Confined Space – Permit Required – Stats and Facts

DID YOU KNOW?

According to data collected by the U.S. Department of Labor (USDOL), Bureau of Labor Statistics (BLS) Census of Fatal Occupational Injuries (CFOI) program, fatal injuries in confined spaces fluctuated from a low of 81 in 1998 to a high of 100 in 2000 during the five-year period, averaging 92 fatalities per year.

About 2.1 million workers enter permit confined spaces annually. According to the National Institute for Occupational Safety and Health (NIOSH), approximately 60 percent of confined-space fatalities are rescuers, and the Occupational Safety and Health Administration reported that when multiple deaths occur during a rescue, the majority of the victims are “would-be” rescuers.

Here are some findings of the NIOSH investigations of confined space incidents:

- 85% of the time a SUPERVISOR was present.
- 29% of the dead were SUPERVISORS.
- 31% had WRITTEN Confined Space Entry PROCEDURES.
- 0% used the WRITTEN PROCEDURES.
- 15% had Confined Space TRAINING.
- 0% had a RESCUE PLAN.
- 60% of “WOULD-BE” RESCUERS died.
- 95% were AUTHORIZED by supervision.
- 0% of the spaces were TESTED prior to entry.
- 0% were VENTILATED.

Out of 100 deaths that were investigated, the main reasons the workers entered the confined space were to perform their work functions of routine maintenance, repairs, and inspections of the confined space.

And out of 217 confined space deaths that were investigated, the two most common types of gases in confined spaces, hydrogen sulfide and carbon monoxide, were the causes found.

While these NIOSH statistics may slightly differ over the years, the reality is that the hazards of confined space entry are the same. Too many workers today are still seriously injured or dying in permit required confined spaces.

So the real question is to ask, “Why aren’t we eliminating or mitigating these risks?” Sadly, some things never change or never change enough because there is no continuous focus from the employers on realistically preparing, supervising, and protecting our workers before entry.

Time for a Reality Check

For more than 15 years, I have been training industrial and manufacturing workers on permit required confined space entry and rescue. The training required for entering a confined space includes a Supervisor, Entrant, Attendant, and Rescue Team.

The reality is that in my career of emergency response services for industrial and manufacturing facilities, I far too often see so many facilities that do not take permit required confined space entry preparation seriously. Their confined space entry and rescue training is inadequate, usually a short video and most often not retained, or utilization of a third-party trainer who doesn’t specialize in confined space training; thus, they’re receiving poor-quality training.

They do not have the proper equipment for confined space retrieval or rescue. They do not have the proper personal protective equipment, or their equipment has not been taken care of and is not safe to use. Or worse yet, they have no equipment at all. Their workers are not trained on the hazards associated with permit required confined spaces. They have no rescue plan or rescue team in place. They opt to call 911 (not an option). They decide they will perform only non-entry rescues, which are rarely effective when you need to rescue an unconscious victim. (Non-

entry rescue only as a plan is an entire topic for another article later!)

The reality is workers and rescuers are still dying or getting seriously injured in confined spaces. The reality is permit required confined spaces are still the leading cause of multiple fatalities in the workplace. The reality is that OSHA regulations mandate employers to provide training, equipment, and proficient rescue services for permit required spaces.

For permit required confined space, OSHA requires employers to identify hazards in confined spaces, test the air prior to entry and during entry, keep the space ventilated, have the proper safety equipment for entry and exit and rescue, and have procedures for summoning proficiently trained rescue teams who can respond in a timely manner.

So how do we change the statistics of confined space injuries and fatalities? Every facility needs to conduct a reality check. A well-designed and properly executed rescue plan is a must (not an option). Investigate their permit required confined space procedures thoroughly. Make changes. Identify and comply with OSHA regulations. Make changes. Inventory their equipment—replace, buy, repair. Make changes. Assign and train their workers and rescuers. Make changes.

The reality is, things must change, and it is the employers who are responsible for protecting their workers.

