

CWA Occupational Safety and Health Fact Sheet #12

Confined Spaces & the Workplace

The hazards associated with entering and performing work in confined spaces is capable of causing bodily injury, illness, and death to involved workers. CWA members employed as telecommunications cable splicers and outside plant technicians as well as workers employed within the manufacturing industry work in confined space environments. Confined spaces are areas that, by design, have limited openings for entry and exit, unfavorable natural ventilation that could contain or produce dangerous air contaminants, and are not intended for continuous worker occupancy. For CWA members, confined space work is done primarily in telecommunications manholes, vaults and customer premise crawl spaces as well as containers and similar equipment used in manufacturing plants that fit the description of a confined space.

Health Effects

CWA members who work in confined spaces are confronted with many potentially hazardous conditions. These hazards can range from an oxygen deficient atmosphere or exposure to toxic agents (i.e., plugging compounds, solvents) to the possibility of an explosion or structural and/or environmental hazards.

The initial symptoms of an oxygen deficient atmosphere are increased breathing volume and accelerated heartbeat. As the percentage of oxygen in the air decreases, other health symptoms such as rapid fatigue, nausea, and unconsciousness occur. According to the National Institute for Occupational Safety and Health (NIOSH), when the oxygen level becomes less than six percent (6%), death will occur in minutes. Oxygen content is in a safe range when it is between 19% and 21%.

CWA members may also suffer exposure to carbon monoxide, a colorless, odorless, and tasteless gas, while performing confined space work. This toxic gas, produced by the incomplete burning of products like coal, wood, gasoline, oil, propane, or any product that contains carbon, can result in various health symptoms including headaches, dizziness, drowsiness, and nausea. Prolonged exposure to carbon monoxide can cause convulsions, asphyxiation, and possibly, death.

Confined space work may also involve work with and exposure to isocyanates contained in telecommunications plugging/splicing compounds. Commonly used plugging compounds include isocyanate compounds such as toluene diisocyanate (TDI) and methylene bisphenyl diisocyanate (MDI). Of particular concern, inhalation to isocyanate products may cause nausea, vomiting, abdominal pain, and breathing problems. In addition, exposure may cause sensitization among affected workers to isocyanate products like TDI and MDI. In turn, further exposure may lead to workers suffering severe allergic reactions that could result in death.

Over the years, CWA members who perform confined space work may have utilized and suffered exposure to hazardous solvents or degreasers including carbon tetrachloride, trichloroethylene, trichloroethane, perchloroethylene, trichlorotrifluoroethane, and mineral spirits. The danger in using solvents in confined spaces varies according to the type of solvent and the duration and

intensity of exposure. CWA members may be exposed to solvents through skin contact that may cause contact dermatitis, a skin rash, and skin absorption. More hazardous is the likelihood that confined space workers will suffer the effects from inhalation of toxic solvent vapors. These vapors can cause upper respiratory irritation, including bronchitis. In addition, solvents may affect the worker's central nervous system, acting as depressants and anesthetics. The resultant dizziness and drowsiness may contribute to a worker being unable to exit a confined space in time to avoid more serious or permanent damage from over-exposure.

CWA members work with lead-encased telecommunications cables and will continue to do so until the cables are completely replaced by polyvinyl or fiber optics. Until that is accomplished, the confined space worker will encounter hazardous lead dust and fumes produced while performing splicing operations with lead-encased cables. Fumes are tiny particulates that boil off when lead is heated. Lead dust is formed during grinding, carding, filing, and many other operations. In addition, a fine film of lead sub-oxide dust can form on the surface of molten lead. The dust is almost invisible even at high concentrations. Due to the design of confined spaces, over-exposure to these lead hazards is likely to occur. Over-exposure to lead can result in headaches, fatigue, high blood pressure, irritability, insomnia, aching muscles and joints, and constipation. More serious effects may be damage to the nervous system, kidney damage, sterility and birth defects, anemia, and interference with the body's blood-forming mechanism.

A number of physical ergonomic hazards exist in confined space work. Some physical hazards cannot be eliminated because of the design/nature of the confined space or the work to be performed within the confined space. Potential hazards include electrical equipment, scaffolding, the development of surface residues, and structural hazards. While electrocution or electrical shock is not the major cause of fatalities in confined spaces, a study by NIOSH indicates it has been a factor in several injuries and deaths in confined spaces. The use of scaffolding in confined spaces may contribute to accidents caused by workers or falling materials. Surface residues in confined spaces can increase the already hazardous condition of electrical shock and bodily injury due to slips and falls.

Due to the design of confined spaces, noise may reverberate within these workplaces resulting in worker exposure to dangerous noise levels. This intensified noise increases the risk of hearing damage and may prevent the affected worker(s) from hearing commands or warning signals. Additional ergonomic hazards include sitting, kneeling, and working in cramped, constrained postures for long periods of time, as well as poor tool design and illumination.

