

Confined Spaces

Common Misconceptions & Errors in Complying With OSHA's Standard

By Bill Taylor

OSHA's permit-required confined space standard (PRCS) went into effect April 15, 1993. This standard (1910.146), arguably the second most difficult of OSHA's standards to comprehend, second only to recordkeeping (1904), likely is the hardest with which to comply. After 18 years, most employers, including many with sound safety systems, are still not in compliance, based on the author's experience. What makes compliance so difficult? What is it employers are not doing?

As a safety consultant, the author has been an expert witness in confined space litigation. He also has conducted audits of clients' confined space systems throughout the U.S., and not a single audit has been without findings. This article shares some common findings encountered to help employers improve their confined space systems. It also examines some misconceptions about the confined space standard. The following findings are presented in no particular order.

IN BRIEF

- For the 5-year period 1998 through 2000, on average, 92 workers died in confined spaces per year.
- Confined space fatalities can be prevented by establishing an effective confined space system and following procedures.
- This article shares some common audit findings encountered to help employers improve their confined space systems. It also examines some misconceptions about the confined space standard.

Misconception No. 1: Large Enough to Enter

Anyone familiar with OSHA's definition of a confined space will quickly recognize the error in the statement, "Large enough to enter." According to OSHA's definition (the only one that counts), a

confined space is, among other things, large enough and so configured that an employee can bodily enter and perform assigned work. For some reason, many employers, in fact most of those audited by the author, have omitted the word "bodily" from the definition of a confined space. This is a big mistake.

If a confined space entry policy writer removes the word "bodily" from the confined space definition, s/he is removing any guidance as to size of the space. This means the space can be any size, including a very small space. By removing the word "bodily," the policy is saying that the space need not be large enough for one to get his/her body into it, only some part of the body.

For example, a residential water meter box, which ordinarily is too small to qualify as a confined space, now meets the definition. Since a poisonous snake or spider may be inside the box, it would be a PRCS. In turn, this would require the city-employed residential water meter reader to have a permit for every meter box s/he must reach into to read the meter.

This omission likely occurs because the policy writer wants the document to reflect his/her own words or is concerned about violating copyright law. As for copyright, OSHA standards are in public domain and are not protected by copyright. These laws can be used verbatim.

While admirable to attempt to make the policy more user friendly or more consistent with other company policies, the writer must not change the meaning. Policy writers must be extremely careful about changing or omitting words from regulations.

Misconception No. 2: A Confined Space Is an Enclosed Space

Another common mistake occurs when employers add to OSHA's definition and define a confined space as an enclosed space. The current definition says nothing about a confined space being enclosed. This likely is a carryover from earlier, pre-1910.146 definitions of confined spaces or perhaps employers are considering only the definition from the ANSI Z117.1 consensus standard.

By adding the word *enclosed*, many spaces that

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otherwise meet OSHA's definition will not be included in the confined space inventory. Examples include an open top aeration basin at a wastewater treatment plant or an open top valve pit (Photo 1). In most cases, these will be PRCS by OSHA's definition, even though neither is enclosed. By changing the definition and not recognizing them as confined spaces, workers required to enter such spaces may be at risk.

Misconception No. 3: All PRCS Must Be Labeled With a Sign

This is a common misconception that can cost an employee his/her life. While signs are a good way to inform employees of the presence and locations of PRCS, unless specific state mandates require such signs (and so far this author has found none), OSHA does not dictate what method employers should use to inform employees of PRCS. Nearly all the written systems examined by the author state that all PRCS will be identified by posting a sign at or near the space's opening.

This introduces two problems. First, if an employer states it will identify every PRCS with a sign, then fails to do so, it can be cited by OSHA for violating its own rule. Second, and this is what makes it dangerous, it never happens. Most employers have PRCS that have not been recognized as confined spaces (see Misconception No. 4), let alone identified with signs, even though their policies state that such signs will be used for this purpose.

It is easy to overlook PRCS. Additionally, certain spaces may have been considered, yet because of a lack of understanding of 1910.146 or because the definition was changed, it was determined that the space(s) did not meet the definition of PRCS.

In the author's experience, the more effective the employer's safety system, the more dangerous it is for workers. Consider this example. The author conducted a deep-dive audit for an East Coast electric power generation company. The employer believed it had one of the best safety systems in the country and certainly within its industry. The audit supported this opinion. The system was very good. So good, in fact, that during some interviews employees demonstrated a conviction that if management said it, then it was true.