Time for Things to Change

Why am I so passionate about permit required confined space safety? I have witnessed the “best in class” facilities that made the right changes, and continue to make changes, to their permit required confined space entry procedures. Unfortunately, I also have visited the ones who did not, have not. The reality is, I have conducted permit required confined space entry and rescue training at facilities after a fatality(s). I have seen the faces of the workers who are grieving the loss of their co-worker(s). I have heard how distraught they are when they find out their

employer didn’t do what was required by OSHA.

The resources are out there for all employers to mitigate, or eliminate, the risks of injury or a fatality(s) when their workers are entering confined spaces as a part of their work function to perform maintenance, repairs or inspections, or other work. There is no excuse to not change the statistics. And if your facility does not have the internal resources necessary to investigate, evaluate, plan, and, most importantly, make changes, find a highly qualified and reputable third-party company that can assist in written procedures, training, and identifying the proper equipment.

Protecting workers is the law and, more importantly, it’s the right thing to do to protect your workers. Your financial investment in a good permit confined space program, training, and equipment is minimal compared to the OSHA citations and the lawsuits that may be filed due to the death of a worker in a confined space. And the cost of keeping on with the old adage, some things never change, is even much higher. The reality is the loss of a worker(s) to a confined space incident is not an option. The reality is with proper training and equipment, the loss of workers working in and around permit required confined spaces can be prevented.

- There were 431 confined space incidents with 530 fatalities in the US due to oxygen deficient and/or toxic atmospheres from 1992-2005
- From 08/18/2009 to 12/31/2009, there were 36 worker fatalities and 6 worker hospitalizations related to confined spaces.
- In 2010, there were 63 worker fatalities and 28 hospitalizations related to confined spaces.
- From 01/01/2011 to 08/01/2011, there were 22 worker fatalities and 3 worker hospitalizations related to confined spaces.
- Repair & Maintenance and cleaning & inspection activities account for almost one-quarter of confined space-related fatalities.

- Construction and manufacturing industries experience the most fatalities.

During a study done in 2006 by a California company, it was found that approximately one-fifth of the confined space incidents result in multiple fatalities. Data also indicated that for every fatality due to oxygen-deficient and/or toxic atmosphere, 2 non-fatal injuries occur, one of which requires hospitalization. More often than not, those additional injuries are to rescuers.

Even if properly trained, workers may forget their training and/or disregard proper entry procedures and enter a confined space without PPE because they are overcome by the natural emotion to rescue a co-worker. Although companies are required to and do have written procedures and programs related to confined space entry, it does not release the company from liability due to an employee's disregard of those procedures, no matter if the employee is regular, temporary or contract. As far as OSHA is concerned, employers are responsible for the safety of *ALL* workers.

KEEP IN MIND

In talking with customers every day, I've come to realize there is some confusion out there as to the various safety aspects of a confined space and the rights and responsibilities of those who work in or around them. Over the coming weeks, we're going to do a series of summary posts in an effort to help clarify this topic a little.

In this post, we'll talk about the 2 main types of confined spaces – permit and non-permit required – and their differences. But before we talk about that, let's first establish what a confined space is as it pertains to worker safety, shall we?

OSHA Confined Space Definition

According to OSHA a confined space is a space that meets these criteria:

1) being large enough for an employee to enter and perform work;

2) has limited or restricted means for entry or exit; and

3) is not designed for continuous occupancy.

This describes many kinds of areas a worker can come in contact with on a daily basis whether on a construction site or elsewhere. And it also illustrates what would be considered a *non-permit required* confined space.

Many workplaces contain spaces that are considered to be "confined" because their configurations hinder the activities of employees who must enter into, work in or exit from them. In many instances, employees who work in confined spaces also face increased risk of exposure to serious physical injury from hazards such as entrapment, engulfment and hazardous atmospheric conditions. Confinement itself may pose entrapment hazards and work in confined spaces may keep employees closer to hazards such as machinery components than they would be otherwise. For example, confinement, limited access and restricted airflow can result in hazardous conditions that would not normally arise in an open workplace.

