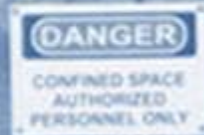


CONFINED SPACES IN CONSTRUCTION



UTCA Safety Committee Meeting



JULY 22, 2015

Objectives

- Describe the development process of the Confined Spaces in Construction Standard
- Recognize the differences between the General Industry and Construction confined space standards
- Recognize the importance of the standard's impact on the construction industry
- Identify how the standard will be implemented in writing citations

Confined Spaces in Construction

Subpart AA

What's New?



Subpart AA Background

- General Industry Standard published 1993
- United Steelworkers settlement 1994
- Consultation with ACCSH and stakeholder meetings
- Proposal 2007
- Comment period & hearing
- Final Rule published May 4, 2015; effective August 3, 2015***
 - Full enforcement postponed until October 2nd for employers that made a **good faith effort** to comply
- What does good faith effort mean....?

Subpart AA Background

- Good faith effort
 - In compliance with training requirements of 1926.1207 or 1926.21(b)(6)(i) regarding hazards, necessary precautions, use of protective and emergency equipment, etc.
 - In compliance with specific regulations that apply to working in dangerous or potentially dangerous areas.
 - Factors we are considering:
 - Has employer scheduled or conducted required training?
 - Does the employer have required PPE, or ordered it while taking alternative protective measures?
 - Has the employer engaged in any additional efforts to educate workers about confined space hazards and protect workers from those hazards?

Subpart AA Scope

- Subpart P still covers work in excavations
 - If there is a confined space within an excavation, such as a sewer pipe, and a worker enters the pipe to perform work, that is covered by Subpart AA
- Subpart S still covers underground construction
 - Work done in an underground space that does not involve altering the **structure** of the space is covered by Subpart AA (such as equipment installs)



Overview of Differences

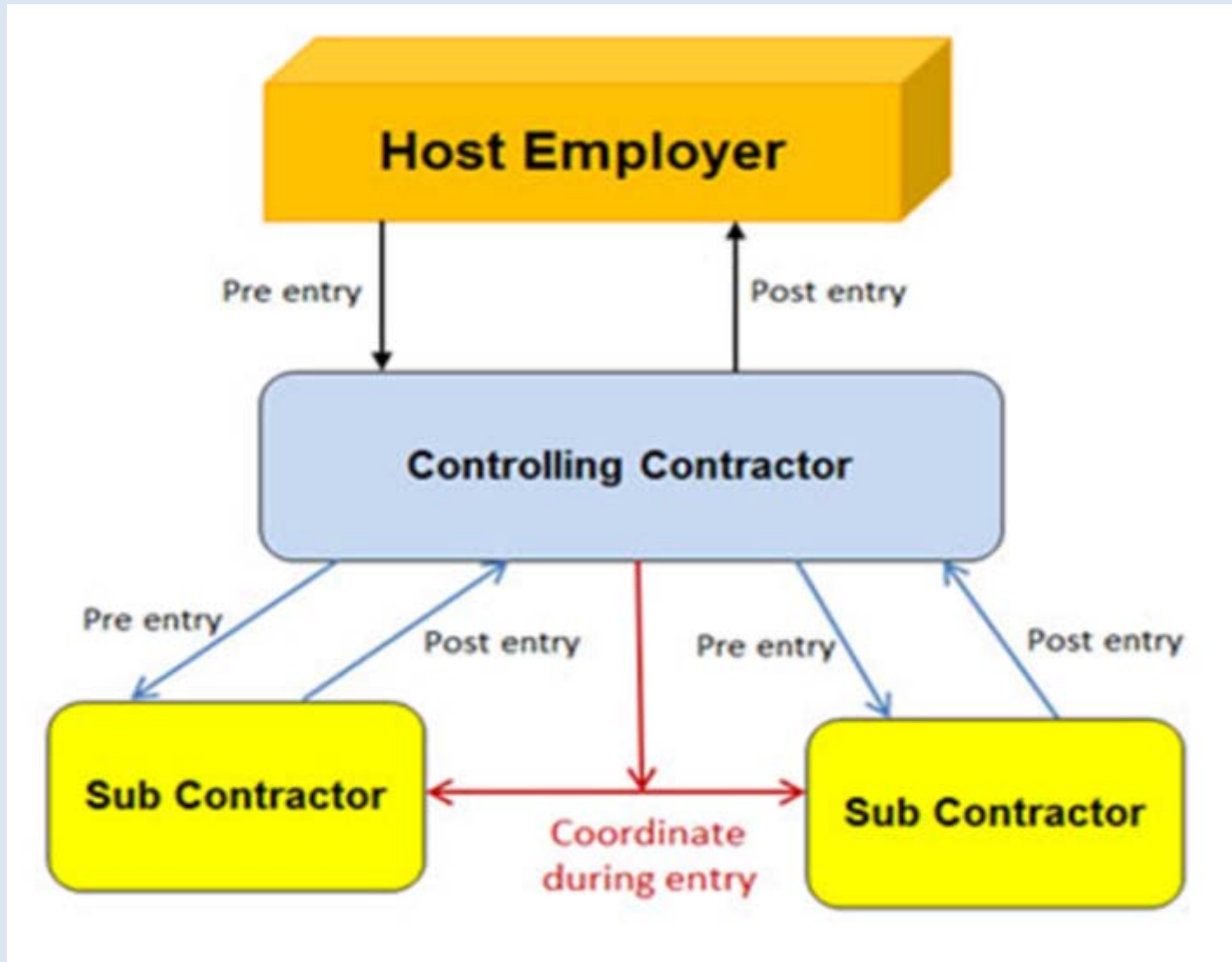
- GI Standard, Plus
- A competent person must conduct worksite evaluation
- Employers using “alternate procedures” for permit space entry must prevent physical hazard exposures through elimination or isolation through methods such as LOTO
- Permits may be suspended instead of cancelled, provided the space is returned to permit conditions prior to re-entry



