside sloped surfaces



Shot Blast Room (cont'd)

View inside showing conveyor hooks and sloped surfaces



Shot Blast Room SWAP

- The area supervisor must:
  - Complete and sign a document/form* certifying there are no atmospheric hazards and the non-atmospheric hazards have been eliminated (Lockout is considered elimination)
  - Ensure all required procedures are being followed by employees entering the shot blast room
  - Ensure employees are properly trained and equipped
  - Monitor for non-compliance of SWAP and ensure employees leave area if procedures/conditions are not met

**Requirement of OSHA 29 CFR 1910.146 (c)(7)(iii)*

Shot Blast Room SWAP (cont'd)

- Employees must:
  - Lockout all electrical, and mechanical energy sources
  - Use the buddy system
  - Open up all the doors going into the shot blast room and keep them open during work
  - Monitor the air using a calibrated 4-gas meter prior to entry
  - Use dust ignition proof lights & equipment approved for Class II locations and use GFCIs when working with portable electrical power equipment and lighting
  - Be aware of heat stress and leave area if necessary
  - Use required PPE (Note: N95 dust mask is recommended)
  - Inform area supervisor when starting and finishing job

Preheat Oven Room

Employees enter to inspect, clear jams, retrieve fallen parts adjust conveyor track

- **Hazards include:**
  - Heat stress
  - Moving parts on conveyor hooks

No atmospheric hazards have ever been recorded

Preheat Oven Room (cont'd)

Photo showing hooks holding parts exiting the preheat oven room into paint powder coat room

Preheat Oven Room SWAP

- The area supervisor must:
  - Complete and sign a document/form* certifying there are no atmospheric hazards and the non-atmospheric hazards have been eliminated (Lockout is considered elimination)
  - Ensure all required procedures are being followed by employees entering the preheat oven
  - Ensure employees are properly trained and equipped
  - Monitor for non-compliance of SWAP and ensure employees leave area if procedures/conditions are not met

**Requirement of OSHA 29 CFR 1910.146 (c)(7)(iii)*

Preheat Oven Room SWAP (cont'd)

- Employees must:
  - Use the buddy system for entering
  - Test the air with a calibrated 4-gas meter prior to entry
  - Follow LOTO procedures for conveyor
  - Use GFCIs when working with electrical portable tools and lighting
  - Wear required PPE (Note: N95 dust mask is recommended)
  - Allow oven to cool to an acceptable level before entry
  - Follow supervisor's recommendations
  - Inform area supervisor when starting and finishing job

Conveyor Pit

Employees enter to adjust conveyor belt, clean out fallen scrap, unjam material on conveyor belt

- **Hazards include:**
  - Mechanical parts and falling parts
  - Entrapment
  - Rotating parts from conveyor

Entryway to pit via fixed ladder

Conveyor Pit (cont'd)

- Redesign conveyor pit by adding:
  - Industrial stairs to replace the fixed ladder
  - Lights
  - A small ventilation fan to circulate the air
  - Signage requiring a SWAP prior to entry

Conveyor Pit (cont'd)

Remove fixed ladder used for access to pit

Conveyor Pit (cont'd)

- After engineering controls are in place:
  - Remove DANGER permit-required confined space sign
  - Replace with safe work authorized procedures sign (SWAP required)