The terms "permit-required confined space" and "permit space" refer to spaces that meet OSHA's definition of a "confined space" and contain health or safety hazards. For this reason, OSHA requires workers to have a permit to enter these spaces. Throughout this publication, the term "permit space" will be used to describe a "permit-required confined space."

Definitions

By definition, a **confined space**:

- Is large enough for an employee to enter fully and perform assigned work;
- Is not designed for continuous occupancy by the employee; and
- Has a limited or restricted means of entry or exit.

These spaces may include underground vaults, tanks, storage bins, pits and diked areas, vessels, silos and other similar areas.

By definition, a **permit-required confined space** has one or more of these characteristics:

- Contains or has the potential to contain a hazardous atmosphere;
- Contains a material with the potential to engulf someone who enters the space;
- Has an internal configuration that might cause an entrant to be trapped or asphyxiated by inwardly converging walls or by a floor that slopes downward and tapers to a smaller cross section; and/or
- Contains any other recognized serious safety or health hazards.

Now, a *permit-required* confined space will contain all of the above, **plus** one or more of the following:

- a substance that has the ability to engulf or asphyxiate the entrant
- a potentially hazardous atmosphere
- spaces with inwardly converging walls within the space or a floor that slopes downward, tapering to a small cross-section
- contains any other serious safety or health hazard

Once a confined space has been identified as having any one of the above four potential hazards, an employer should identify it as such via either safety signs or another effective means of communication. Any time an employer has workers that will be entering confined spaces, there needs to be a written program developed that outlines and instructs on the proper safety procedures for working around and occupancy of these confined spaces.

One such important procedure is drafting the actual permit for the permit required confined space. This is called the entry permit and is defined by OSHA as:

the written or printed document that is provided by the employer to allow and control entry into a permit space and that contains the necessary information as required in paragraph (f) of this standard's section.

I can hear you now…just dying to find out what is in paragraph f! Well, don't get too excited, because OSHA lists **14** required pieces of information that need to be on a confined space entry permit. And in the spirit of resourcefulness, I'll list each one here in the following section, but thought it might also be helpful to show an example of a typical confined spaces entry permit, with all of the correct information, so I've included that after the list. Without further ado, the following information is what OSHA wants to see on an entry permit for confined spaces:

1. The confined spaces to be entered;
2. The purpose of entry;
3. The date and authorized duration of the permit;
4. The authorized entrants within the permit space, by name or some other means that will enable the attendant to determine quickly and accurately, for the duration of the permit, which authorized entrants are inside the permit space;
5. Names of attendants;
6. Supervisor's name, with a space for the signature or initials of the supervisor who originally authorized entry;
7. The hazards of the confined spaces to be entered;
8. The measures used to isolate the permit space and to eliminate or control any occupational hazards before enter (i.e. purging, flushing, or ventilating the confined space as well as lockout and tagging of equipment);
9. Acceptable entry conditions;
10. The results of any initial and periodic tests performed, accompanied by the names or initials of the testers and by an indication of when the tests were performed;
11. The rescue and emergency services that can be called on and the means (such as the equipment to use and the numbers to call) for reaching those services;
12. The communication procedures used by authorized entrants and attendants to maintain contact during the entry;

13. Equipment, such as personal protective equipment, testing equipment, communications equipment, alarm systems, and rescue equipment, to be used in the confined spaces;
14. Any other information whose inclusion is necessary, given the circumstances of the particular confined space, in order to ensure employee safety; and any additional permits, such as for hot work, that have been issued to authorize work in the permit space.

