

Effective Confined Space Entry Team Member Training

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Introduction

When an employer assembles an entry team together to enter into a confined space, each member needs to receive enough training to enter and exit the space safely. The instruction needs to be in the correct topic area and comprehensive enough for them to do their job and understand the hazards. This session will emphasize the key areas of training for each of the following entry team members: Entry Supervisor, Attendant, Entrant, Atmospheric Tester, and Rescue Personnel. This paper is designed with adult learning principles that follow instructional system design criteria and ANSI Z490.1 standard on Accepted Practices in Safety, Health, and Environmental Training.¹

This informational deliverance is in enough detail to reach the intermediate level of attendee's knowledge of confined spaces, however comprehensive enough to offer technical information to an advanced audience. The attendee will go away with an appreciation of the depth of training needed for each team member and will look at their own confined space entry program with a new understanding of the importance of effective training.

Following are examples of the topics discussed in this seminar's training for the following entry team members per Occupational Safety and Health Administration (OSHA) 29 CFR 1910.146²: The Entry Supervisor, the Attendant, the Entrant, the Atmospheric Tester and the Rescue Personnel.

Entry Supervisor Training^{2,3}

This individual needs to be selected by the employer because of his/her knowledge and experience of the space to be entered. They need to be aware of all the existing or potential hazards in and around the space no matter how minor they may seem. i.e. hydrogen sulfide measured at 2 ppm around the ground opening at a refinery may be within all regulatory limits, however because of the location and density of the gas may become a serious issue during the entry if allowed to proceed. The supervisor also needs to know the signs and symptoms of exposures and overexposures. The supervisor, in addition, needs to have a current certificate of training on file with the company and be able to:

1. Recommend effective controls such as; ventilation, LOTO, GFCI, or PPE.
2. Be trained in all the other team member's duties and select the team member most capable of filling that position on the team. (Discuss member's concerns and where to best place them on the team).
3. Research the rescue team capabilities and response time in case of an emergency and contact them prior to commencing entry to ensure their availability (whether it is in-house or an outside rescue service). Verifies communication means are operable. Practice rescue with dummies.
4. Understand all types of personal protective equipment (PPE) and their limitations in order to ensure proper selection. (Show a few respirators and their limitations. Pass around some gloves and coveralls, ask where could you use them and not use them)
5. Ensure proper selection and explains limitations of all the tools and equipment used in connection with the entry, and verifies they are working properly and inspected prior to use. (Demonstrate some issues with tools and equipment)
6. Fill out the entry permit and the necessity of proper completion and signing it to authorize the entry to begin. They may have to explain the reason why blanks areas are not allowed and instrument readings need to be documented in their time slot, and what those readings mean. i.e. 20% oxygen level, is it OK?
7. Explain what the test instrument displays or readings indicate. The entry supervisor must be given instruction on the test instruments and their limitations and poisons. To evaluate, have the supervisor explain a bump test and solvent flash points.
8. Responsibly transfer supervisor control and canceling of the permit if extended shifts are needed to complete the confined space entry task.
9. Ensure canceled permits are collected and retained for at least a year for review and trainings purposes.
10. Remove unauthorized individuals who enter or attempt to enter during entry operations. (Explain how to do that with some mock situations. Usually explaining that they could die with little or no warning if they enter the space is usually good enough)

Attendant Training Requirements^{2,3}

The person selected, as the attendant needs to have the following qualities and have a current certificate of training on file with the company:

1. Must know the hazards of the space and the signs and symptoms of exposures and overexposures.
2. Is aware of possible behavioral effects of hazard exposure in entrants.
3. Is able to continuously keep an accurate count of all the authorized entrants.
4. Will remain outside the space but in constant communication with entrants during the entry operation. (This means at the portal not wondering away or taking a restroom or coffee break)
5. Communicates with authorized entrants as necessary to monitor entrant's status and to alert them if a need to possibly evacuate occurs because of the following issues:
 - a. If the attendant detects a prohibited condition; (Give some examples i.e. lightning storm, tank overflow or rupture etc.)
 - b. If the attendant notices the behavioral effects of hazard exposures affecting one or more entrants.
 - c. If the attendant detected a condition outside the space that could endanger the entrants.
 - d. If the attendant cannot effectively and safely perform all the duties required.

6. Monitors activities inside and outside the space to determine if it is safe for entrants to remain in the space or if they need to evacuate.
7. Summons rescue and other emergency services as soon as the attendant determines the entrants may need assistance. (This has been determined by professional rescuers as the very first indication of a problem, not waiting for verification of a problem)
8. Takes the following actions when unauthorized persons approach or attempt to enter the permit space:
 - a. Warn the unauthorized person they must stay away;
 - b. Advise the unauthorized person they must exit immediately if they have entered the permit space;
 - c. Inform the authorized entrants and entry supervisor if unauthorized persons have entered the permit space;
9. Performs non-entry rescue as specified by the employer's rescue procedures.
10. Performs no other duties that might interfere with the attendant's primary duty to monitor and protect the authorized entrants. (For example: no envelope stuffing, no face book viewing and no e-bay activity)

Authorized Entrant's Training ^{2,3}

This member of the entry team enters the space to do the assigned work. Not only does he/she have to be physically able to get into the space, but be medically able to wear the necessary personal protective equipment and do the assigned task. He/she must also be trained in the following prior to entry and have a current certificate of training on file with the company.

