



# Confined Space Entry

MWEA Operators Day

February 5, 2019

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# Confined Space: 3-part Definition

1. Can bodily get into it to do work
2. Not designed for normal human occupancy
3. Has limited access / egress –
  - Does it have a doorway?
  - Do you need to use your hands to enter?



# Confined Space:

Needs a recognized Hazard to be a  
*Permit-required* Confined Space

1. Atmospheric hazard
2. Engulfment hazard
3. Entrapment hazard



# Confined Space Hazards:

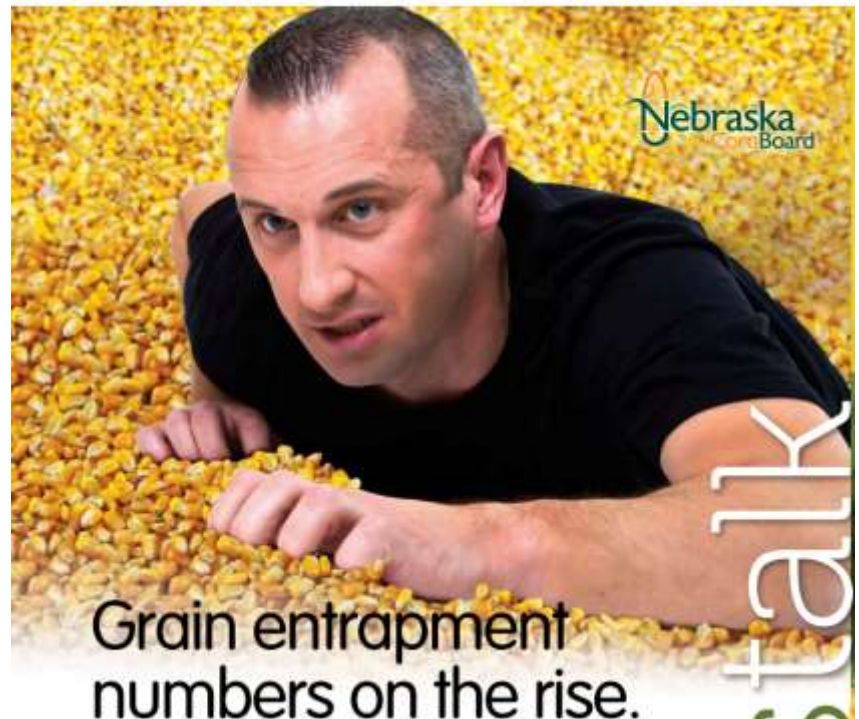
## 1. Atmospheric hazard

- Oxygen
  - ❖ Deficiency
  - ❖ Enrichment
- Combustibles
  - ❖ Methane
  - ❖ Spilled combustibles
- Toxics
  - ❖ H<sub>2</sub>S
  - ❖ CO
  - ❖ Cl<sub>2</sub>
  - ❖ NH<sub>3</sub>
  - ❖ SO<sub>2</sub>
  - ❖ Solvents



# Confined Space Hazards:

2. Engulfment by a liquid, or a solid that flows like a liquid
  - Liquid (aka drowning)
  - Grain
  - Sand
  - Salt





# Confined Space Hazards:

## 3. Entrapment -- sloping walls, tight quarters



Duluth City  
Workers Free  
Trapped Raccoon





# Examples of Confined Spaces

- Storm Drain
- Lift Station
- Meter Pit
- Clarifier
- Lagoon
- Dumpster?



Confined Space?





# Basic Requirements of a Confined Space Entry Program

- Written Program
- Identification of Confined Spaces
- Signage
- Identification of Hazards
- Safety Equipment
- Training
- Permits



# Written Program

Minimum:

Binder with one or more sheets of paper for each confined space.



# Classification of Confined Spaces

Determine all confined spaces.

Each space gets a separate page.

Three types of confined spaces.

