# Spring Thaw 2018

# CALCIMA

## California Construction and Industrial Materials Association

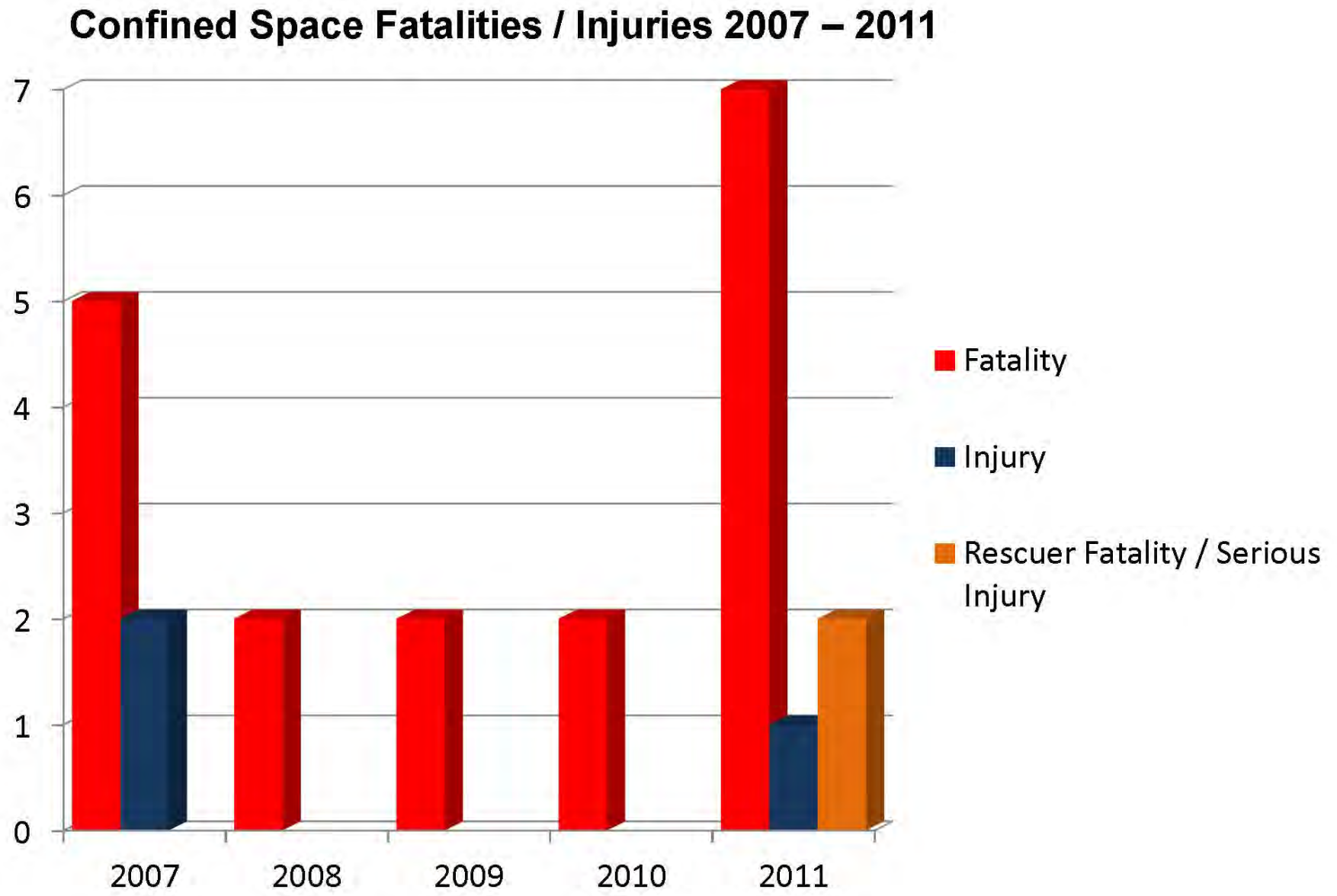
**Ontario February 27** **Sacramento March 13**

