

Entering a confined space can be extremely dangerous, even if it's just for a few seconds or minutes, as the tragic stories on the following pages will describe.

- Evaluate all confined spaces to determine if they contain any actual or potential hazards and follow a comprehensive written confined space entry program to protect workers.
- Never enter a confined space before 1) the hazards have been identified, 2) the steps to address the hazards are in place, and 3) safe entry and exit methods are available.
- Air sampling should be conducted before anyone enters a confined space. Before and during entry, test and monitor for oxygen content, flammability, toxicity, and explosion hazards.
- Consider chemical reactions that could occur based on the materials in the confined spaces, and potential byproducts that could create a hazardous atmosphere.
- The confined space must be properly ventilated.
- Workers entering confined spaces should maintain contact with a trained attendant either visually, by phone, or by two-way radio.
- Use appropriate equipment (fall protection, rescue, air monitoring, lighting, and communication) according to the entry procedures.
- Before entry, review the emergency action plan.



0003393-5



A city engineer, a co-worker, and an intern drove to a landfill to replace the battery of a flow meter that had been placed in a manhole. The manhole was 7'4" deep and 24" in diameter at the point of entry. The flow meter was attached to the top rung of the ladder that was 34" below the manhole opening.

While the engineer was pulling up the flow meter it accidentally dropped and fell to the bottom of the manhole. He quickly descended into the manhole to retrieve it. He got to the bottom of the manhole, picked up the flow meter, but before he could get out, he lost consciousness and collapsed while still at the bottom of the manhole.

The co-worker called 911 and the fire department was able to extricate the engineer in about 20 minutes. He was taken to a nearby hospital but pronounced dead.

According to the fire department monitoring data, the oxygen concentration at the bottom of the manhole was 2.1% and the flammable vapors exceeded 60% of the lower explosive level (LEL) at the time of the rescue.

New York
Case Report
03NY027



The flow meter that was used to measure the flow rate in the manhole.



The landfill manhole where the fatality occurred.





A paint maker was working by himself using a paint stripper to remove dried paint from the inside of a paint tank. The paint stripper contained methylene chloride, methanol, and mineral spirits.

The tank met the requirements for a permit-required confined space, the workspace inside the tank was not adequately ventilated, and the paint maker was not trained in confined space entry. There was no attendant at the tank opening to monitor the work process. The paint maker was wearing a cartridge respirator that did not adequately protect him against inhaling methylene chloride vapors.

When he did not show up for a scheduled break, a co-worker went to the tank and saw him unresponsive at the bottom. Instead of calling for help, he got inside the tank to attempt a rescue but got dizzy and passed out.

Some time later both workers were discovered in the tank, they were rescued, and emergency services were called. The paint maker was declared dead at the hospital and his co-worker was lucky to survive after four days in the hospital.

California
FACE Report
11CA009



The paint tank being cleaned when this tragic incident occurred.



View of the bottom of the tank and the ladders used to enter and exit the tank.



Two workers were in the process of draining a 10,500-gallon tank which had held a mixture of molasses and water. The tank was nearly 12 feet wide by almost 14 feet high. Near the bottom of the tank was a pipe to drain the contents.

Using a gasoline-fueled pump they began to pump the contents from the tank. One of the workers wanted to enter the tank through the 15-inch hatch opening at the top in order to move the drainpipe into a better position for draining.

To enter the tank, he placed a lift truck in front of it and raised the forks above the opening. Then he put on a pair of full-length waders and a full-face respirator and rappelled to the base of the tank while holding cargo tie-down straps attached to the lift truck. He was then able to push the drainpipe into position.

He attempted to climb out of the tank by walking up the side of the tank while pulling on the straps, but then became unresponsive. To rescue him other workers had to cut a hole in the side of the tank with a circular saw where they found he had drowned in the liquid at the bottom. He was taken to the hospital where he was declared dead.

Michigan
Case Report
16MI071



Tank where this incident occurred (back right) with the lift truck positioned in front of it.



The bottom of the tank where the circular saw and the worker's respirator were left behind.



Two brothers working together were part of a three-man crew that was flushing out the drainage system of an organic waste recycling facility. The drainage system consisted of 24-inch diameter underground pipes that were accessed by 14 manhole shafts.

All three workers took turns sitting on the edge of the shaft while using a high-pressure water hose to flush residual compost to the bottom. This cleaning method was unsuccessful, so they placed an 8-foot ladder in the shaft.

The younger brother (age 16) was standing on the ladder inside the shaft when he was overcome by hydrogen sulfide and fell to the bottom of the 10-foot shaft. The older brother (age 22) attempted to rescue his brother but was also overcome and collapsed at the bottom of the shaft.

The third worker called for help and the rescue team entered the shaft wearing self-contained-breathing-apparatus (SCBA) to pull them out. Both brothers died soon after their rescue due to hydrogen sulfide intoxication.

California
Case Report
11CA008



The shaft opening.



The ladder found in the shaft.

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INCIDENT REPORTS

- New York Case Report 03NY027; cdc.gov/niosh/face/stateface/ny/03ny027.html
- California Case Report 11CA009; cdc.gov/niosh/face/pdfs/11CA009.pdf
- Michigan Case Report 16MI071; cdc.gov/niosh/face/stateface/mi/16MI071.html
- California Case Report 11CA008; cdc.gov/niosh/face/stateface/ca/11CA008.html

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