1. Non-permit – no recognized hazards
2. Alternate Entry – Only hazard is a *potential* or *actual* atmospheric hazard, but can be controlled through detection and ventilation.
3. Full Permit Entry – Typically a space with:
  - A potentially hazardous atmosphere
  - Material or liquid inside that may engulf or trap you
  - An internal design that could trap or asphyxiate you
  - *Any other serious safety or health hazard*



## 3 Types of Confined Spaces

1. Non-permit – no hazards at all.
2. Alternate Entry – Only hazard is a *potential* or *actual* atmospheric hazard, but can be controlled through detection and ventilation.
3. Full Permit Entry – Typically a space with:
  - A potentially hazardous atmosphere
  - Material or liquid inside that may engulf or trap you
  - An internal design that could trap or asphyxiate you
  - *Any other serious safety or health hazard*



Label All Confined Spaces



# Identify Confined Space Hazards

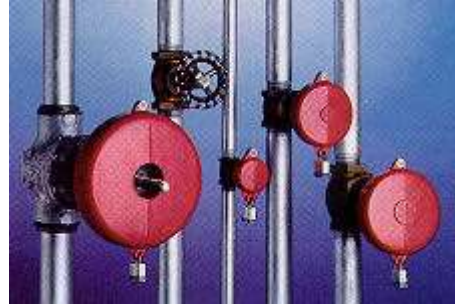
- Fire & Explosion
- Engulfment
- Asphyxiation
- Entrapment
- Slips & Falls
- Electric Shock
- Noise & Vibration
- Chemical Exposure
- Toxic Atmospheres
- Thermal / Chemical Burns





# Safety Equipment

- LOTO
- Gas Detection / Calibration
- Ventilation
- Retrieval
- Rescue
- Lighting
- Communication
- PPE
- Cooling



# Lock Out / Tag Out; Block and Bleed

# Portable Gas Detection



Continuous Atmospheric Monitoring  
Prior to and During Entry

# Fixed, Continuous Gas Detection





# Calibration Kit is Essential



*...the internal atmosphere shall be tested,  
with a calibrated direct-reading instrument...*



## If Necessary, Expand Gas Detection Capability







## Continuous Forced Air Ventilation



*The Solution to Pollution is Dilution*



## **Harness for Non-entry Rescue**



If Less than 5' Deep  
No Mechanical Advantage Required



If deeper than 5', Full Permit Entries require retrieval device with mechanical advantage.

## Entry Rescue Personal Protective Equipment SCBA & Supplied Air Respirator



# Sample Confined Space Permit

ENTRY PERMIT PERMIT VALID FOR 8 HOURS ONLY. ALL COPIES OF PERMIT WILL REMAIN AT JOB SITE UNTIL JOB IS COMPLETED

DATE: - - SITE LOCATION and DESCRIPTION

PURPOSE OF ENTRY \_\_\_\_\_

SUPERVISOR(S) in charge of crews Type of Crew Phone \_\_\_\_\_

COMMUNICATION PROCEDURES \_\_\_\_\_

RESCUE PROCEDURES (PHONE NUMBERS AT BOTTOM) \_\_\_\_\_

REQUIREMENTS	COMPLETED	DATE TIME
Lock Out/De-energize/Try-out	_____	_____
Line(s) Broken-Capped-Blanked	_____	_____
Purge-Flush and Vent	_____	_____
Ventilation	_____	_____
Secure Area (Post and Flag)	_____	_____
Breathing Apparatus	_____	_____
Resuscitator - Inhalator	_____	_____
Standby Safety Personnel	_____	_____
Full Body Harness w/"D" ring	_____	_____
Emergency Escape Retrieval Equip	_____	_____
Lifelines	_____	_____
Fire Extinguishers	_____	_____
Lighting (Explosive Proof)	_____	_____
Protective Clothing	_____	_____
Respirator(s) (Air Purifying)	_____	_____
Burning and Welding Permit	_____	_____

Note: Items that do not apply enter N/A in the blank. \*\*RECORD CONTINUOUS MONITORING RESULTS EVERY 2 HOURS

CONTINUOUS MONITORING\*\*

PERCENT OF OXYGEN 19.5% to 23.5%	_____	_____	_____	_____
LOWER FLAMMABLE LIMIT Under 10%	_____	_____	_____	_____
CARBON MONOXIDE +35 PPM	_____	_____	_____	_____
Aromatic Hydrocarbon + 1 PPM * 5PPM	_____	_____	_____	_____
Hydrogen Cyanide (Skin) * 4PPM	_____	_____	_____	_____
Hydrogen Sulfide +10 PPM *15PPM	_____	_____	_____	_____
Ammonia *35PPM	_____	_____	_____	_____

REMARKS: \_\_\_\_\_

GAS TESTER NAME INSTRUMENT(S) MODEL SERIAL &/OR & CHECK # USED &/OR TYPE UNIT # \_\_\_\_\_

SAFETY STANDBY PERSON IS REQUIRED FOR ALL CONFINED SPACE WORK SAFETY STANDBY CHECK # CONFINED CONFINED





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***Thank you!***