Overview of Differences, *cont'd*

- GI Standard, Plus
- Continuous monitoring of atmospheric and engulfment hazards
- Employers relying on local emergency services for rescue must arrange for responders to notify in advance if responders will be unavailable
- Specific information exchange requirements for multi-employer work sites

Information Exchange



Confined Space Basics

- What is a confined space?
 - Large enough for a person to enter
 - Difficult to exit in the event of an emergency
 - Is not intended for regular human occupancy
- Where are confined spaces usually found?
 - Sewers, pits, tanks, crawl spaces, attics, boilers, utility rooms/closets, etc

Confined Space Basics, *cont'd*

- What are the hazards?
 - Atmospheric (respirable) hazards, such as hydrogen sulfide, carbon monoxide, low oxygen, excessive oxygen, and other toxic gases and particulates
 - Explosive hazards, including flammable gases in concentrations above 10% of the lower explosive limit (LEL), combustible dusts, and other explosive/flammable materials
 - Physical hazards, including tripping hazards, fall hazards, struck-by hazards, and electrical hazards

Confined Space Basics, *cont'd*

- What *aren't* hazards addressed by this rule?
 - The confined spaces rules address hazards that could make it difficult or impossible for a worker inside the space to exit. In other words, hazards that have an immediate or near-immediate impact on the entrant
 - Other rules address long-term exposure hazards, like the standards addressing lead and asbestos exposure

What must employers do?

- First, employers must determine whether confined spaces exist at the work site.
 - Under the construction rule, a competent person – a person capable of identifying existing and probable hazards who has the authority to take corrective measures – must identify all confined spaces. 1203(a)
 - The competent person must also identify all permit spaces – those workers will enter, and those they will not. All permit spaces must be posted/identified in some way. 1203(b)

What must employers do? *cont'd*

- Next, an employer who has determined that workers will perform work in permit spaces must develop a permit space program 1203(d)
- If workers will not perform work in permit spaces, the employer must ensure that the workers are prevented from entering the permit spaces 1203(c)

What is a permit space program?