Any employer who allows employee entry into a permit space must develop and implement a written program for the space. Among other things, the OSHA standard requires the employer's written program to:

- Implement necessary measures to prevent unauthorized entry;
- Identify and evaluate permit space hazards before allowing employee entry;
- Test atmospheric conditions in the permit space before entry operations and monitor the space during entry;
- Perform appropriate testing for the following atmospheric hazards in this sequence: oxygen, combustible gases or vapors, and toxic gases or vapors;
- Establish and implement the means, procedures and practices to eliminate or control hazards necessary for safe permit space entry operations;
- Identify employee job duties;
- Provide and maintain, at no cost to the employee, personal protective equipment and any other equipment necessary for safe entry and require employees to use it;
- Ensure that at least one attendant is stationed outside the permit space for the duration of entry operations;
- Coordinate entry operations when employees of more than one employer are working in the permit space;
- Implement appropriate procedures for summoning rescue and emergency services, and preventing unauthorized personnel from attempting rescue;
- Establish, in writing, and implement a system for the preparation, issue, use and cancellation of entry permits;
- Review established entry operations annually and revise the

permit space entry program as necessary; and
- Implement the procedures that any attendant who is required to monitor multiple spaces will follow during an emergency in one or more of those spaces.

Controlling Hazards

The employer’s written program should establish the means, procedures and practices to eliminate or control hazards necessary for safe permit space entry operations. These may include:

- Specifying acceptable entry conditions;
- Isolating the permit space;
- Providing barriers;
- Verifying acceptable entry conditions; and
- Purging, making inert, flushing or ventilating the permit space.

Equipment for safe entry

In addition to personal protective equipment, other equipment that employees may require for safe entry into a permit space includes:

- Testing, monitoring, ventilating, communications and lighting equipment;
- Barriers and shields;
- Ladders; and
- Retrieval devices.

Detection of hazardous conditions

If hazardous conditions are detected during entry, employees must immediately leave the space. The employer must evaluate the space to determine the cause of the hazardous atmosphere and modify the program as necessary.

When entry to permit spaces is prohibited, the employer must take effective measures to prevent unauthorized entry. Non-permit confined spaces must be evaluated when changes occur in their use

or configuration and, where appropriate, must be reclassified as permit spaces.

A space with no potential to have atmospheric hazards may be classified as a non-permit confined space only when all hazards are eliminated in accordance with the standard. If entry is required to eliminate hazards and obtain data, the employer must follow specific procedures in the standard.

Informing Contract Employees

Employers must inform any contractors whom they hire to enter permit spaces about:

- The permit spaces and permit space entry requirements;
- Any identified hazards;
- The employer's experience with the space, such as knowledge of hazardous conditions; and
- Precautions or procedures to be followed when in or near permit spaces.

When employees of more than one employer are conducting entry operations, the affected employers must coordinate entry operations to ensure that affected employees are appropriately protected from permit space hazards. The employer also must give contractors any other pertinent information regarding hazards and operations in permit spaces and be debriefed at the conclusion of entry operations.

Entry Permits

A permit, signed by the entry supervisor, must be posted at all entrances or otherwise made available to entrants before they enter a permit space. The permit must verify that pre-entry preparations outlined in the standard have been completed. The duration of entry permits must not exceed the time required to complete an assignment.

Entry permits must include:

- Name of permit space to be entered, authorized entrant(s),

eligible attendants and individuals authorized to be entry supervisors;
- Test results;
- Tester’s initials or signature;
- Name and signature of supervisor who authorizes entry;
- Purpose of entry and known space hazards;
- Measures to be taken to isolate permit spaces and to eliminate or control space hazards;
- Name and telephone numbers of rescue and emergency services and means to be used to contact them;
- Date and authorized duration of entry;
- Acceptable entry conditions;
- Communication procedures and equipment to maintain contact during entry;
- Additional permits, such as for hot work, that have been issued authorizing work in the permit space;
- Special equipment and procedures, including personal protective equipment and alarm systems; and
- Any other information needed to ensure employee safety.

Cancelled entry permits

The entry supervisor must cancel entry permits when an assignment is completed or when new conditions exist. New conditions must be noted on the canceled permit and used in revising the permit space program. The standard requires that the employer keep all canceled entry permits for at least one year.

