Confined Spaces:
within the confines of the law

Version 3.0

"Are you all right, brother?"

These were the last words of Robert LaPolice. He called them out to John Hewson, 31, who had climbed down into a Hamilton steel maker's vacuum degasser tank to clean it. As Hewson reached the bottom of the tank he collapsed, his lungs filling with argon gas. LaPolice, 26, entered the tank in an attempt to rescue him. In the end, both men died.

No one provided training for proper procedures when working inside the degasser tank. No one tested for atmospheric levels before entry. No emergency procedures were in place. A coroner's inquest into the two fatalities learned of these deficiencies and more. As a result jurors made 30 recommendations including ones which suggested improvements to the steel maker's confined space entry program and strengthened minimum standards regulated by the province.

Following persistent pressure from the workers' families and organized labour, the Ontario government responded. Legislative changes included updates to confined space language in existing regulations, and the creation of a new standalone Confined Spaces Regulation (O. Reg. 632/05). The generic regulation provides coverage to many workers who were previously unprotected by the law.

With this, the Ontario Ministry of Labour, Immigration, Training and Skills Development consolidated all requirements relating to work in confined spaces into the existing single generic regulation.

Despite a continued campaign by the labour movement and others, agricultural workers continue to be excluded from coverage, even though confined space accidents and deaths are common in the agricultural industry. In one case, an agricultural worker succumbed to hydrogen sulphide gas when he climbed inside a manure spreader to clear a blocked hose. Two more workers died trying to save him. Sadly this is a common workplace scenario. It is estimated that 60 per cent of confined space fatalities occur among rescuers. Too often they are ill-equipped and untrained.

What is a confined space?

"A confined space is a fully or partially enclosed space, that is not designed and constructed for continuous human occupancy, and in which atmospheric hazards may occur because of its construction, location, or contents or because of work that is done in it." This is the legal definition of a confined space under Ontario's *Occupational Health and Safety Act (OHSA)* and Regulations.

Almost every workplace has some sort of confined space. A few examples include caissons, boilers, enclosed crawl spaces, furnaces, pits, vessels, digesters, silos, storage tanks, reactors, ducts, septic tanks, sewers, tunnels and vaults. Confined spaces usually have limited routes of entry and exit, lack natural ventilation, and are subject to rapid atmospheric and physical changes.

What are the hazards?

Confined spaces contain both atmospheric and physical hazards. Every confined space is different, making it essential to assess the individual hazards in each.

Atmospheric hazards

Confined spaces can potentially contain several atmospheric hazards. Atmospheric hazards are *chemical, physical, or biological* agents that affect the air a worker breathes.

Hazards may pre-exist in a confined space or develop after workers have entered the space. For example, carbon monoxide emitted from machinery operating nearby may accumulate at deadly levels inside a confined space affecting those working in the space.

Air in confined spaces can be stagnant but at the same time subject to rapid change. To prevent worker exposure to hazardous substances, the law requires atmospheric levels to be monitored before every entry and at regular intervals during work.

Oxygen deficiency and excess

A normal atmospheric level consists of 20.9% oxygen, 78.1% nitrogen and 1% argon along with small amounts of other gases. Air that contains too much or too little oxygen is hazardous. Deficient oxygen levels can lead to light-headedness or asphyxiation. Excess oxygen can cause explosive atmospheres where flammables can easily ignite.

Flammable or explosive atmospheres

Gases, vapours and dusts can also cause flammable or explosive atmospheres when they accumulate in a confined space. A spark, as small as static shock, can easily start a fire or even an explosion.

Toxic atmospheres

Biological or chemical agents in the smallest amounts can be deadly in a confined space. A common example is carbon monoxide which causes chemical asphyxiation by displacing oxygen in the blood. Animal droppings in confined spaces may contain infectious agents.

Physical hazards

Entry and exit

Getting in and out of confined spaces can be difficult because they often have openings that are not readily accessible. They can be small, angled, constricted, or very high up. Others open into traffic. Still others have large openings but require ladders or hoists for entry/exit.

Temperature

Confined spaces are not designed to regulate temperature, therefore extreme heat and cold conditions often exist. Extremes in temperature make work mentally and physically difficult, and can dangerously react with other work conditions to cause new dangers or hazards. For instance, wet work in extreme cold can create icy working surfaces. On a hot day, the temperature inside an enclosed space can climb rapidly. Think of how quickly a parked car becomes a furnace in the summer.

Walking/working surfaces and visibility

Walking/working surfaces in confined spaces can be constricted, irregularly shaped, slick, cramped, sloped or elevated. Poor lighting or work processes kicking up dust, fumes, or smoke reduce visibility and make work inside a confined space more dangerous.

Electrical hazards

Many confined spaces are made of metal. This elevates the risk of electrocution for workers inside. Defective cords or cables; metal tools not grounded or properly insulated; metal ladders, bars or lifelines; and damp surfaces can all lead to death or serious injury when combined with active electricity in any confined space.

Lines and systems

Workers can be trapped, burned, drowned or smothered unless all pipes and supply lines running into a confined space are properly blocked off or disconnected.