- A permit space program is a plan that includes:
 - Identification and evaluation of the hazards in the permit space 1204(b)
 - Measures that will be used to prevent unauthorized entry 1204(a)
 - Means, procedures, and practices needed for safe entry, including: 1204(c)

Program Elements

- Specify acceptable entry conditions, including but not limited to
 - Atmospheric conditions such as oxygen levels, explosive substance limits, toxic substance limits
1204(c)(1)
- When and how the employer will provide each authorized entrant or their representative the chance to observe monitoring or testing of permit spaces
1204(c)(2)
- How the employer will isolate the permit space and physical hazards within the space, if needed
1204(c)(3)

Program Elements, *cont'd*

- Whether and how the employer will purge, inert, flush, or ventilate the permit space to eliminate or control atmospheric hazards 1204(c)(4)
- Specify the use of a monitoring system or procedures that will detect hazardous changes in atmospheric conditions in time for entrants to safely exit the space 1204(c)(5)
- Discuss the barriers that will be used to prevent entrants from external hazards and unauthorized entry 1204(c)(6)

Program Elements, *cont'd*

- Ways the employer will verify that conditions in the permit space are safe for entry throughout entry operations 1204(c)(7)
- Ways the employer will eliminate any conditions that could make it unsafe to remove an entrance cover 1204(c)(8)
- Discussion of necessary safety equipment and how the employer will ensure entrants are provided with appropriate PPE

Program Elements, *cont'd*

- Examples of required equipment (1204(d)):
 - Testing and monitoring equipment
 - Ventilation equipment
 - Communications equipment for attendants and entrants
 - PPE
 - Lighting equipment that meets the illumination requirements of 1926.56 and is rated for the conditions in the space (flammable/combustible substances)

Program Elements, *cont'd*

- Equipment (cont'd)
 - Ladders, etc. needed for safe entry and exit
 - Rescue and emergency equipment, such as
 - Harnesses, lanyards, wristlets or anklets, tripods, winches, etc.



Program Elements, *cont'd*

- Space Evaluation During Entry (1204(e))
 - Testing of conditions prior to making changes in ventilation 1204(e)(1)
 - Continuous monitoring of atmospheric hazards unless equipment for continuous monitoring is not commercially available 1204(e)(2)
 - If continuous monitoring is not used, employer must plan for period monitoring at sufficient frequency to provide workers with time to exit

Program Elements, *cont'd*

- Space Evaluation During Entry
 - If it is a continuous space and isolation is not possible, perform pre-entry testing to the extent possible 1204(e)(1)(i)
 - Continuously monitor conditions in the areas where entrants are working, unless periodic monitoring must be used as above 1204(e)(1)(ii)
 - Provide an early-warning system that continuously monitors for engulfment hazards and alerts entrants of hazards in sufficient time for them to safely exit 1204(e)(1)(iii)

Program Elements, *cont'd*

- Atmospheric Testing and Monitoring
 - Employer must test for oxygen first, then combustible gases and vapors, then toxic gases and vapors 1204(e)(3)
 - Provide each entrant or representative with an opportunity to observe all testing or monitoring of permit spaces 1204(e)(4)
 - Reevaluate permit spaces at the request of entrants or representatives when there is some indication that the current evaluation may not have been adequate 1204(e)(5)
 - Provide entrants or representatives with the results of testing 1204(e)(6)

Program Elements, *cont'd*

- Discuss providing at least one attendant to monitor permit space(s) 1204(f)
- Discuss assigning an entry supervisor for each entry 1204(g)
- Discuss each role employees will fulfill and ensuring that each employee assigned a role is provided training for that role (entrant, attendant, entry supervisor, atmospheric monitor, etc.) 1204(h)

Program Elements, *cont'd*

- Rescue
 - List procedures for summoning rescue and emergency services (including procedures for emergency assistance in the event of a failed rescue) 1204(i)
 - If necessary, list procedures for entry rescue, including evaluation of rescue services 1204(i)

Program Elements, *cont'd*

- Discuss the system for issuing, use, and cancellation of permits 1204(j)
- Discuss the procedures for coordinating entry operations in consultation with the controlling contractor when more than one employer will perform work that affects conditions in the space 1204(k)
- Discuss procedures for concluding entry operations 1204(l)

Program Elements, *cont'd*

- Discuss procedures for review of the program when incidents or near-misses reveal deficiencies in the program 1204(m)
- Discuss procedures for annual review of canceled permits and potential revision of program to ensure workers are protected from permit space hazards 1204(n)

What about “Alternate Procedures”?

- Much like 1910.146(c)(5)
 - A permit space where the only hazard is atmospheric, because there are no physical hazards or physical hazards have been eliminated/isolated so as to prevent worker exposure 1203(e)(3)(i)
 - No need for a permit or program so long as the employer provides sufficient continuous forced-air ventilation to eliminate the atmospheric hazard (1203(e)(3)(ii) and 1203(e)(4)(v)), and
 - Continuous monitoring must be used unless the employer can show it is not available, in which case periodic monitoring must be used with sufficient frequency to ensure workers have time to exit safely 1204(e)(4)(vi)

What about “Reclassification”?