# Confined Space Regulations: A Quick Review

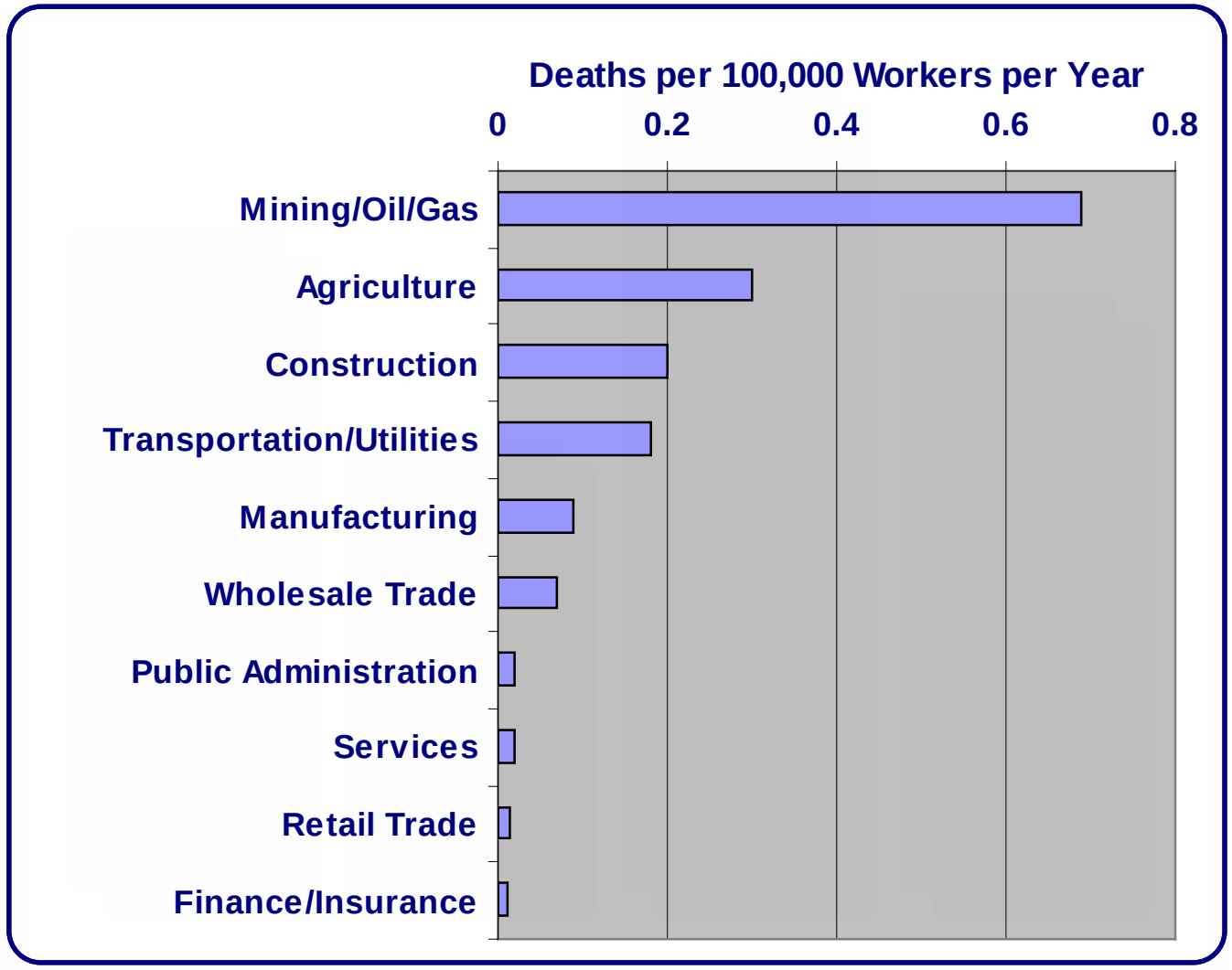
Zohra Ali, MS
Cal/OSHA Senior Safety Engineer

CalCIMA Spring Thaw 2018
Ontario – February 27, 2018
Sacramento – March 13, 2018

# California Confined Space Fatalities



# Confined Space Fatalities by Industry




*Rates of Confined-Space Deaths by Industry (NIOSH, 1980-1989)*

# Confined Space Emphasis Program: Different Confined Space Regulations

**Article 37. Confined Spaces in Construction, 1950-1962**

**5157** Permit Required Confined Space

**5158** Other Confined Spaces

**5178** Grain Handling Facilities

**8616** Telecommunication Vaults

**8355** Ship Building, Repairing, Breaking

# Permit-Required Confined Spaces: Definitions

(b) Confined Space:

1. Is large enough to enter; and
2. Has limited/restricted means of entry or exit; and
3. Is not designed for continuous EE occupancy

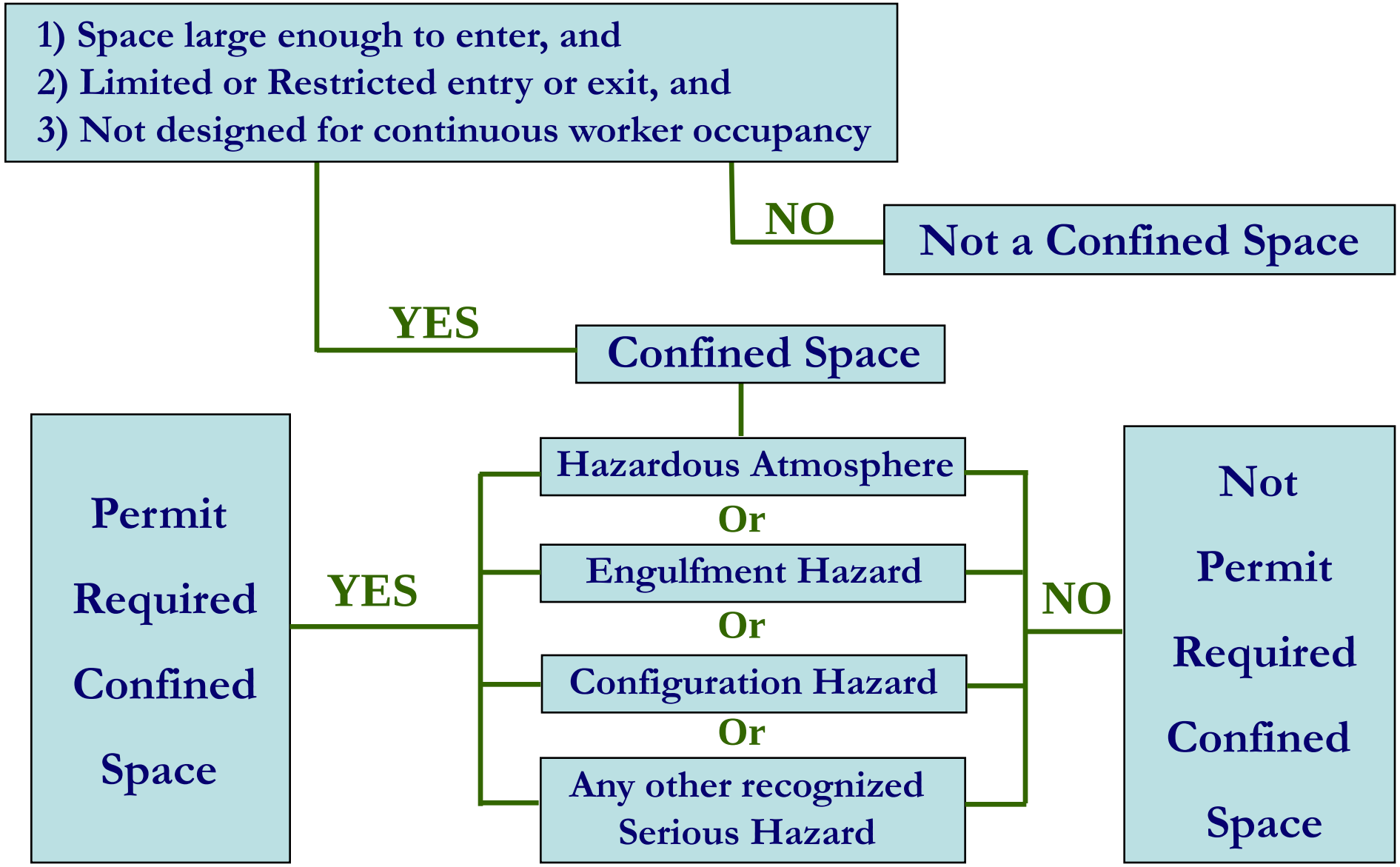
# Permit-Required Confined Space

One or more of the following:

- **Hazardous atmosphere**
  - ✓<19.5% Oxygen
  - ✓> 23.5% Oxygen
  - ✓**>10%** LEL (G/V)
  - ✓**=/> 100%** LEL (Dust)
  - ✓ IDLH
  - ✓ >PEL (Acute)

- **Energy sources**
  - ✓electrical
  - ✓mechanical
  - ✓hydraulic
  - ✓pneumatic, etc.
- Other
  - ✓ steam
  - ✓ corrosives, etc.
- Engulfment
- Entrapment

# Categorizing Work Spaces



# Confined Space Recognition

## How many of you have any Confined Spaces on your property?

## Any Permit Required Spaces?

## Confined spaces such as:

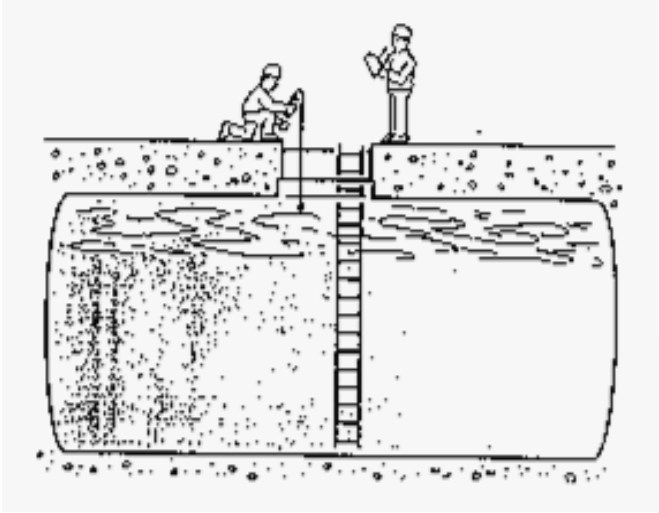
**Silos, tanks, vats, vessels, boilers, compartments, ducts, sewers, pipelines, vaults, bins, hoppers, tubs, and pits.**

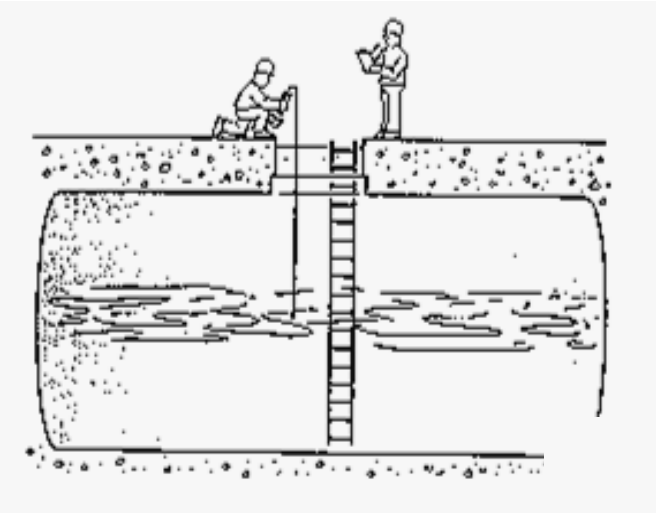
# Confined Space Identification

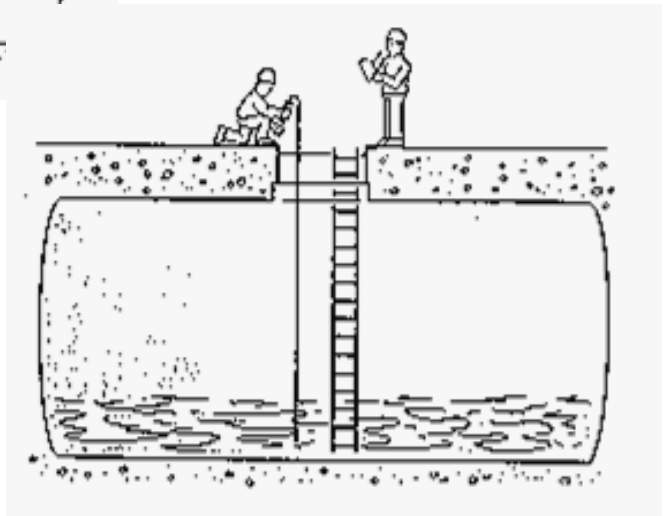

# Causes of Hazardous Atmospheres

- Product stored in a confined space:
  - Gases released when cleaning.
  - Materials absorbed into walls of confined space.
  - Decomposition of materials in the confined space.
- Work performed in a confined space:
  - Welding, cutting, brazing, soldering.
  - Painting, scraping, sanding, degreasing.
  - Sealing, bonding, melting.
- Areas adjacent to a confined space. Piping connections. Leaks.