1. Know the hazards of the space and the signs and symptoms of exposures.
2. Properly use equipment as required by program elements (d)(4).
3. Communicate with the attendant as necessary to allow the attendant to monitor entrant's status and enable the attendant to alert entrants of the need to evacuate.
4. Alert the attendant whenever:
 - a. The entrant notices any warning signs or symptoms of exposure to a dangerous situation, or
 - b. The entrant detects a prohibitive condition; and
5. Exits the space as quickly as possible whenever:
 - a. An order to evacuate is given by the attendant or the entry supervisor,
 - b. The entrant recognizes any warning sign or symptom of exposure to a dangerous situation,
 - c. The entrant detects a prohibited condition, or
 - d. An evacuation alarm is activated.
6. Be aware of activities in the space, from the space's process energy to activities of other entrants that may affect your exposures to hazards.

The Atmospheric Tester ³

This individual must possess the knowledge, skills, and abilities to properly use the testing and monitoring equipment and be able to interpret results to ensure all areas where the entry team will be working are within the established acceptable limits under 1910.146 (c)(4)(c)(5), (c)(7), (d)(4)(i), (d)(5), and (f)(10). The atmospheric tester needs to have a certificate of training on file at the company required under (g)(4) following the requirements of (g)(1)-(g)(3). Training of this individual needs to cover the following:

1. Knowledge of proper calibration procedures of all monitoring equipment prior to use as needed.
2. Know why, when, and how to bump test the instrument.
3. Know the limitations of all test instruments.
4. Is familiar with the sensor poisons and when not to use a test meter.
5. Has read the manufacture's instructions and has used the instrument before.
6. Is trained to periodically back up electronic sensors with other methods i.e. gasbags, detector tubes, PID, FID, MOS.
7. Has received training or is familiar with remote sampling techniques.
8. Has been designated by the entry supervisor as the atmospheric tester.

Rescue Personnel^{2,3}

If the employer selects an in-house rescue team to perform rescue operations from permit spaces the rescue personnel selected needs to have a current certificate of training on file with the company. Also, the persons selected need to be physically able to perform rescue tasks in a timely manner dependent on the hazards involved and be medically able to wear the PPE required (fit tested and trained for respirator use i.e. SCBA or airline combination unit). Persons selected for the rescue team must receive training as an authorized entrant and be proficient in the following:

1. Have access to the permit space to be entered and practice at least once every 12 months.
2. Is equipped for and proficient in; provided rescue equipment i.e. harness, lifelines, tripod or davit arm, rope and pulley or mechanical winch, stokes stretcher or back board, basic first aid and CPR procedures and at least one member is currently certified.
3. Horizontal rescue techniques requiring slide boards, backboards or the use of wristlet or anklets.
4. Non-entry rescue techniques and set-up and when entering the space for entrant packaging is necessary to prevent any further injury.
5. To facilitate non-entry rescue, the entrant shall be equipped with a full body harness with a lifeline attached to the center of the entrants back near shoulder level or other attachment point determined by the employer would be best with the other end attached to an anchor point outside or to a mechanical winch, rope and pulley.
6. High angle rescue issues and special equipment and training needed to retrieve entrants from a water tower, ventilation ductwork, a bag house or elevated tower.

Subject matter experts in the topics being taught must do the training for all entry personnel and company selected rescue team. The training must test the proficiency of the entry team member through hands-on application and documented testing to ensure the needed skills are acquired. The training program shall include, at a minimum, the following measureable elements:

Effective Confined Space Entry Team Training Minimum Requirements¹

- Needs assessment,
- Training topic objectives,
- Adult learning application and principles,
- Applicable standards and resources available for additional information,
- Clear course criteria for completion including passing post test,
- Training delivered by a knowledgeable instructor,

- Training evaluation and a continuous improvement system,
- Written training program plan and record keeping,
- Training certificate given to each student upon successful completion.

Following the preceding training recommendations and being familiar with the referenced documents, you should be able to deliver:

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Endnotes

¹ ANSI/ASSE Z490.1 – 2009, *Criteria for Accepted Practices in Safety, Health and Environmental Training*. Des Plaines, IL: ASSE.

² Occupational Safety and Health Administration (OSHA) 2012. 29 CFR 1910.146, Permit-required confined spaces.
http://www.osha.gov/pls/oshaweb/owasrch.search_form?p_doc_type=STANDARDS&p_toc_level=1&p_keyvalue=1910

³ ANSI/ASSE Z117.1 - 2009 – *Safety Requirements for Confined Spaces*. Des Plaines, IL: ASSE.