- Similar to 1910.146(c)(7), found at 1926.1204(g)
 - Competent person must determine that the space:
 - Poses no actual or potential atmospheric hazards and all physical hazards within the space have been eliminated without entry (ex. LOTO of circuit breaker), unless doing so without entry is infeasible 1204(g)(1)
 - If eliminating hazards without entry is infeasible, entry must occur using full permit requirements. If testing during that entry shows no atmospheric or physical hazards, the space may be reclassified 1204(g)(2)
 - The entry employer must document the basis for reclassification 1204(g)(3)
 - If hazards arise in a reclassified space, the space must be evacuated and classified as a permit space 1204(g)(4)

What needs to be on the permit?

- The space to which the permit applies 1206(a)
- The purpose of the entry 1206(b)
- The date and duration of the permit 1206(c)
- The names or other designation of the authorized entrants (can refer to a roster or tracking system) 1206(d)
- Methods used to detect increased hazardous atmospheric conditions 1206(e)

What needs to be on the permit?*cont'd*

- Name of attendant(s) 1206(f)
- Name of entry supervisor(s), and signature or initials of each supervisor who authorizes entry 1206(g)
- Hazards in the space and measures used to eliminate or control permit space hazards 1206(h) and 1206(i)
- Acceptable entry conditions 1206(j)
- Results of atmospheric tests and monitoring and names/initials of testers, and dates of tests 1206(k)



What needs to be on the permit? *cont'd*

- Rescue and emergency services that can be summoned and the means (such as equipment to use and numbers to call) for summoning those services 1206(l)
- Communication procedures used by entrants and attendants during entry 1206(m)
- Equipment necessary for entry 1206(n)
- Any additional permits (such as hot work) issued to authorize work being performed in the space 1206(p)



Training – When?

- Employer must provide to EACH affected employee
 - At no cost to the employee 1207(a)
 - In a language and vocabulary the employee can understand 1207(b)(1)
 - Before the employee is assigned duties 1207(b)(2)
 - Before there is a change in assigned duties 1207(b)(3)
 - Whenever there is a change in permit space entry operations for which the employee has not been trained 1207(b)(4)
 - Whenever there is a deviation from permit space entry procedures or there are deficiencies in the employees knowledge or use of these procedures 1207(b)(5)

Training

- What must training cover?
 - The hazards in the permit space and methods used to isolate, control, or otherwise protect employees from the hazards 1207(a)
 - Dangers of unauthorized rescue 1207(a)
 - Proficiency in the duties required by this standard and any new or revised procedures, as necessary 1207(c)
- How do we know the training occurred?
 - Employers must maintain training records that contain the employee's name, the trainer's name, and the dates of training, for as long as the employee is employed by that employer. The records must be available to employees and their representatives as well 1207(d)

Authorized Entrants

- Need to know the hazards that may occur during entry, including signs, symptoms, and consequences of exposure 1208(a)
- Need to know how to use safety equipment discussed above 1208(b)
- Need to communicate with attendant(s) 1208(c)
- Must alert the attendant if there is an indication of exposure or a prohibited condition 1208(d) and
- Must evacuate the space if this occurs or if the attendant orders evacuation or an evacuation alarm sounds 1208(e)

Attendants

- Must know the hazards that may occur during entry, including signs, symptoms, and consequences of exposure 1209(a)
- Must know possible behavioral effects of hazard exposure 1209(b)
- Must maintain an accurate count of entrants in the space and be able to identify who is in the space 1209(c)
- Remains outside the space until relieved by another attendant 1209(d)

Attendants, *cont'd*

- Communicates with entrants to assess entrant status and to alert entrants of the need to evacuate 1209(e)
- Orders entrants to evacuate if:
 - A prohibited condition occurs 1209(f)(1)
 - Behavioral effects of exposure are apparent in an entrant 1209(f)(2)
 - If a condition outside the space could endanger the entrants (1209(f)(3), or
 - If the attendant cannot perform the duties required under the standard 1209(f)(4)

