



# Into the void

*By Helena Bryan*

Toxic gases or a lack of oxygen can turn a confined space into a death trap. But it doesn't have to be that way.

**O**n October 4, 2001, Cody McNolty was working alongside his father, Dan, as a welder's assistant in northern B.C. He followed his dad into one of the hatches on a barge they were refitting. Only one of them came out alive.

Within a few minutes of climbing into the hatch to perform what he thought was a routine inspection of the space, Dan died from a lack of oxygen, the most common cause of death in a confined space. Cody and the two other men who tried to rescue him came perilously close to losing their own lives.

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# “Confined-space rescue is often a matter of extracting a dead body.”

– Peter Gilmour, WorkSafeBC



A worker peers into the entryway of a potentially lethal confined space. Strict controls require workers to obtain a permit before entering such a space.

## Our mistake

An article in the November/December issue of WorkSafe magazine (“Violence in health care”) incorrectly named the location involving the stabbing of a nurse as the Royal Columbian Hospital in New Westminster. In fact, the incident in question occurred at the Queen’s Park Care Centre in New Westminster. We apologize for the error.

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In a WorkSafeBC video called *Precious Time* on the dangers of confined spaces (<http://www2.worksafebc.com/Publications/Multimedia/Videos.asp?reportid=34287>), Cody paints a vivid picture of the little piece of hell into which the men had unwittingly stumbled: “Father and son lying on top of each other, dying with every breath they take and the rest of the world doesn’t even know.”

It’s a scenario that has played out all too often in B.C.’s recent history. Over a 15-year period, 18 deaths occurred in confined spaces – more than one a year, according to WorkSafeBC statistics. Some national estimates indicate more than 100 such deaths take place across Canada each year. And the national estimates are likely to be conservative ones, says Peter Gilmour, WorkSafeBC Regional Prevention Manager, Interior/North Region, and a Canadian Standards Association technical committee member charged with setting higher standards for confined-space management. “Compensation Boards don’t classify confined-space accidents as such,” he says. “A confined-space incident involving an oxygen deficiency, for example, will be recorded as an injury or death due to asphyxiation, not as a confined-space accident.”

While less common than other workplace incidents, the outcome of workers in confined spaces is most often dire, involving multiple fatalities or serious injury. “Confined-space rescue is often a matter of extracting a dead body,” Gilmour says.

Most fatalities in confined spaces take place because of dangers present in the atmosphere: toxic gases or a lack of oxygen, as in the McNolty case. Other confined spaces are created by physical hazards: crushings, burials, or blows by objects. It’s a sad irony, too, that more than half of confined-space fatalities – an estimated 60 percent – occur during rescue attempts. Cody and the two men who tried to save his dad were lucky to beat the odds.



Photos courtesy of the WorkSafeBC video, *Precious Time*, the Cody McNolty Story

Dangerous confined spaces can be difficult to identify in many workplaces. They can be found in a wide range of sites, such as tanks, boilers, manure pits, storage bins, and water reservoirs.

Today, Cody is working to make sure others don't have to rely on such luck. As health and safety training coordinator for Washington Marine Group (WMG), which owns and operates Vancouver Shipyards, Vancouver Drydock, Victoria Shipyards, and Seaspan International, he ensures that a rigorous training matrix is prepared for confined-space entry programs; of which employees get a taste as soon as they are hired. During orientation, employees must learn the definition of confined spaces, the various hazards associated with them and whether these hazards are classified as high, medium, or low. And that's just for starters.

### **The line between lethal and manageable**

One of the challenges of confined-space management, Cody points out, is to find these spaces. While there's no shortage of potential "death traps," they aren't always obvious. The WorkSafeBC Regulation describes a confined space as an

enclosed or partially enclosed area big enough for a worker to enter. The space is not designed for someone to work in regularly, but employees may need to enter the space to perform inspections, cleaning, maintenance, or repairs. The hazards associated with such a space include a potentially small opening or a layout with obstructions, making entry and exit difficult and complicating rescue procedures.

In effect, confined spaces come in all shapes, sizes, and configurations (see *Workspaces to watch for*), and they are an issue in numerous sectors: shipping and ship repair, agriculture, brewing and fermentation, manufacturing, construction, and municipalities.