For example, this company had installed engraved metal signs to identify PRCS. However, several PRCS had not, for some reason, been identified with a sign of any type. During one interview, the auditor pointed to such an unsigned space and asked the interviewee whether he would need a permit to enter the space. He said



Photo 1 depicts a permit-required confined space that is not enclosed. Failing to recognize such a space places workers at risk.

no because no sign was posted. Even after explaining why the space was a confined space and pointing out hazards and potential hazards within it, the employee remained steadfast in his belief that a permit was not required. "They told us if it didn't have a sign, then we didn't need a permit," he emphatically stated. The dangers are evident.

At 1910.146(c)(2) OSHA states, "If the workplace contains permit spaces, the employer shall inform exposed employees, by posting danger signs or by any other equally effective means, of the existence and location of and the danger posed by the permit spaces."

As long as employees can recognize a PRCS and its associated danger, then the standard's intent has been met; therefore, training employees to be able



While signs are a good way to identify PRCS, they should not be the only method used since signs fade (Photos 2 and 3) or get damaged, and spaces get overlooked.



If a sign is used, it should be a danger sign, not a caution sign.

The sign in Photo 4 violates 1910.146(c)(2) and 1910.145(c).

In addition, the unmarked manhole cover (Photo 5, below) is part of the same system as the manhole cover seen in the background, which is marked.

Marking one and not marking the other sends the wrong message to workers who have not been trained to know that there will not always be a sign to indicate the space is permit-required.



to recognize PRCS and their hazards would be an adequate alternative to signs. A sign is a good way to do this, but not the only way, nor should it be the only method used since signs fade or get damaged, and spaces get over-

looked (Photos 2 and 3, p. 43).

In addition, it is not feasible to post signs at or near the openings of every PRCS. Some employers will have tens, if not hundreds of thousands of PRCS. For example, how many PRCS might one find at a typical chemical plant or refinery? How many manholes are in New York City or Davenport, IA? Where are these manholes? Many are located in the streets where they are run over by thousands of cars and trucks each day.

According to the Con Edison website, the electrical provider has more than 250,000 manholes and service boxes within its service area, which includes Westchester County and the five boroughs of New York City. Not only would installing signage be cost-prohibitive for some employers, but ensuring that each one is identified is nearly impossible. And, if a company fails, for whatever reason, to post a sign on a space after it tells workers it will, the company may be sending workers the wrong message (Photos 4 and 5).

This is not to suggest that signs should not be used. Employers should install signs. In addition, however, they should train workers to recognize PRCS and inform them that the absence of a sign does not mean a hazard does not exist and a permit is not needed. Workers also must know that any time they have doubts they should seek help in making such determinations.

With respect to signs, there is no such thing as a dangerous non-permit confined space. Yet, many employers post signs with the message: Danger! Nonpermit Confined Space or a similar message. If a confined space contains any danger or has a potential for a hazardous atmosphere, then that space is a PRCS and should be marked accordingly. Also, many employers use caution signs to identify PRCS. Remember, 1910.146(c)(2) says that if a sign is used,

then it is to be a danger sign. The standard, at 1910.145(c), details the difference between a danger sign and a caution sign. Never understate the danger of a PRCS by posting anything other than a danger sign.

Misconception No. 4: Confined Space Recognition

Few employers have identified every PRCS on a site. Many have tried valiantly, but some spaces likely will be overlooked, particularly as the number of spaces increases (Photo 7, p. 46). This is understandable given the way confined spaces are defined by 1910.146.

The only way to effectively identify all PRCS is to walk through the entire site looking for spaces that meet the definition. During the walk through, ask:

- 1) Is the space large enough and so configured that the smallest employee can get his/her body into it and still have wiggle room to perform the task?
- 2) Does the space in question have entry openings so small that entrants are unable to walk through upright and unimpeded? Or, must they bend over, step up, turn sideways or otherwise contort the body to enter or exit?
- 3) Is the space not intended or designed for continuous occupancy?

Any space meeting these three elements is considered a confined space.

Although this sounds simple enough, remember that not every worker is the same size. Many spaces have been deemed to be too small for bodily entry and, thus, are not included on the confined space inventory. Yet, one can easily underestimate an individual's ability to squeeze through an opening. The author has conducted at least one fatality investigation in which the entrant got his entire body through an 8-in. opening shortly before he was asphyxiated. The employer did not consider the space to be a confined space because it was believed that no one could fit through such a small opening.

