



WORKERS KILLED IN CONFINED SPACES

What is the Hazard?^{1,2}

While confined spaces can be found in many types of workplaces, they are not always easy to recognize and signs of danger may not be obvious. Confined spaces are defined by the following characteristics:

- They are not designed for continuous occupancy,
- They are large enough for a worker to enter to perform work, and
- They have limited openings for entry and exit.

Confined spaces can present a number of serious hazards that could lead to death, including but not limited to:

- Too little oxygen for the worker to breathe,
- Toxic chemicals or fumes that could cause the worker to lose consciousness,
- Explosive or flammable atmosphere,
- Potential for engulfment by solid materials like grain or sand that can suffocate a worker or liquid materials that can drown a worker,
- Extreme temperatures, and
- Fall and trip hazards

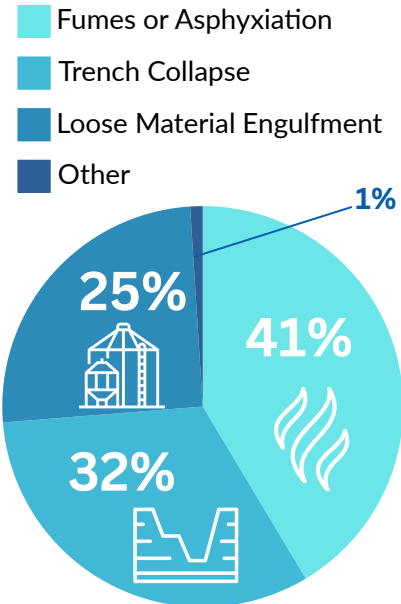
The following worker deaths occurred in confined spaces in Kentucky:

- Case 1: A worker was replacing pumps and fell into a confined drainage system at a power plant. A second worker called for help and when help arrived, the second worker was also in the drainage system. Both workers died of asphyxiation caused by hydrogen sulfide inhalation. (2022)
- Case 2: Three workers were doing a confined space entry into a sewage tank to do a refabrication on the pump station. Elevated levels in the pump station caused a plug in the downstream pipe to pop due to too much pressure. The workers were engulfed in sewer water and two of the workers were killed. The third worker was able to climb out and survived. (2023)

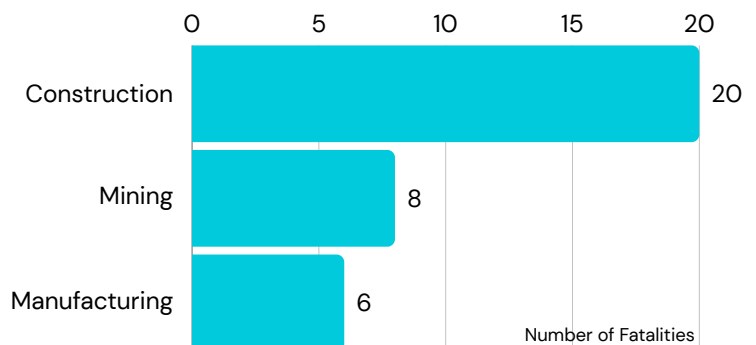
Kentucky Stats³

From 1994 to 2022, there have been 56 workers killed in confined spaces in Kentucky. Six workers were killed in double-fatality events. Nearly 50% of workers killed in confined space incidents worked in construction and extraction occupations and 36% of all workers killed in confined space incidents worked in the construction industry.

Confined Space Fatalities by Incident Type, Kentucky, 1994-2022³



Top Industries for Confined Space Fatalities, Kentucky, 1994-2022³



The following industries had between one and four confined space fatalities: Agriculture; Forestry & Fishing; Wholesale Trade, Transportation & Warehousing; Professional, Scientific & Technical Services; Administrative Support & Waste Management; Accommodation & Food Services; Public Administration; Other Services.