Conveyor Pit SWAP

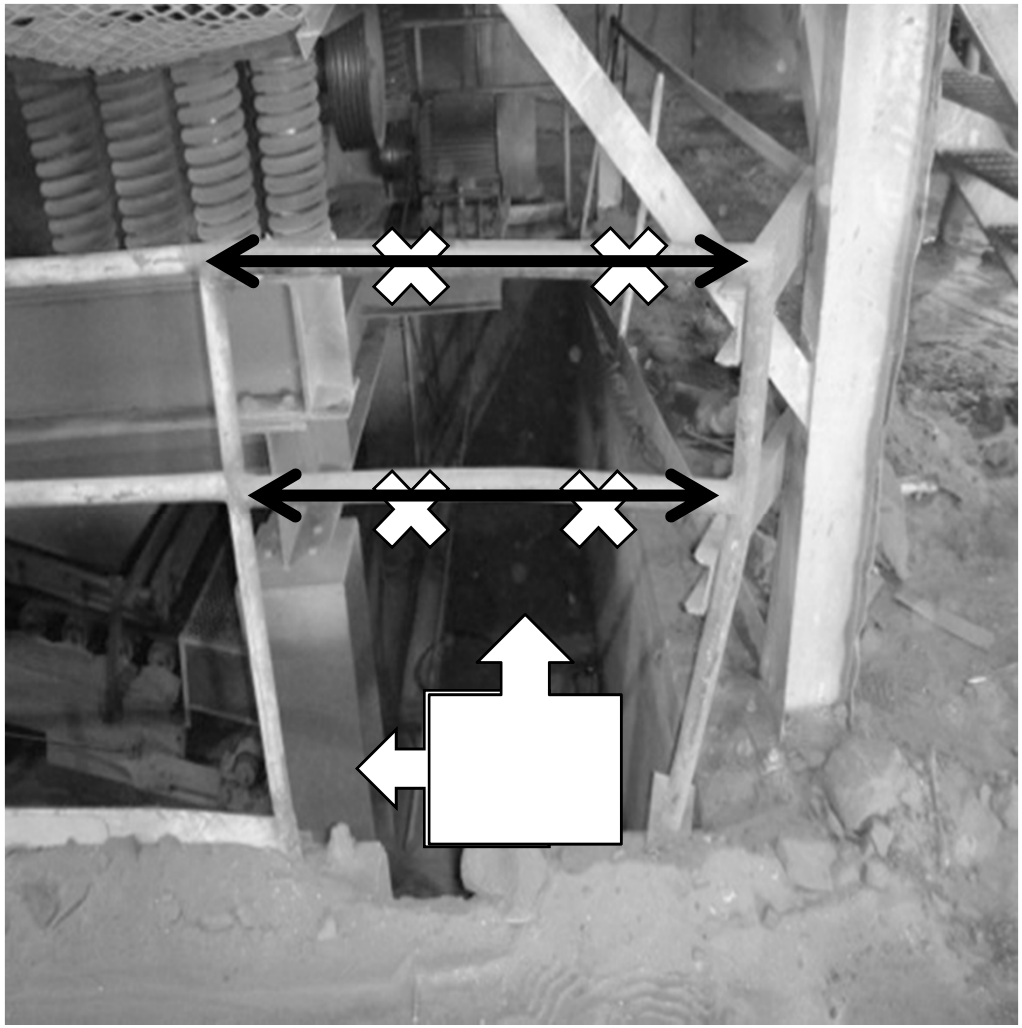
- The area supervisor must:
  - Verify that lockout procedures have been followed to de-energize the conveyor system
  - Ensure all required procedures are being followed by employees entering the conveyor pit
  - Ensure employees are properly trained and equipped
  - Monitor for non-compliance of SWAP and ensure employees leave area if procedures/conditions are not met
  - Ensure employees are protected from forktruck and scrap unloading truck traffic

Conveyor Pit SWAP (cont'd)

- Employees must:
  - Inform area supervisor when starting and finishing job
  - Use the buddy system
  - Test the air with a calibrated 4-gas meter prior to entry
  - Follow LOTO procedures to de-energize the conveyor systems moving parts
  - Inform crane operator of work activities and set up protective barriers
  - Use GFCI when working with electrical portable tools and lighting
  - Wear required PPE (N95 dust mask is recommended)

Conveyor Pit (cont'd)

- To replace ladder without blocking access to work areas:
  - Install a landing halfway down
  - Continue stairs in two directions



NEVER Use SWAP When…

- **Hazards cannot be eliminated**
- **The permit space has to be ventilated to control atmospheric hazards**
- **The permit space has too many hazards or unknown hazards**

IMPORTANT!

SWAP are designed to ensure maximum safety with minimum personnel and are <u>not</u> intended to replace the permit system

Conclusion

SAFE WORK AUTHORIZED PROCEDURES can be used for entry into spaces:

- That meet the definition of a confined space but do not have serious hazards to qualify it for a permit space
- That meet the definition of a permit space but all hazards have been eliminated
- For any routine or non-routine task that needs a set of procedures signed off by management to ensure it is done safely

BOTTOM LINE: <u>ALWAYS PROTECT EMPLOYEES BY HAVING COMPLETE, CONSISTENT CONTROL DURING ENTRY ACTIVITIES</u>