# Confined Space Hazards







**Check ALL areas of the Confined Space for Atmospheric Hazards**

# Confined Space Recognition

# Confined Space Recognition

# Confined Space Recognition

# Confined Space Recognition

# Confined Space Recognition

# SAMPLE CONFINED SPACE ENTRY PERMIT

**PERMIT REQUIRED** **NON-PERMIT REQUIRED** **ENCLOSED SPACE**

## PART I General Information

Date _____ Time _____ Space To Be Entered _____

Location/Building _____

Purpose of Entry _____

PWO Number _____ Work Permit Number _____

Date/Time Permit Expires _____

## PART II Pre-Entry

Emergency Point of Contact _____

Means of Notification Phone, # _____

Radio, Call ID _____

Suspected Atmospheric Contaminant _____

Suspected Flammable Gas, Vapor, Dust _____

Material Previously Stored/Processed Within Space _____

Materials To Be Utilized During Entry _____

## PART III Atmospheric Test Results (** Test Results After Ventilation)

| Elements of Test | PEL | Test Results | Date/Time | ** Test Results | Date/Time |
|---|---|---|---|---|---|
| % Oxygen | -19.5 23.5% | | | | |
| % LEL | ≥ 10 % | | | | |
| Carbon Monoxide | 35 PPM | | | | |
| Hydrogen Sulfide | 10 PPM | | | | |
| Sulfur Dioxide | 5 PPM | | | | |
| Ammonia | 25 PPM | | | | |

Test Instrument _____ ID # _____ Calibration Date _____

# Physical Hazards (Entrapment)

## Entrapment Examples include:

Accidental dumping of a product on a worker, pulling of product from under a worker, and a worker walking or standing on unstable material.

Such unstable materials could conceal a void underneath that gives way under the weight of the worker, resulting in engulfment.

Any bin, hopper, or pile of granular material may look harmless, however the center of the material may collapse suddenly.