Controlling hazards in confined spaces



To mitigate hazards, employers should:

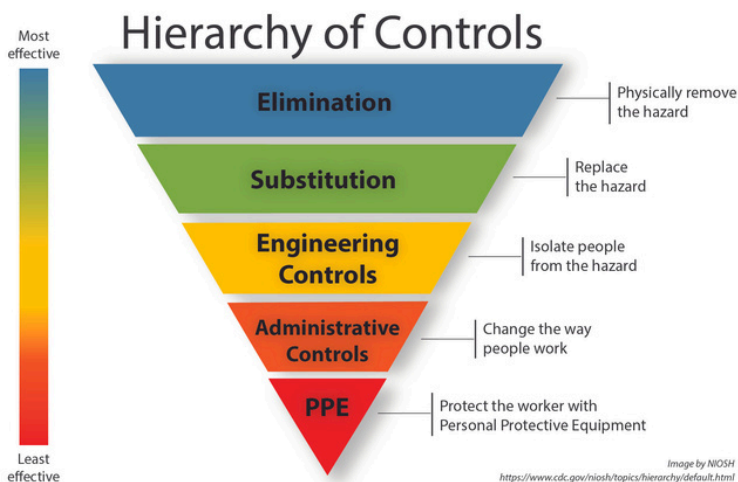
Identify confined spaces at your workplace and post warning signs.

Some examples of confined spaces are provided at right.

Train workers to never enter a confined space before the hazards have been evaluated and addressed and to never enter a confined space to rescue another worker.

Evaluate all confined spaces to determine what hazards exist or could occur given certain conditions. Work activities or conditions outside of the confined space may cause hazards that were not there previously. It is important to evaluate hazards each time the confined space is entered. This may include checking for physical hazards and testing and monitoring for oxygen content, flammability, toxicity, and electrical and explosive hazards.

Use the hierarchy of controls to develop a plan to address the hazards that are identified.



Have written procedures for confined space entry that cover the following:

- Identifying hazards prior to entry,
- Testing and monitoring before and during entry,
- Ventilating the confined space,
- Maintaining contact with a trained attendant at all times during entry,
- Protective equipment to be used during entry, and
- Emergency plan

Ensure workers know and follow the procedures before entering a confined space. Provide training frequently and conduct audits to ensure workers are following procedures.

EXAMPLES OF CONFINED SPACES:

- Storage tank
- Cistern
- Crawl space
- Pipeline
- Silo
- Digester
- Drained swimming pools
- Hopper interior
- Kiln
- Manhole, sewer, and storm drain
- Manure pit
- Meter vault
- Septic tank or water tank interior
- Ship hold
- Tanker truck interior
- Trench, ditch, channel, excavation
- Vat or bin interior
- Utility tunnel
- Well
- Vault

FURTHER RESOURCES

Name of Resource	Resource Description	Resource Link
Confined Spaces Hazards and Solutions	OSHA's web page listing resources for confined spaces hazards and solutions.	https://www.osha.gov/confined-spaces/hazards-solutions
Confined Space Standards	OSHA's web page featuring OSHA standards and documents related to confined spaces.	https://www.osha.gov/confined-spaces/standards
Confined Space – Preventing Deaths and Injuries to Workers	A tailgate discussion guide developed by the New York FACE program to be used by health and safety professionals.	https://www.health.ny.gov/environmental/investigations/face/training/confined_space_awareness_training.htm
Confined Space Fact Sheet	Fact sheet from the Canadian Centre for Occupational Health and Safety about confined space hazards and mitigation.	https://www.ccohs.ca/oshanswers/hsp/rograms/confinedspace/confinedspace_intro.pdf
Hierarchy of Controls	NIOSH website that provides information about the Hierarchy of Controls.	https://www.cdc.gov/niosh/learning/safetyculturehc/module-3/2.html

SOURCES

1. Confined Spaces Hazards and Solutions. Occupational Safety and Health Administration. <https://www.osha.gov/confined-spaces/hazards-solutions>
2. Confined Space Awareness—Preventing Deaths and Injuries to Workers. New York State Department of Health. https://www.health.ny.gov/environmental/investigations/face/training/confined_space_awareness_training.htm
3. The Kentucky Fatality Assessment and Control Evaluation database



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Acknowledgments

Produced by the Kentucky Occupational Safety and Health Surveillance (KOSHS) Program, Kentucky Injury Prevention and Research Center (KIPRC), as bona fide agent for the Kentucky Department for Public Health.

This work was supported by the National Institute for Occupational Safety and Health (NIOSH), Centers for Disease Control and Prevention (CDC) of the U.S. Department of Health and Human Services (HHS), as part of cooperative agreement 5 U60OH008483 totaling \$1,601,266 with 0% financed with nongovernmental sources. The contents are those of the author(s) and do not necessarily represent the official views of, nor an endorsement by, NIOSH, CDC, HHS, or the U.S. government.



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