Attendants, *cont'd*

- Must summon rescue and other emergency services as soon as it is determined that entrants may need assistance to escape 1209(g)
- Must warn unauthorized persons that they must stay away from the permit space 1209(h)(1)
- Advises unauthorized entrants that they must exit immediately if they have entered the space, and informs authorized entrants and entry supervisor 1209(h)(2) and (h)(3)
- Must perform non-entry rescue as specified by the program 1209(i)
- Performs no duties that might interfere with attendant duties 1209(j)

Entry Supervisors

- Must know the hazards that may occur during entry, including signs, symptoms, and consequences of exposure 1210(a)
- Must verify that all tests specified by the permit have been conducted and that permit procedures and equipment are in place before allowing entry to begin 1210(b)
- Must terminate entry and cancel/suspend permit in the event of work completion, prohibited conditions, or emergency, as appropriate 1210(c)



Entry Supervisors, *cont'd*

- Verify availability of rescue services and that means of summoning them work, and that the rescue service will notify if it becomes unavailable 1210(d)
- Remove unauthorized entrants 1210(e)
- Must determine that entry operations are consistent with the terms of the entry permit and that acceptable entry conditions are maintained throughout the entry 1210(f)

Rescue

- Non-entry rescue must be provided unless it is infeasible 1211(c)
 - Full-body harness with a retrieval line attached at the dorsal attachment point, above the entrant's head, or at another point which allows the entrant to present a small enough profile to be pulled out of the space safely 1211(c)(1)
 - Wristlets or anklets may be used if the employer can demonstrate that a full-body harness is infeasible or presents a greater hazard

Rescue, *cont'd*

- Non-entry rescue, *cont'd*
 - The other end of the retrieval line must be attached to a mechanical device or fixed point outside the permit space so that rescue can begin as soon as it is deemed necessary. A mechanical device must be available if entrants are in a vertical space more than 5 feet deep. 1211(c)(2)
 - Unsuitable equipment must not be used (retrieval lines that could become entangled with the retrieval lines of other entrants, etc.) 1211(c)(3)

Entry Rescue

- Employers must evaluate an entry rescue service to ensure it can
 - Respond in a timely manner 1211(a)(1)
 - Perform rescue in the specific permit space(s) identified 1211(a)(2)
 - Reach victims in a time frame appropriate for the hazards identified 1211(a)(3)(i)
 - Is equipped for and proficient in the necessary services 1211(a)(3)(ii)
 - Agrees to notify the employer in the event that the service becomes unavailable 1211(a)(3)(iii)