## Article 15. Vats, Pans, Bins, Bunkers, Hoppers, and Similar Containers and Vessels

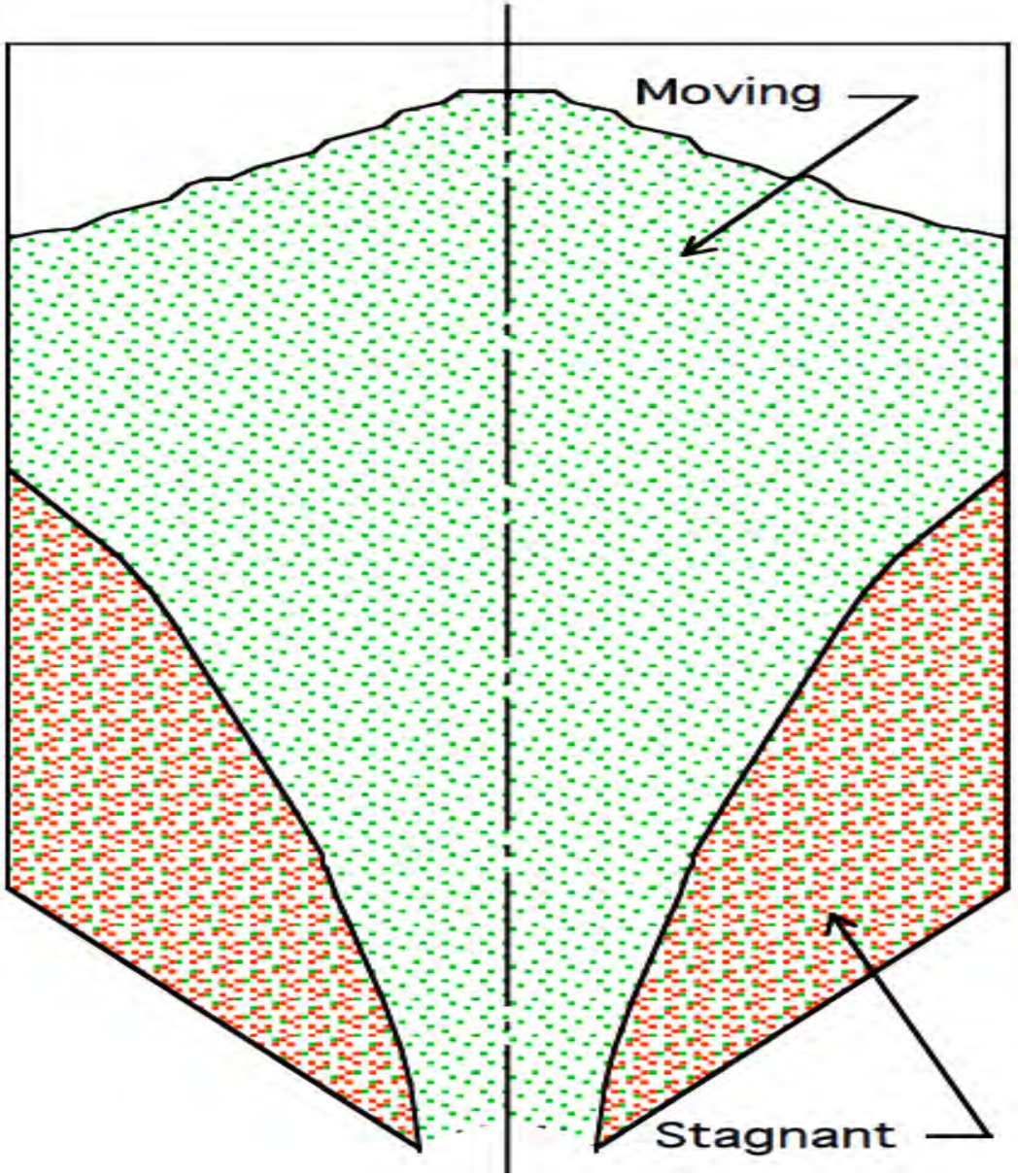
# §3482 Bulk Storage of Loose Material.

(a) No employees shall be permitted to work on or over loose material, or attend an employee working on or over loose material, until they have been instructed in the hazards involved and the precautions that must be taken to prevent employees from being caught in caved-in material.

(b) Fuel houses, silos, bins, bunkers, hoppers and similar structures shall be so constructed or equipped with tunnels, chains, mechanical diggers, vibrators or other effective means of removing material so that employees are not required to work where there is a possibility of being engulfed or having their bodies entrapped by a cave-in; or platforms or walkways shall be provided and employees shall remain upon such platforms or walkways while working over loose material within such structures unless protected as required in Section 3482(c) or (d).

(c) When construction as required in Section 3482(b) is impractical and in existing installations, when the design permits, a manually powered hoist with an operator shall be provided. The hoist shall be capable of supporting and lifting an employee and tools and equipment.

