Confined Space

Definition

- A Confined Space
  - Is large enough and so configured that an employee can enter & perform assigned work
  - Has limited/restricted means for entry or exit
  - Is not designed for continuous employee occupancy

PERMIT REQUIRED

- A Permit Required Confined Space has one or more of the following characteristics:
  - Contains or has a potential to contain a hazardous atmosphere
  - Contains a material that has the potential for engulfing an entrant
  - Has an internal configuration such that an entrant could be trapped or asphyxiated by inwardly converging walls or by a floor which slopes downward and tapers to a smaller cross-section
  - Contains any other recognized serious safety or health hazard
  - IDLH – Immediately Dangerous to Life or Health
CONFINED SPACES

IF YOU SEE THIS SIGN
DO NOT ENTER
ONLY TRAINED AND AUTHORIZED PERSONAL CAN ENTER A CONFINED SPACE

HAZARDS OF CONFINED SPACES

- Atmospheric
- Physical Configuration
- Mechanical
- Electrical
- Thermal
- Noise
- Vibration
- Engulfment or Entrapment
CONFINED SPACE FATAL ACCIDENTS

- 35% Supervisor or Higher
- 64% Did not need to enter
- 66% Water / Wastewater / Sewer / Construction
- 78% Oxygen deficient or IDLH toxic
- 95% No confined space training
- 100% No (or inadequate) powered ventilation
- 100% No instrument at site (to measure hazardous atmosphere)
- Fatal accidents due to rescue attempts is high

Safety

- All entrants, supervisors and entry attendants must be fully qualified and trained
- Do not enter into a confined space if not authorized to do it
- Some confined spaces require an entrance permit
- All confined spaces should be treated virtually the same at the beginning.
- Assumptions can be and are often times fatal
- No gas cylinders inside a confined space

Safety

- Assume that the most unfavorable situation exists in every case until proven otherwise
- Spaces may need extensive pre-cleaning and re-cleaning.
- If involved in confined space operations, follow all provisions of the company's written confined space program.
- Open all manholes for ventilation.
Safety

- All confined space atmospheres must be considered dangerous until it can be verified otherwise.
- Less than 19.5% oxygen can kill.
- Confined spaces may contain gases that will explode or kill you.
- An attendant should be always on duty when an employee is inside a confined space.
- Ask your supervisor about confined spaces at your plant.

Cylinders in a Confined Space

Acetylene cylinder inside vehicle over the weekend. When the worker opened the door, an undetermined spark source (the door light switch, light bulb, cellular phone, static etc.) ignited the mixture.

Atmospheric Hazards

- Oxygen Deficient Atmospheres
- Oxygen Enriched Atmospheres
- Flammable Atmospheres
- Toxic Atmospheres
- Corrosive Atmospheres
- Asphyxiating Atmospheres
ATMOSPHERIC HAZARDS

OXYGEN LEVEL BELOW 19.5%
Reduction of oxygen in a confined space may be the result of either consumption or displacement.

OXYGEN LEVEL ABOVE 23%.
- Causes flammable and combustible materials to burn violently when ignited. Never use pure oxygen to ventilate. Never store or place compressed gas tanks in a confined space.

ATMOSPHERIC HAZARDS

- Flammable Atmospheres
  - Contain Flammable Gas, Vapor or Dust which can ignite.
- Toxic Atmospheres
  - Contain toxic gases such as carbon monoxide.
- Corrosive atmospheres
  - Cause skin exposure reactions and damage to your nervous system through skin absorption or breathing.

OTHER HAZARDS

- Physical configuration
  - Wet or slippery surfaces
  - Uneven bottoms
  - Bends in tunnels
  - Narrow areas that can entrap workers
  - Poor lighting
- Mechanical
  - Paddles - Blades - Shafts - Chain or belt drives
  - All equipment must be Locked and Tagged before entry
OTHER HAZARDS

- Electrical hazards
  - Broken lighting
  - Electrical sensing devices
  - Limit switches
  - Level indicating devices
  - Hazards from equipment taken inside

- High and low temperature hazards
  - Burns, Frostbite, Heat Stress

OTHER HAZARDS

- Engulfment hazards
  - The entrapment of a person by the contents of a space
  - Completely empty the contents before entry

- Noise hazards
  - Eliminate noise sources prior to entry
  - Use proper hearing protection

- Vibration hazards
  - Vibration can cause damage to the body
  - Eliminate equipment vibrations prior to entry
  - Use vibration dampening tools & gloves

TESTING THE ATMOSPHERE

- Verify presence of safe work atmosphere.
  - Calibrate Air Monitoring Equipment before use
  - Test all areas of a confined space
    - Top, Middle, Bottom
    - Check for Explosive & Toxic Gases
    - Check Oxygen level
  - Record all readings
VENTILATION

- Consider best of exhaust or supply or both
- Provide work zone exhaust if welding
- Plan ventilation supply and exhaust paths
- Ensure no "re-circulation" of air supply
- Use continuous ventilation
- Retest the confined space before and during entry

Disclaimer

As a committee of a national organization, the Safety, Health & Environmental Committee of NPCA must reference federal standards. However, users of this information are informed that state and local agencies may have more stringent standards than those cited here. It is the users responsibility to ensure that the federal standards referenced herein are applicable in their locale. If more stringent standards apply locally, you must adhere to those local requirements.

Disclaimer

This publication is designed to provide accurate and authoritative information in regard to the subject matter covered; however, National Precast Concrete Association acts as mediator without approving, disapproving, or guaranteeing the validity or accuracy of any data, claim or opinion appearing herein. Information is provided and disseminated with the understanding that National Precast Concrete Association does not assume and hereby disclaims liability to any person for any loss or damage caused by errors or omissions in the material contained herein, regardless of whether such errors result from negligence, accident, or any other cause whatsoever.