Controlling the Hazard

Poor natural ventilation is one of the characteristics of a confined space. Purging is the initial step in adjusting the atmosphere in a confined space to acceptable standards. This is accomplished by displacing the atmosphere in the confined space with fluid or vapor, or by forced air ventilation. After purging the atmosphere, testing should be conducted to determine oxygen level, flammability characteristics, the presence of toxic agents, and physical hazards (i.e., limited openings, communications).

CWA strongly believes that there must be two workers assigned to perform confined space work. This would allow one employee to perform the work inside the confined space work environment

and a second employee to remain above ground/at the entrance to render assistance if a safety or health emergency occurs. The second person would need to be capable of performing basic first aid and cardiopulmonary resuscitation procedures. Involved workers should be provided with safety belts and/or harnesses. In addition, hoisting equipment should be provided to enable the employee above-ground to lift her/his co-worker out of the confined space if an emergency develops, as well as protecting the employee working above-ground from having to enter the confined space and being exposed to the hazard. In addition, although air monitoring is currently required before a worker enters a confined space work environment, continuous air monitoring should be provided where there is the possibility that potentially hazardous conditions may develop.

Telecommunications workers who perform confined space work are covered by the OSHA Telecommunications Standard Code of Federal Regulations (CFR), 29 CFR 1910.268, Section (o), Underground Lines; 29 CFR 1910.146, the OSHA General Industry Permit-Required Confined Spaces Standard, as well as the OSHA Construction Industry Confined Spaces Standard, 29 CFR 1926.1200-1213; whereas other CWA members, including manufacturing workers, who perform confined space work are covered by the OSHA General Industry Permit-Required Confined Spaces Standard, CFR 1910.146.

OSHA Telecommunications Standard

In the OSHA General Industry Standards, 29 CFR 1910, the Telecommunications Standard may be found in 29 CFR 1910.268. In particular, Section (o) "Underground Lines" contains requirements for telecommunications work in confined spaces. This section of the Standard provides for the guarding of an opening to a manhole by railings or other suitable temporary barriers and the length of ladders used to enter and exit manholes. The Standard also provides for proper procedures prior to entering and working in a manhole. These procedures include testing the internal atmosphere and conducting continuous ventilation of the work area in the event that hazardous vapors are initially detected, organic solvents and/or open-flame torches are used, or the manhole is located in a traffic area exposing the worker to seepage of gases produced by vehicular traffic.

Section (o) also provides requirements for work being performed in a manhole containing both electric and telecommunications utility equipment. Specifically, it requires that an employee with basic first aid training be in the immediate vicinity to render emergency assistance as may be necessary. Unfortunately, the same paragraph also indicates that employees may enter and work alone in a joint-use manhole for short periods of time "if such work can be performed safely." Leaving this section of the Standard open to legal interpretation has contributed to confusion and disparity of treatment by employers.

To counteract this situation, CWA members have been instrumental in working with several states to enact legislation that specifically requires two workers to a confined space; one above ground trained in basic first aid and cardio-pulmonary resuscitation procedures to provide assistance in the event of an emergency. These states include California, Kentucky, Maryland, Michigan, and Pennsylvania. (Interested members may contact the department of labor within the specific state(s) to obtain a copy of the legislation/regulation).

In instances where CWA members must work alone to perform confined space work, absent specific language (regulatory, legislative, or contractual) indicating that two employees must be assigned to all confined space work, CWA members should perform the assigned job. The only exception to this practice would be work that would constitute "imminent danger." An "imminent danger" situation refers to "any condition or practice where there is reasonable certainty that a danger exists that can be expected to cause death or serious physical harm immediately or before the danger can be eliminated through normal (OSHA) enforcement procedures." If a member believes an "imminent danger" condition exists, she/he should immediately notify the supervisor and the appropriate union representative. In addition, the workers should request alternate work until the "imminent danger" is abated.

OSHA Permit-Required Confined Spaces Standard

Promulgated on April 15, 1993, 29 CFR 1910.146, the OSHA General Industry Permit-Required Confined Spaces Standard, contains requirements for practices and procedures to protect workers in general industry who perform confined space work. The standard requires all employers, including telecommunications and manufacturing companies, to determine if their workplace(s) contains/contain any confined spaces that meet the definition of a permit-required confined space (i.e., having one or more of the following characteristics):

- Contains or has a potential to contain a hazardous atmosphere;
- Contains a material that has the potential for engulfing an entrant,
- Has an internal configuration such that an entrant could be trapped or asphyxiated by inwardly converging walls or by a floor which slopes downward and tapers to a smaller cross-section, or
- Contains any other recognized serious safety or health hazard.

Therefore, all general industry employers, including telecommunications companies, must investigate all confined spaces to determine if working conditions are safe and healthful.