A special audit must be conducted by someone with a strong understanding of OSHA's confined space standard, or at least of the definitions of a confined space and the two types of confined spaces. This individual should go through the workplace and methodically consider each space that might remotely meet the criteria, applying the definitions along the way. If a space is identified as a confined space, one must then determine whether it is permit or non-permit space.

Misconception No. 5: Permit Duration

According to OSHA, a permit for entering a PRCS can be valid for as long as it takes to perform the work within the space. While most employers understand this concept, many have misunderstood that a permit may be valid for a period of up to 8 hours. Many will even have their maximum duration, such as 8 hours, printed somewhere on the permit (often at the top).

This mistake appears to have originated from



There is no such thing as a non-permit confined space with a danger (Photo 6, left). If danger exists, the space is permit-required. The sign in Photo 7 (right) indicating the space is a confined space is not compliant with 1910.146(c)(2) because it does not contain information required. It also violates 1910.145(c)(1)(i) since the sign varies from design requirements for a danger sign.

the standard itself. The sample permit provided in Appendix D-2 states, near the top, that it is valid for 8 hours only. Many employers have adopted this sample permit or modeled theirs to resemble it, including the 8-hour duration statement. This would be a violation for any entry that would last less than the stated 8-hour period. If it is a 2-hour job, then the permit may be written for no more than 2 hours. If it is later determined that more time is needed, then the permit can be cancelled and a new permit written, or the original permit may be extended.

OSHA has clarified, through verbal interpretation to the author, that Appendix D-2 was intended only to be an example and was not meant to be used without recognizing the need to adjust the duration based on the job. This is a rare example in which copying OSHA language verbatim is not good.

Misconception No. 6: Any Space Can Be Reclassified

The biggest problem in reclassification seems to be the potential for hazardous atmosphere. It seems many employers erroneously believe that if they ventilate a PRCS that might have a potential for an atmospheric hazard, then they can reclassify the space under 1910.146(c)(7). This is not always true. Ventilation only controls the atmospheric hazard, it does not eliminate it. If the atmospheric hazard could return once ventilation ceases or is removed, then the space may not be reclassified.

Often, a confined space system will contain provisions to reclassify sanitary sewers. Sanitary sewers may never be reclassified since the potential for an atmospheric hazard cannot be eliminated. The best policy is to consider any confined space that is below grade a PRCS since it is rarely known what may be seeping through the soil or floating on the water table. Such contaminants, which usually come from leaking underground storage tanks, leaking gas pipes, etc., often wind up inside vaults, storm drains and sanitary sewers. If all hazards and the potential for hazards cannot be eliminated, then the space cannot be reclassified.

Misconception No. 7: Rescue

When a confined space emergency occurs, time is of the essence. Most employers audited by the author boast of having a well-trained in-house emergency response team or an established agreement with the local fire department, yet they are not capable of effective, safe rescue of entrants. Many employers have failed to adequately evaluate rescue capability or have failed to make corrections when evaluations reveal serious problems. In most cases, rescue plans have several problems.

For example, one refinery had a top emergency

response team, as evidenced by the trophies lining the walls of the team commander's office—trophies the in-house team had won in competitions around the country. During an audit interview, the team commander was asked about the competitions. The most recent competition, which all team members attended, was in Phoenix, AZ, he said.

When asked who provides rescue at the plant while the team is at a competition, he said the site would rely on the local fire department. Yet, according to the team commander, the fire department's response time was 25 to 30 minutes to the front gate. Furthermore, the company had not evaluated the effectiveness of the fire department's response.

At another site outside a small Midwestern town, the plan was to call the local volunteer fire department in the event of an emergency. Confidence was high because a plant employee was a volunteer firefighter. However, he had a full beard that would preclude him from wearing an SCBA to enter a space for rescue. Also, he was too large to fit through most openings of the plant's PRCS.

And what was the plan during the periods when this employee was not on duty? The response time, according to the local chief at the volunteer station, was 10 to 15 minutes. However, the department had never been on site to conduct drills or even evaluate the plant's PRCS.