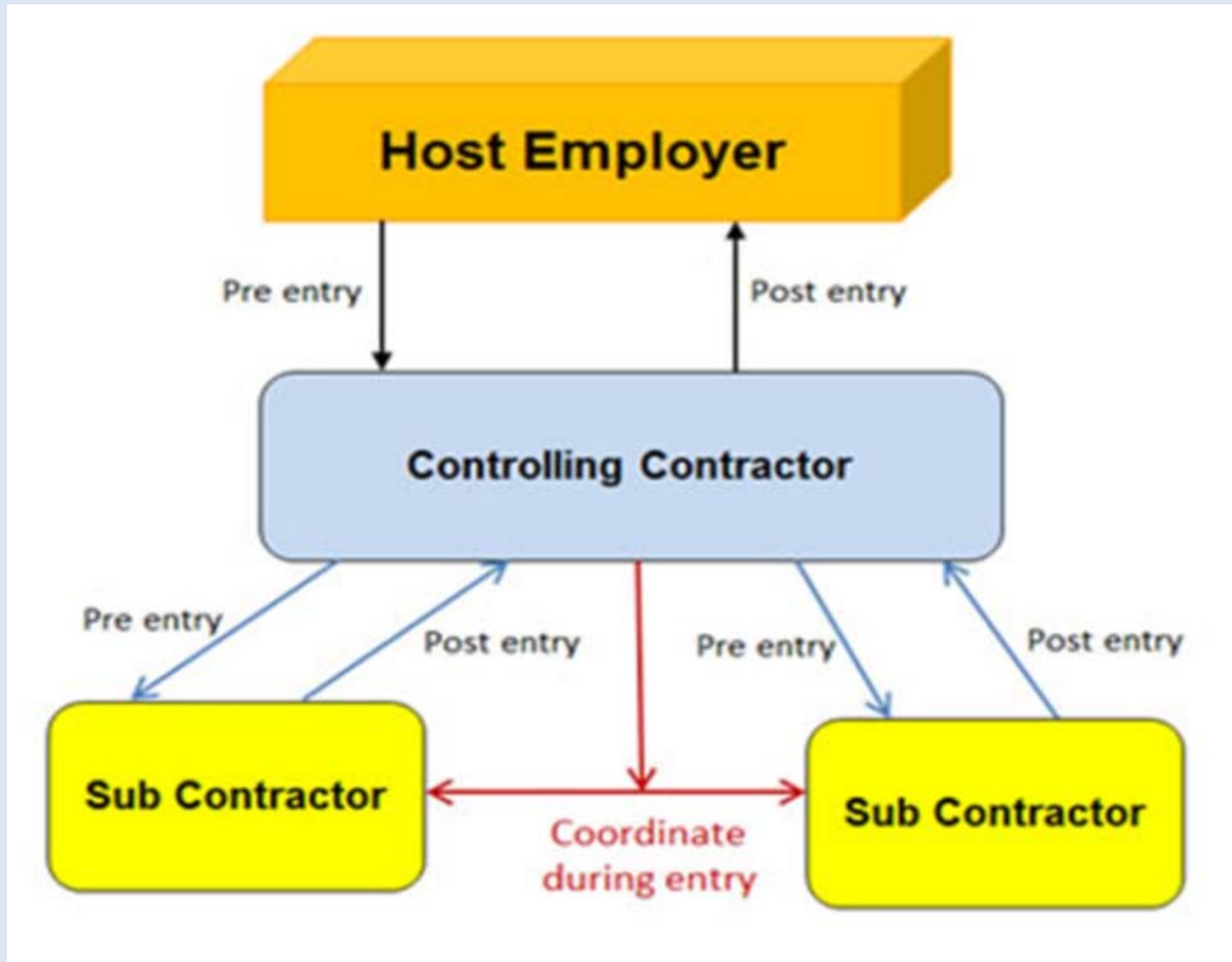
Entry Rescue, *cont'd*

- The employer must inform the rescue service of the hazards they may confront
1211(a)(4)
- The employer must provide the rescue service with access to all permit spaces from which rescue may be necessary
1211(a)(5)

Rescuers

- An employer whose workers will perform rescue must, at no cost to the employees (1211(b)):
 - Provide the necessary PPE to each employee and train each employee in its use 1211(b)(1)
 - Train each employee how to perform assigned rescue duties 1211(b)(2)
 - Train each employee in basic first aid and CPR, and ensure at least one member of the team has a current certification in basic first aid and CPR 1211(b)(3)
 - Ensure each employee practices rescue before attempting an actual rescue, and at least every 12 months 1211(b)(4)

Information Exchange



Information Exchange, *cont'd*

- The host employer has to give any information it already has to the controlling contractor. 1203(h)(i)-(h)(iii)
 - If the host employer does not have information about the location of each known permit space, the hazards or potential hazards in the space(s), and previous precautions taken regarding the space(s), it is not required to acquire that information

Information Exchange, *cont'd*

- Before entry operations begin, the controlling contractor must:
 - Obtain information from the host employer if it has it. 1203(h)(2)(i)
 - Provide the following information to each entry employer entering a permit space and any other employer whose activities could affect the space:
 - Information from the host employer 1203(h)(2)(ii)(a)
 - Any additional information the controlling contractor has 1203(h)(2)(ii)(b)
 - Precautions that the host employer, controlling contractor, or other entry employers have implemented 1203(h)(2)(ii)(c)

Information Exchange, *cont'd*

- Before entry operations begin, each entry employer must:
 - Obtain all of the controlling contractor's information regarding permit space hazards and entry operations 1203(h)(3)(i)
 - Inform the controlling contractor of the permit space program to be followed, including likely hazards to be found or created in the space 1203(h)(3)(ii)

Information Exchange, *cont'd*

- Coordination
 - The controlling contractor and entry employer(s) must coordinate entry operations when
 - More than one entity performs entry operations in the same space at the same time 1203(h)(4)(i)
 - Permit space entry is performed at the same time that any activities that could cause a hazard in the permit space are performed 1203(h)(4)(ii)



Information Exchange, *cont'd*

- After entry operations
 - The controlling contractor must talk to each entity that entered a permit space about the program followed and any hazards found or created in the permit space(s) while in the space 1203(h)(5)(i)
 - The entry employer must inform the controlling contractor in a timely manner of the program followed and of any hazards found or created while in the space 1203(h)(5)(ii)