To complicate matters, the physical space might be less of a problem than what's happening inside, undetected. That might explain why a lack of oxygen is the most common cause of death

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in confined spaces, says Occupational Hygiene Officer Doug Irving. “Void spaces, when sealed, tend to form the perfect environment for rust,” he says. “The rusting process can suck out the oxygen, drawing it down to a lethal level in a matter of days.”

Such environments provide no warning signs. And the line between a survivable oxygen level and a fatal one is barely perceptible. “The legal oxygen limit is 19.5 percent,” Irving points out. “If you’re in good physical shape, you might not notice anything until the oxygen level goes down to about 16 percent. You could take your chances and survive that scenario for all the wrong reasons. However, an oxygen level of 12 percent is totally unforgiving.”

## Know your danger spots

“If you don’t test the air in a confined space, it’s like playing Russian Roulette. Out of 17 void spaces, you might be able to get in and out of half of them without incident. But go in the wrong one? Even if you knew something was wrong, you wouldn’t have the muscle power to get out,” Irving says. “Always test the air before entering a confined space, and, based on the results, take the appropriate precautions.”

Fortunately, such risks are manageable. To start, a comprehensive inventory of confined spaces is a critical part of a confined-space entry program. “Employers need to know what constitutes a confined space and err on the side of caution,” Gilmour says.

## Identify the hazards

The next step – and the foundation on which an effective program rests –

involves risk assessment. Risks should be identified whether workers enter the space regularly or just for the sake of maintenance, because this assessment will determine the appropriate controls. “If you don’t get this part right,” insists Gilmour, “mistakes will be made and someone might die.”

In order to do a proper risk assessment, it might be necessary to hire a qualified person who has experience in confined-space hazard controls, such as a certified safety professional, a professional engineer, or a certified industrial hygienist. This choice will depend on the complexity and potential hazards of the worksite – whether or not flammable or toxic chemicals are used, or if rust is an issue.

## Manage the risks

Once the risks are assessed, the proper controls can be put in place. Employees are required to test oxygen levels with hand-held instruments before entering the space. If toxins are a concern, the space will need ventilating and employees working in it might need to wear respirators. To reduce the dangers of chemical contaminants and other hazards, piping must be disconnected or sealed before entering the space. If potential fire or explosions pose a risk, all the sources of ignition should be eliminated.

WGM ensures that such controls are used through a stringent permit system. Employees can’t enter a confined space without a permit, which records the hazard rating, pre-entry testing results, a second set of atmospheric testing and inspection results, and a rescue-preparedness plan. The permit only receives authorization from someone deemed competent to do so, and each

permit is signed off by a supervisor and the employees entering and posted at the confined space.

## Hope for the best, prepare for the worst

It’s no surprise that Cody emphasizes the importance of rescue provisions: “You can’t save someone if you can’t save yourself,” he says.

“And phoning the fire department alone doesn’t cut it,” Irving points out. “The employer of the workers who enter these spaces has the primary responsibility for developing rescue procedures and ensuring they are carried out. Furthermore, not all fire departments are equipped and trained for confined-space rescues.”

At WGM, the rigour of such rescue procedures depends on whether a space has been assessed as high-, medium-, or low-hazard.

If you have the proper procedures in place and you follow them,” Cody says, “even if things go wrong, the situation is controlled.”

If only it were so six years ago when he tried to save his dad. Although rescuers were able to reach Cody and his co-workers in time, Cody’s father had already succumbed to the dangers of being trapped too long in a confined space.

Still, as painful as it is for Cody to recall the events of seven years ago, his ongoing efforts to make changes through WGM have had positive repercussions. “When workers are disgruntled about permitting because of the extra paperwork,” Cody says. “I tell them about my past and they seem to come around. It’s like listening to

## Work spaces to watch for

Do you have confined spaces in your workplace? The

following sites are examples of confined spaces that pose potential hazards:

- Tanks
- Pipelines
- Pits, sumps
- Boilers
- Sewers
- Vessels
- Vats
- Manure pits
- Manholes
- Kilns
- Storage bins
- Water reservoirs
- Vaults

a coach who's actually played the sport.”

## What is a confined space?

A confined space can be identified as follows:

1. Enclosed or partially enclosed
2. Not designed or intended for continuous human occupancy
3. Restricted for entry/exit, complicating emergency services
4. Big enough for a worker to enter



Three members of North Vancouver's Washington Marine Group display the proper technique and safety gear associated with a confined-space rescue during an on-site training exercise.