Worker Training

Before the initial work assignment begins, the employer must provide proper training for all workers who are required to work in permit spaces. After the training, employers must ensure that the employees have acquired the understanding, knowledge and skills necessary to safely perform their duties. Additional training is required when:

- The job duties change;
- A change occurs in the permit space program or the permit

space operation presents any new hazard; and
- An employee’s job performance shows deficiencies. In addition to this training, rescue team members also require training in CPR and first aid. Employers must certify that this training has been provided.

After completion of training, the employer must keep a record of employee training and make it available for inspection by employees and their authorized representatives. The record must include the employee’s name, the trainer’s signature or initials and dates of the training.

Assigned Duties

Authorized entrant

Authorized entrants are required to:

- Know space hazards, including information on the means of exposure such as inhalation or dermal absorption, signs of symptoms and consequences of the exposure;
- Use appropriate personal protective equipment properly;
- Maintain communication with attendants as necessary to enable them to monitor the entrant’s status and alert the entrant to evacuate when necessary;
- Exit from the permit space as soon as possible when:
- Ordered by the authorized person;
- He or she recognizes the warning signs or symptoms of exposure;
- A prohibited condition exists; or
- An automatic alarm is activated.
- Alert the attendant when a prohibited condition exists or when warning signs or symptoms of exposure exist.

Attendant

The attendant is required to:

- Remain outside the permit space during entry operations unless relieved by another authorized attendant;
- Perform non-entry rescues when specified by the employer’s rescue procedure;
- Know existing and potential hazards, including information on the mode of exposure, signs or symptoms, consequences and physiological effects;
- Maintain communication with and keep an accurate account of those workers entering the permit space;
- Order evacuation of the permit space when:
- A prohibited condition exists;
- A worker shows signs of physiological effects of hazard exposure;
- An emergency outside the confined space exists; and
- The attendant cannot effectively and safely perform required duties.
- Summon rescue and other services during an emergency;
- Ensure that unauthorized people stay away from permit spaces or exit immediately if they have entered the permit space;
- Inform authorized entrants and the entry supervisor if any unauthorized person enters the permit space; and
- Perform no other duties that interfere with the attendant’s primary duties.

Entry supervisor

Entry supervisors are required to:

- Know space hazards including information on the mode of exposure, signs or symptoms and consequences;
- Verify emergency plans and specified entry conditions such as permits, tests, procedures and equipment before allowing entry;
- Terminate entry and cancel permits when entry operations are completed or if a new condition exists;
- Verify that rescue services are available and that the means for summoning them are operable;
- Take appropriate measures to remove unauthorized entrants; and

- Ensure that entry operations remain consistent with the entry permit and that acceptable entry conditions are maintained.

Emergencies

Rescue service personnel

The standard requires employers to ensure that responders are capable of responding to an emergency in a timely manner. Employers must provide rescue service personnel with personal protective and rescue equipment, including respirators, and training in how to use it. Rescue service personnel also must receive the authorized entrants training and be trained to perform assigned rescue duties.

The standard also requires that all rescuers be trained in first aid and CPR. At a minimum, one rescue team member must be currently certified in first aid and CPR. Employers must ensure that practice rescue exercises are performed yearly and that rescue services are provided access to permit spaces so they can practice rescue operations. Rescuers also must be informed of the hazards of the permit space.

Harnesses and retrieval lines

Authorized entrants who enter a permit space must wear a chest or full body harness with a retrieval line attached to the center of their backs near shoulder level or above their heads. Wristlets may be used if the employer can demonstrate that the use of a chest or full body harness is not feasible or creates a greater hazard.

Also, the employer must ensure that the other end of the retrieval line is attached to a mechanical device or a fixed point outside the permit space. A mechanical device must be available to retrieve someone from vertical type permit spaces more than five feet (1.524 meters) deep.

SDS

If an injured entrant is exposed to a substance for which a Safety Data Sheet (SDS) or other similar written information is required to be kept at the worksite, that SDS or other written information must be made available to the medical facility personnel treating the exposed entrant.