Information Exchange, *cont'd*

- After entry operations *continued*
 - The controlling contractor must give the host employer the information exchanged with entry employers
- If there is no controlling contractor, the requirements for and role of controlling contractor must be fulfilled by the host employer or whichever employer arranges (contracts) to have an employer perform work in a permit space 1203(h)(5)(iv)



Construction Fatalities

Georgetown, Idaho Wastewater Treatment Project



Brief Description of Incident

Two employees were overcome by an oxygen deficient and organic vapor rich environment in a confined space. Flex Seal™ spray sealant was sprayed inside a 5' x 5' x 17.5' manhole. This manhole is approximately 440 cubic feet in volume. (Approximately 75 cubic feet of water in the bottom and 360 cubic feet of air space above the water.) Flex Seal™ contains several organic solvents and gases (including toluene, parachlorobenzotrifluoride, acetone, heptane, isobutane and propane).

Victim #1 took a spray can of Flex Seal™ (purchased by Victim #2) and went down a ladder into the manhole 5-7 feet level and sprayed sealant on the seam of the manhole where leaks were found. He sprayed once at about 9:00 am and a second time at about 4:00 pm, at which time he lost consciousness and fell (~8 feet) into ~4-5 feet of water below. Cause of death was determined to be asphyxiation and drowning.

Victim #2 saw that the first victim had not come back out of the confined space and discovered him face down in the water below. He then attempted to rescue the employee, but was also asphyxiated and collapsed on top of the first victim. Witness, third employee (son of Victim#2) observed the incident, but had an inoperable cell phone and drove about a mile into town to call for help. He returned with an EMT and volunteer fire fighters. Approximately 45 minutes later, rescuers were finally able to safely extract the victims from the manhole. The victims were transported to Bear Lake County Hospital in Montpelier, Idaho, but the medical team was unable to stabilize either victim.



Incident Details

Incident type: Confined Space; Double fatality

Date & time / Weather conditions: Thursday, August 28, 2014 @ ~ 4:00 pm; Weather was clear and sunny; approximately 70 degrees F and no humidity

Type of operation: Construction of wastewater treatment lagoon and water piping system

Size of work crew: Three employees of General Contractor. No Sub-contractors were on site due to the upcoming holiday weekend.

Worksite inspection conducted: Superintendent had a verbal discussion with the city inspector (per OSHAs recorded interview with him) about the hazards of using Flex Seal™ in a confined space. No written records or documentation were available at the scene.

Competent safety monitoring on site: None

Safety and Health program in effect: Formal, written safety programs for confined space entry were not effective.

Training and education for workers: No confined space training specific to entry into the manhole or with the use of Flex Seal™. Entry and rescue equipment was not readily available. In a job trailer approx. one mile away.



Incident Details, *cont'd*

Occupations of deceased workers: Laborer (#1) and Superintendent (#2)

Age/Sex of deceased worker: Both victims were male; Caucasian

- Victim #1 – 19 years old, laborer (nephew of the Superintendent)
- Victim #2 – 44 years old, Superintendent (Father of the Witness and Uncle of Victim #1)
- Witness -- 18 years old, truck driver (son of the Superintendent)

Time on job:

- Victim #1 – Approximately 12 months and
- Victim #2 – Approximately 24 years

Time at task: Less than five minutes

Time employed/classification (FT/PT/Temporary):