Another audit involved a review of canceled confined space permits. One PRCS entry had up to eight entrants within the space at any given time. How was the single attendant going to rescue eight entrants if an emergency should arise in which all entrants were overcome by contaminants or oxygen deficiency? The thought of such an eventuality was not considered at the time of entry. In other words, no planning had taken place.

As noted, many employers have not thoroughly evaluated either in-house or outside rescue service capabilities. This is particularly true for those who plan to rely on local municipal or volunteer fire departments. The local fire department may be well trained and properly equipped (although this is not always the case), but its abilities are negated if held up by a train, traffic or a draw bridge.

Rescue also can be delayed if responders have never trained for rescue from specific spaces that present unusual difficulties (e.g., the only portal is too small to allow entry while using SCBA, or is too restrictive to allow the use of spinal immobilization devices). A portal may be at the top of a tank 50 ft in the air, or the only tank entry is obstructed by fea-



Photo 7 shows a dock leveler, which employers often fail to recognize as PRCS.

tures such as piping or structural members that prohibit use of standard retrieval equipment.

If the local fire department is not trained or equipped to provide adequate rescue service, then provisions must be made to ensure that proper rescue is made available by some other means.

Ignoring the fact that a serious problem exists could result in loss of life. In effect, the employ-

ees at such sites do not have a rescue team that will be able to respond in time to save lives. Unfortunately, they are unaware of this until too late.

Misconception No. 8: Atmospheric Monitoring

Atmospheric monitoring instrumentation has improved significantly in recent years, making it more reliable and easier to operate. While most employers with a confined space program have obtained adequate atmospheric monitoring equipment and have trained employees to use it, atmospheric monitoring inside PRCS may not be conducted properly.

During one of the author's audits, the entry supervisor simply waved the instrument at arm's length inside the space opening for all of 3 seconds, even though entrants were working deep within the space several feet from the opening.

The author also has observed equipment that has not been calibrated since leaving the factory or is being used to monitor contaminants; or sites at which bump tests, a quick functional test to verify accuracy of atmospheric monitoring instruments, have never been conducted.

In one case, a monitor was set up with the probe inside the space, yet the battery was dead. One audit interviewee was observed using a monitor to check the atmosphere inside a sanitary sewer. When asked what the instrument was measuring, he could only be sure that oxygen was among the "three or four gases" it would check.

Although some employers do an excellent job in this area, many, especially those without the input and advice of an appropriate expert, fail to follow manufacturer's instructions for proper equipment care, maintenance and use.

Manufacturer's representatives will come on site to conduct employee training, yet when questioned, those who have been trained often are unable to answer simple questions regarding use of the equipment or potential hazards within spaces for which they are responsible. The result is a false sense of security for the entrant who thinks the air within the space has been properly checked before entry.

Misconception No. 9: System Effectiveness

Any employer that allows workers to enter PRCS should thoroughly audit its confined space systems and practices, including rescue procedures, at least annually. It also is suggested that each entry be evaluated upon completion in the same way one would critique a fire drill.

OSHA requires a debriefing between the host employer and contractors at the conclusion of confined space operations. The author suggests that each confined space job be followed by a debriefing. This would enable employers to detect potential problems that can be corrected before subsequent entries are made and possibly prevent confined space entry from becoming routine.

Conclusion

It has been said, rightfully so, that full OSHA compliance is not possible. In some cases, non-compliance may not pose a great threat to workers. For example, it is a violation if the letters on exit signs are only 5 in. tall instead of the required minimum 6 in., but it is not a violation that poses the same danger as a failure to lockout equipment. In cases that involve electrical hazards, fall hazards and improper machining guarding, the threat is real and consequences severe.

Working inside PRCS easily falls into this category. It is an area in which there is no room for error, and shortcuts cannot be tolerated. When things go wrong during a confined space entry, people do not just get hurt, they die. But the threat is so often a silent one. Yet, there are few areas among employers with confined space systems in which there is greater noncompliance.

Many employers have excellent confined space systems, but many more are dangerously non-compliant and are placing workers at risk. Often, however, they are unaware of the extent of their noncompliance. Many believe their system is adequate, enabling employees to enter and work safely within PRCS and having reliable rescue. This is a dangerous assumption that has resulted in many employee fatalities.

Do not wait for OSHA to point out the problems. Do not wait for an emergency to reveal the problems. Instead, conduct an audit, ask tough questions that might reveal problem areas, then ensure that corrections are made. Lives will not be saved by ignoring the problem. **PS**

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