# Funnel Flow in Bins and Hoppers



# Four Minute Rule

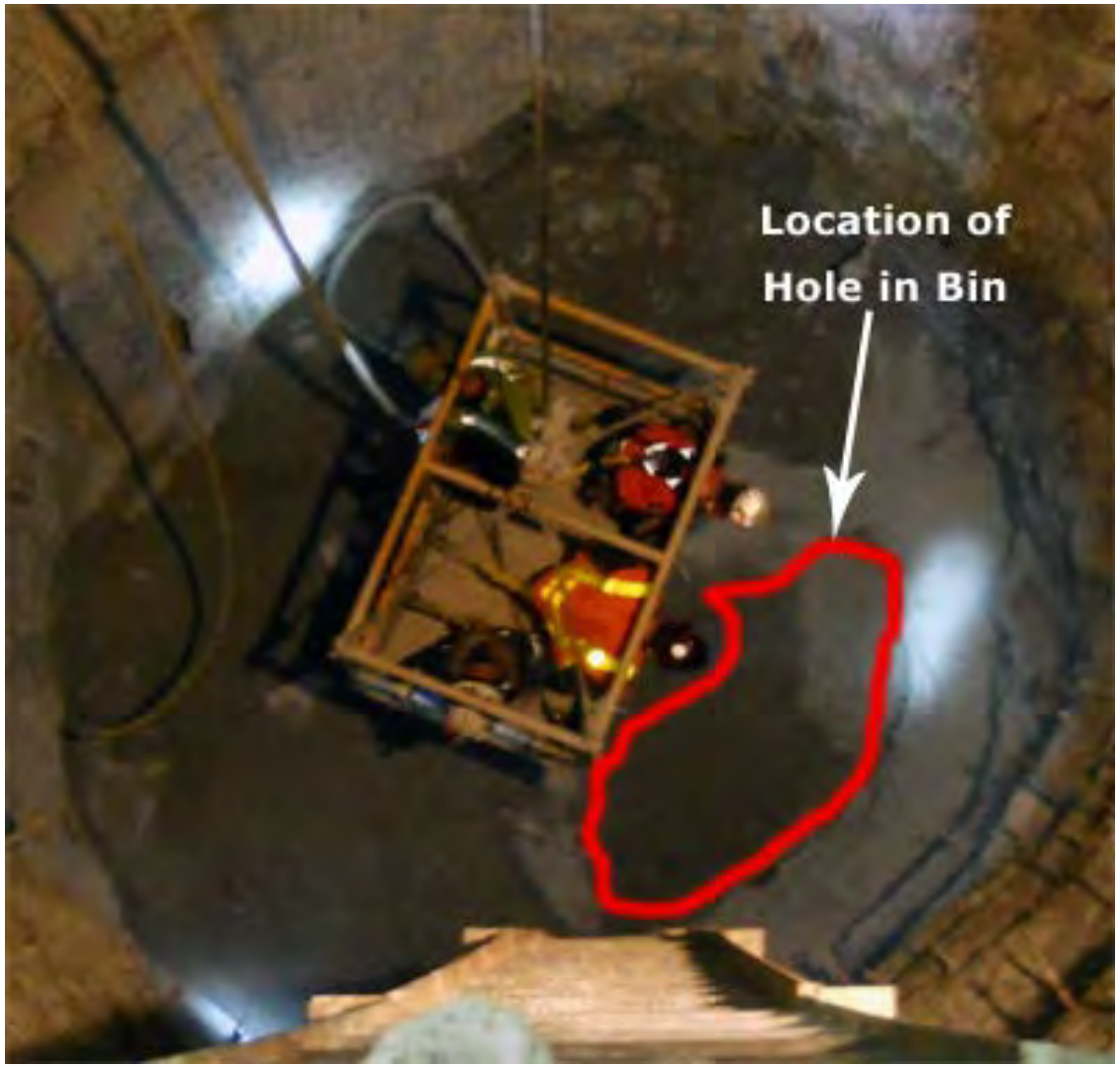
# Confined Space Fatalities

**More than 60% of Confined Space fatalities occur among would-be rescuers.**

# Asphyxiation - Idaho

## Silver Ore

## Hecla Limited - Lucky Friday




On November 17, 2011, a 26 year-old contract underground miner with 3.5 years of experience was seriously injured in a silver mine. He died at a hospital on November 19, 2011. The victim and a coworker were attempting to dislodge muck in a bin excavation when the muck they were standing on started to flow. The victim was wearing a safety harness attached to a self-retracting lanyard; however, the lanyard extended and did not lock before he became engulfed. The other miner was freed immediately, treated, and released from the hospital.