Machines or equipment

Unneeded machinery or equipment should be removed or isolated during work in a confined space. If it must stay, use lockout procedures to avoid accidental start up.

Residual material and engulfment

Residual materials in a confined space can cause deadly atmospheric hazards unless properly decontaminated and purged before entry. Any loose material or crust on walls or ceilings of a confined space should be contained so it does not fall on workers inside. In underground facilities evaluate and control flood risks. When necessary, trench walls, floors and ceilings to eliminate the threat of cave-ins.

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Noise and vibration

Noise and vibration can be more intense inside confined spaces. Echoing and intensified noise combined with personal protective equipment can interfere with verbal communication between workers or with attendants. Take measures to dampen noise at the source and always provide workers with means to communicate effectively.

What is the law?

In Ontario, legal requirements relating to work in confined spaces are outlined in *Ontario Regulation 632/05—Confined Spaces*. This regulation addresses a range of legal requirements relating to work in confined spaces including:

- requirements for assessing potential confined spaces;
- specifications for content of confined space entry procedures and programs;
- stricter atmospheric testing in most workplaces;
- worker training by a person of adequate knowledge and training;
- record keeping, including a separate permit for each entry;
- the inclusion of the definition "lead employer" which gives an employer hiring contractors the ultimate responsibility to ensure the Regulations are observed; and
- provision for the duties of attendants.

Workers on construction projects will not benefit from a specific provision for other regulated workplaces that confined space programs must be developed and maintained in consultation with the joint health and safety committee or health and safety representative (Section 5, *Ontario Regulation 632/05—Confined Spaces).*

Confined space entry program

Workplaces with confined spaces must have a confined space entry program developed in consultation with the joint health and safety committee or health and safety representative. The program must be customized for each particular confined space and must contain the following:

- a method for recognizing each confined space;
- a method for assessing hazards;
- a plan to control hazards;
- adequate training of workers and supervisors;
- an entry permit system;
- emergency equipment; and
- emergency response procedures.

Confined space entry plan

A confined space entry plan is a written plan identifying the practices and procedures for controlling all confined space hazards identified by the assessment. The plan must be in place before any worker performs work in a confined space. Each plan must include the following:

- duties of workers;
- a coordination document, if required—in the case of multiple workplaces or employers;
- a plan outlining specific worker training;
- entry permits;
- rescue procedures;
- provisions for personal protective equipment, clothing and devices;
- isolation of energy (lockout procedures) and control of material movement;
- attendant's duties;
- adequate means for entering and exiting quickly if necessary;
- atmospheric testing;
- procedures for working near explosive or flammable substances; and
- ventilation and purging.

Worker training

Employers must ensure workers receive adequate training to recognize hazards and how to follow the confined space entry plan(s). Except on construction projects, this training must take place in consultation with the joint health and safety committee or worker representative. Records must be kept identifying the nature of training, the date it occurred and who provided it.

Entry permits

Entry permits are now required for every entry into a confined space. This means if a space is vacated for break or any other reason, a new entry permit is necessary for re-entry. Copies must be made available to every person entering or performing related work. The minimum entry permit must include:

- location of the confined space;
- description of work being performed;
- description of hazards and control measures;
- time period for the entry permit;
- name of the attendant;
- record of each worker's entry and exit;
- a list of equipment required for entry and rescue and verification it is in working condition;
- atmospheric testing results; and
- any provisions for hot work and control methods.

Rescue procedures

The employer must develop and have in place rescue procedures before any worker can enter a confined space. They must ensure enough workers are rescuetrained and available to rescue every worker in a confined space at any given time. Rescue equipment must always be readily available, in working order and appropriate for the confined space.

Attendants

Attendants often succumb to confined space injury or death trying to save their fellow workers. New provisions were written in hopes of curtailing this danger. Attendants must be able to observe the worker inside the confined space. They have to be in constant communication, by either sight or speech, with the worker or workers inside the confined space. Workers stationed as an attendant cannot have other duties that cause them to be distracted or move away from the space. Attendants are forbidden to enter the confined space themselves, even to attempt rescue.

Unauthorized entry

The confined space entry plan must address the possibility of accidental or unauthorized entry into a confined space. Employers must identify confined spaces with warning signs, and when necessary secure the spaces with barricades and locks.

Isolation

Before entry, confined spaces must be isolated or removed from service by:

- locking out unnecessary sources of energy;
- locking and tagging equipment and machinery to prevent accidental start-up; and
- disconnecting all lines and systems leading to a confined space to prevent the entry of hazardous substances.

Atmospheric testing

Atmospheric testing must be performed in confined spaces as often as necessary to ensure acceptable levels are maintained during the time that workers are inside the confined space and before they enter. Testing must be specific to the hazards identified in the assessment, and must be done for oxygen deficiency, flammability, and toxic substances or agents.

NOTE: The Workers Health & Safety Centre offers a number of confined space training programs. For more information, contact a WHSC training services representative near you.

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Resource Lines

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