However, where telecommunications employers have information indicating that confined spaces comply with the requirements spelled out in 29 CFR 1910.146, they would not have to physically investigate these confined spaces. Such information must be provided to requesting CWA members and representatives. Further, in cases where the investigation required by 29 CFR 1910.146 demonstrates that the telecommunications company's confined spaces are not addressed or covered by the OSHA Telecommunications Standard, 29 CFR 1910.268, the provisions of 29 CFR 1910.146 would apply. However, where confined space hazards are identified (through compliance with 29 CFR 1910.146) as being addressed, the Telecommunications Standard would apply.

This means that the OSHA General Industry Permit-Required Confined Spaces Standard, 29 CFR 1910.146, applies in all instances unless confined space hazards are adequately addressed by the following provisions of the OSHA Telecommunications Standard, CFR 1910.268:

- Protection from falling objects (29 CFR 1910.268 (o)(i)(ii),
- Availability of first aid assistance where there is reason to believe that safety hazards (such as vehicular or pedestrian traffic hazards not addressed by 29 CFR 1910.268(d)(i) or (o)(1)(i), unusual water hazards, and operations in manholes used jointly by a telecommunications utility and an electric utility are present (29 CFR 1910.268(o)(1)(ii) and (o)(3), and
- Testing the atmosphere of manholes and unvented vaults prior to employee entry and where atmospheric hazards are detected, ventilating, and taking any other measures necessary for safe entry (29 CFR 1910.268(o)(2).

In work locations where 29 CFR 1910.146 applies, employers must develop and implement a permit-required confined space program. The program must include the identification and evaluation of permit-required confined space hazards, as well as the procedures and practices necessary for safe permit-required confined space work operations. In addition, all necessary work equipment such as monitoring, ventilating, illuminating, climbing, communications, personal protective, and rescue and emergency equipment must be provided by the employer. Other requirements include the provision of an "attendant" outside the confined space work location, as well as the development and implementation of rescue and emergency procedures.

One of the most important requirements of the Standard involves training. Training materials must be developed and provided to all involved workers. Training must be provided before the work is conducted and whenever changes in permit-required confined space operations have occurred.

OSHA Construction Industry Confined Spaces Standard

Promulgated in August, 2015, the OSHA Construction Industry Confined Spaces Standard, 29 CFR 1926.1200-1213 provides many protections that go beyond the Telecommunications Industry and General Industry Confined Spaces Standards. Specific to the Telecommunications Industry, construction of telecommunications manholes or vaults would be covered under the Construction Industry Confined Spaces Standard. Coverage under the Telecommunications Confined Spaces Standard would remain for tasks including maintenance and repair of telecommunications lines and equipment; testing, locating and inspecting telecommunications lines and equipment; splicing telecommunications lines and equipment; and installing and removing telecommunications lines and equipment. Also, telecommunications manholes or vaults which contain toxic or hazardous atmospheres/hazardous chemicals are present would be covered under the General Industry Confined Spaces Standard.

Areas in which the Construction Industry Confined Spaces Standard provides improvements include:

- Employers must identify all confined spaces in which their employees may work and determine whether they are permit spaces covered by the standard. Such identification must be provided by a competent person, i.e., one who is capable of identifying existing and predictable hazards in the work environment and has the authority to take prompt and corrective measures to eliminate them. In turn, employers must inform workers regarding

the locations and dangers of each permit space.

- Employers must develop a written permit-required confined space program.
- Employers must perform continuous air contaminant monitoring during work operations within permit-required confined spaces.
- Employers must develop and provide training to all affected workers allowing them to have the knowledge and skills necessary to recognize confined space hazards and protect themselves and their co-workers from permit-required hazards
- Employers must develop and implement rescue and emergency procedures for confined space workers who become sick or are injured while performing their work.
- Employers must provide an attendant outside of the permit-required confined space who must maintain communication with the confined space worker(s) and monitor her/his/their condition. In cases where a confined space worker suffers an injury or becomes ill, the attendant would be responsible for initiating rescue procedures.

What Can You Do?

All CWA members should make sure that their employer is maintaining a safe and healthful workplace. The key to making the workplace safe for all CWA members is strong, active local safety and health committees. The committee can identify dangerous conditions at the workplace and discuss them with management. If the employer refuses to cooperate, the committee can request an OSHA inspection. The committee should always coordinate its activities through the local officers, the CWA Representatives, and negotiated safety and health committees.

In addition, CWA members may obtain information and assistance by contacting the:
CWA Occupational Safety and Health Department
501 Third Street, NW
Washington, D.C. 20001-2797
Webpage: www.cwasafetyandhealth.org
Phone: (202) 434-1160.

Developed in 1980 and revised in 1991, 1994, 1996, 1980, 2000, 2002, 2004, 2007, 2009, 2013, and 2017.