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HOW NOT TO ENTER A CONFINED SPACE



ANNULLER

HOLE IN ONE — The work-a-day world can be topsy-turvy, as Les Peters found out recently in West Branch. Peters, working for a company that is repaying a section of M-55 in the city's downtown area, was lowered through the manhole to see if the job was meeting specifications. Assisting were fellow workers John Lee, left, and Bob Trout, right.



AWWA Waterweek

Four workers die when pipe ruptures in meter pit

Four men were killed Jan. 31 in Macomb Township, Mich., when thousands of gallons of water poured from a high-pressure pipe into an underground meter pit where they were working in bitter cold weather.

Two inspectors for the Macomb Township Water and Sewer Department and two employees of a contruction firm died after they were slammed against the walls of the concrete pit by the swirling water, which quickly filled the pit. Three men died of hypothermia and drowning. The other, David Kremhelmer, died instantly from the force of the blast, which tore his skin and separated joints, according to the autopsy report.

The township inspectors, Richard Boettcher and Russell Rocker, were in the pit to inspect the installation of a meter by Kremhelmer and Lawrence Spinks, employees of Weiss Construction. Raymond Blake, a Detroit Water inspector who was also onsite at the time of the accident, escaped through a manhole as the water surged into the 6foot-deep chamber.

The Weiss contractors had completed their work and, apparently, as the water was turned back on, a 4- to 5-foot section of the 8-inch pipe exploded, possibly from the effects of a water hammer. State safety officials are investigating the accident.

WATERWEEK

NIOSH FACE Study

54 Incidents resulting in 84 Fatalities

- 5% Had Proper Training
- 35% Were Supervisor Level or Higher
- 64% Entry Wasn't Even Necessary
- 66% Water/Wastewater
- **78% Inadequate Ventilation**
- 100%No Atmospheric Testing/Monitoring 100 Percent !!!



- 89% of the fatalities occurred with jobs authorized by supervisors
- 80% of the fatalities happened in locations that had been previously entered by the same person who later died
- 35% of those who died were supervisors
- Only 7% of the locations had warning signs indicating that they were C.S.s
- 65% of the C.S fatalities were due to atmospheric hazards
- 35% of the fatalities were due to electrocution, caught between, crushed by, engulfed or falls
- 100% of the fatalities at 139 sites in 17 states in a 2yr period had one thing in common – no detectors or powered ventilation
- 60% of all who dies were would-be rescuers

Confined Space

•Large enough to bodily enter and perform work, <u>and</u>

•Has limited or restricted access or egress, <u>and</u>

 Is not designed for continuous human occupancy

•Contains, or has the potential to contain a hazardous atmosphere, or Contains a material that has the potential to engulf an entrant, or •Has an internal configuration such that could trap or asphyxiate the entrant, or Contains any other recognized serious safety or health hazard

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| Requirements for Confined Spaces | | | | | | | | | | |
|---------------------------------------|--------------------------------------------------|-----------------------------------------------------------------|--------------|-----------|-----------|--------|-----------------|----------|-----------------------------|---------|
| For spaces that are | The requirements in the following sections apply | | | | | | | | | |
| | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) | (12) | (13) |
| | Evaluation | Permit-required confined space entry programs and permits | Permit Entry | Equipment | Personnel | Rescue | Alternate entry | Training | Multi-employer worksites | Records |
| Confined spaces | Х | | | | | | | | | |
| Permit-required confined spaces | Х | х | Х | x | x | x | | X | x | х |
| Never entered | Х | | | | | | | | | |
| | | | | | | | | | | |
| If you only: | | | | | | | | | | |
| Use alternate entry procedures | x | | | x | | | x | x | | |
| Have other employers enter your space | X | | | | | | | | X | Х |
| Are a rescue service provider | | X | X | x | x | x | | Х | | Х |

PRCS Written Program

- Document of entry procedures
- Measures to control unauthorized entrants
- Designation of roles and designated duties
- Training on written program, permits and roles
- Instructions on how to identify and evaluate hazards
- Methods to eliminate and/or control hazards
- Instruction on equipment use and maintenance
- Instructions to coordinate entry with others
- Procedures for processing permits
- Review of program

Written PRCS Program

Entry Permit

- Written procedures to
- The space to be entered
- Purpose for the entry
- The date, start, and stop times of the permit
- The hazards of the space
- Acceptable entry conditions
- Results of atmospheric test and monitoring
- Appropriate measures including Lockout-Tagout procedures
- Names and signatures of Attendant, Entrant, and Entry Supervisor
- Communication Procedures
- Rescue procedures available and how to contact them
- Any problems encountered during entry

Alternate Entry Procedures

A Permit Space may be entered without a Permit when:

- Space has been properly evaluated and All hazards have been eliminated, or
- All physical hazards, if any, have been eliminated and all atmospheric hazards are controlled with continuous forced air ventilation
- Space is NOT part of a continuous system unless the space has been isolated and potential hazard no longer exists
- Have the necessary equipment required to perform safe entry
- Employees are properly trained
- Entry is authorized and employees are able to identify, evaluate, eliminate or control hazards
- Employees are trained in the necessary equipment required to maintain acceptable entry conditions
- Methods in place to ensure employees follow procedures

Evaluation

- Are there CS in the workplace and if so, are they PRCS
- Inform employees
- Any known or anticipated hazards
- Do those hazards make the space Permit Required
- Prevent entry until fully evaluated
- Mobile workforce and/or multi-employer worksite
- Re-evaluate
- Control unauthorized entry

Acceptable Atmospheric Conditions

Oxygen 20.8% Normal 19.5%Oxygen Deficient 23.5% Oxygen Enriched Flammable Limits 10% LEL/LFL Toxicity Gases – CO, H2S, Chlorine, Mists – Paint Spray, pressure washer Vapors – Paints, degreasers, coatings, gases Fumes – Welding/cutting Dusts - 5', Asbestos. Silica

Atmospheric Testing

- Acceptable Atmospheric Conditions
- Real-time = current conditions
- Cumulative measure total exposure over time
- All readings recorded and documented
- Inspection of instrument
- Calibration
 - In fresh air
 - Manufactured recommendations
 - Adjustments made w/ known concentration of gas
 - Functional tests



Atmospheric Testing

Monitoring

- Monitor as work proceeds
- Position monitor to test air that workers are breathing
- Position monitor so that alarms can be seen/heard
- Follow manufacturers recommendations

Ventilation

Natural

Mechanical

- Clean source
- Efficiency of blower (CFM) and hoses (bends)
- Additional requirements for hazardous tasks
 - Welding cutting Etc
 - Chemical
 - Gas powered equipment

Communication

Primary and Secondary Modes

- Voice
- Two-way Radio
- Cellular
- Whistle/Horn?

To Summon Help/Assistance

Before and After the job

Equipment





Fall Protection

- Guard rails
- Fall arrest
- Rescue/Retrieval
- Harness and Lifelines
- Tripod/Davit Arm and Retreival devices

Roles and Responsibilities

Entry Supervisor

Entrant

Attendant

Contractors/Host Employers





Appropriate for the task

- When 1st assigned the duty
- When duties, SOPs, Equipment changes
- When performance indicates that retraining is necessary



Rescue and Emergency Procedures

In-House Rescue Service

Contract Rescue services



Rescue Equipment

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QUESTION?

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