- Both victims were full-time employees

Language spoken: Both spoke English

Union/Non-Union: None



Construction Fatalities

DANGER
CONFINED SPACE
AUTHORIZED
PERSONNEL ONLY

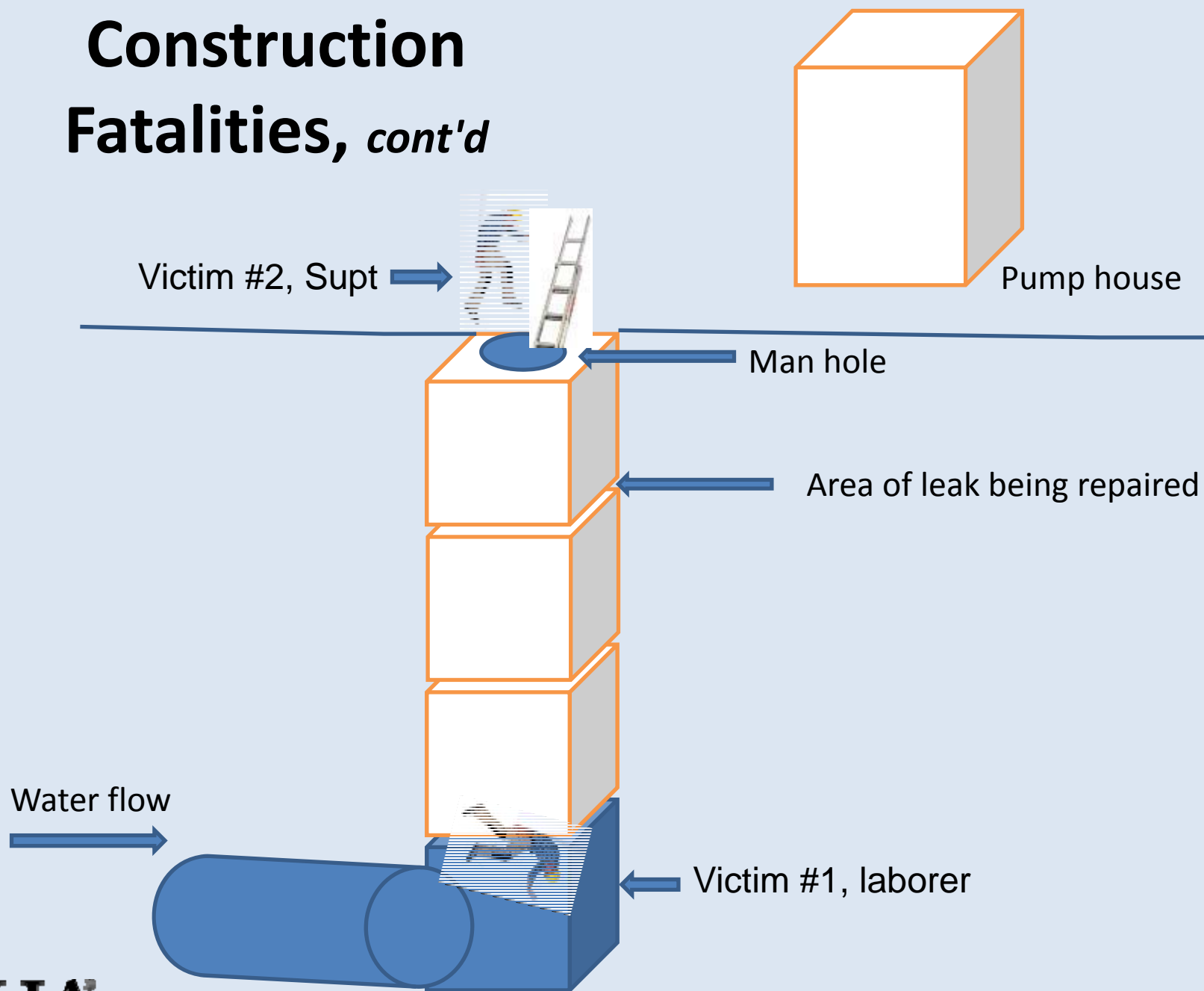
Pump House

Manhole

Entry Ladder



Construction Fatalities, *cont'd*



CSHO's View into Manhole

DANGER
CONFINED SPACE
AUTHORIZED
PERSONNEL ONLY



Manhole Entrance

⚠ DANGER
CONFINED SPACE
AUTHORIZED
PERSONNEL ONLY



OSHA Standards That Were Applied

(Construction confined space standards were not available)

1. Safety program providing frequent and regular inspections ... 1926.20(b)(2)
2. Instruction on flammable materials ... 1926.21(b)(5)
3. MSDS availability at the site ... 1910.1200(g)(8)
4. Effective information/training on hazardous chemicals ... 1910.1200(h)(1)
5. Confined space hazards instruction ... 1926.21(b)(6)(i)
6. Written respiratory protection program/emergency situations ... 1910.134(c)(1)(iv)
7. Not considered IDLH atmosphere when unable to estimate exposure ... 1910.134(d)(1)(iii)

Questions?



DANGER
CONFINED SPACE
AUTHORIZED
PERSONNEL ONLY