# Asphyxiation - Washington

## Sand and Gravel

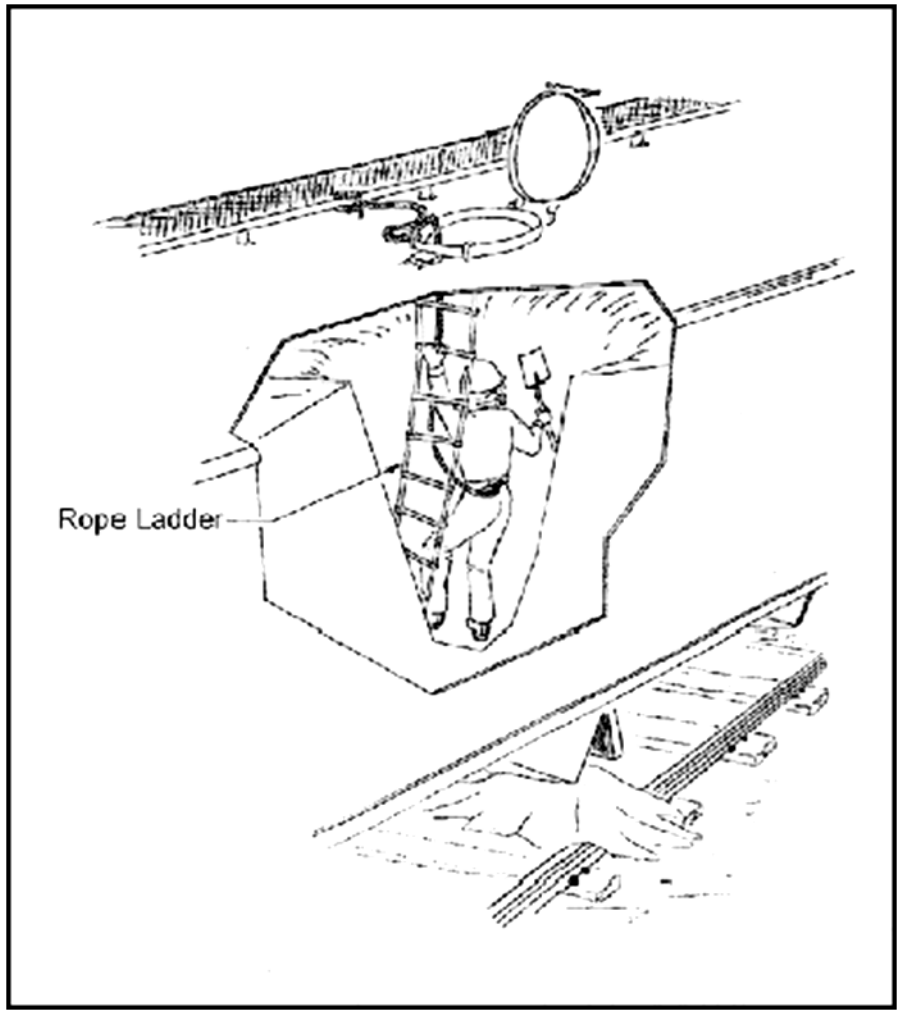
## Cagi Portable Wash Plant

On December 4, 2001, a 52-year-old laborer with 5 years mining experience was fatally injured at a sand and gravel operation. The victim had entered the feed hopper, apparently to dislodge a hang up, when he was engulfed by material and suffocated.

# Asphyxiation - Georgia

## Clay Mill

## Evans Clay Company Mill




On August 21, 1998, a 41-year-old laborer (contractor employee) with 15 years of mining experience was fatally injured at a clay mill. The victim was inside a rail hopper car using a shovel to dislodge material. Apparently, he fell from the rope ladder he had been working from and became engulfed in the material. The victim had a safety belt with a lifeline fastened at the top of the rail car, but the line was too long to afford protection. A second person was not assigned to tend the lifeline.

# Asphyxiation - Kentucky

## Limestone (C&B)

## Grassy Stone LLC Mine

On March 11, 2005, a 23-year-old laborer, with one year mining experience, was fatally injured at a crushed stone operation. The victim had entered a bin and was attempting to dislodge material that had adhered to the inside walls. The victim was not wearing a safety belt secured to a lanyard. He was engulfed when the material suddenly broke free.

# Questions to Ask Operators

- Do you ever enter bins, hoppers, or other confined spaces?
- What work is done inside?
- Do you have a safe entry system that governs entries?
- If so, is it a written process?
- Do you pre-plan entries?
- Have miners been trained on confined space hazards and safe work procedures?

# Cal/OSHA Confined Space Requirements

In *general*, confined space regulations require all employers to have:

- A written confined space plan, including recognizing and marking all confined spaces on site;
- Procedures to test and monitor the air inside confined spaces before and during all employee entries;
- Procedures to prevent unauthorized entries and to have an attendant outside the space at all times;
- Effective controls of all existing atmospheric or safety hazards inside the confined space;
- Employee and supervisor training on safe work procedures, hazard controls, and rescue procedures; and
- Effective rescue procedures which are immediately available on site.

Zohra Ali, MS
Senior Safety Engineer
Cal/OSHA Consultation
zali@dir.ca.gov


# Questions?

Acknowledgements:
M&T Principal Safety Engineer: John Leahy (ret.)
Acting Program Manager: Gene Glendenning
Chief: Juliann Sum