

Safe Practices in and around Confined Spaces

Manure pits, unventilated grain silos, and other confined spaces can be oxygen-deficient, toxic, and explosive.^{1,2} There are four gases in these spaces that are of primary concern: hydrogen sulfide, carbon dioxide, ammonia, and methane gases.

- “Hydrogen sulfide is a highly toxic gas that is heavier than air. It can cause dizziness, unconsciousness, and death. At low concentrations, it may smell like rotten eggs; at higher concentrations, it deadens the sense of smell so that no odor can be detected.
- Carbon dioxide is an odorless, tasteless gas that is heavier than air. It displaces the oxygen supply in the bloodstream, which can cause unconsciousness and death.
- Ammonia is a gas that is lighter than air. It has a pungent smell and can irritate the eyes and respiratory tract. Ammonia also displaces oxygen in the bloodstream.
- Methane is also a gas that is lighter than air. The primary hazard of methane gas is that it can create an explosive atmosphere. This gas also displaces oxygen.”²

Workers should be trained about safety and use extreme caution around manure pits, grain silos, and other confined spaces that may produce toxic and potentially deadly gases. Extreme caution should also be used around grain bins and wagons to avoid being trapped and suffocated by the extreme force and weight of grain.

Grain Bins

- Always lock access doors to grain storage structures.³
- Stay out of grain bins, wagons, and grain trucks when unloading equipment is running.⁴
- If you must enter a grain bin, ensure the following:
 - The unloader is shut off.

- The unloading equipment is locked out to prevent someone from starting the equipment while you are inside.

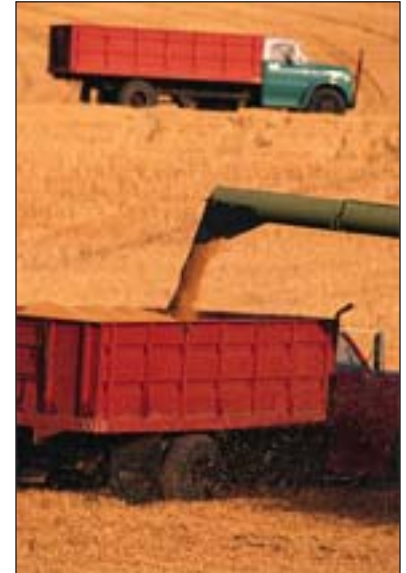
- You have put on a safety harness and attached a lifeline to a lifting device before entering.⁴

- Stay near the outer wall of the bin, and keep walking if the grain should start to flow.⁴
- Always wear an appropriate [respirator](#) when working in a grain bin because grain dust can cause difficulty breathing.⁴

- Have at least one and preferably two people outside the bin to help if you become trapped.⁴
- Always know where ALL family members are (especially children) at all times when grain is being loaded, unloaded, moved, or otherwise handled.³
- Never permit children to ride in grain wagons or enter grain storage areas.³

Manure Pits

- Be aware of the dangers of entering manure pits. Potentially dangerous gases remain in pits even after they have been emptied.⁴
- Label the manure pit and manure storage areas to warn of the gas hazards.¹
- Obtain and use monitoring equipment to determine the level of gases present in the manure storage area.¹



- Never enter a manure pit unless you are wearing a self-contained breathing apparatus (SCBA respirator) and a lifeline and harness and are monitored by a standby person who is equipped and trained to rescue you.⁴ The use of a harness or safety belt with a lifeline is critical because it is the only safe means for a standby person to rescue a worker from the pit without proper respiratory protection (such as a positive-pressure, SCBA⁴).
- Do not try to rescue someone from a manure pit unless you have been trained and are wearing the proper equipment. Call the local fire department or rescue squad immediately. They have the training and equipment needed to accomplish such a rescue without endangering other lives.⁴

Silos

- Label the silo to warn of the gas hazards.⁵
- Obtain and use monitoring equipment to determine the level of NO₂, CO₂ or O₂ present. If dangerous levels exist, do not enter.⁵



- Be aware of the signs of silo gas, such as yellow-brown or reddish color/fumes in the air or near the silo or a bleach-like odor.⁵ These gases, if inhaled, can cause severe delayed lung damage.⁴
- Do not enter silos after filling has started. Silo gas concentration may be the highest 48-72 hours after filling. Lethal concentrations may exist for

up to three weeks in poorly ventilated silos.⁵ It is recommended that you do not enter a silo for four to six weeks after filling, as several different dangerous gases are produced as forages ferment. Be aware that even after six weeks, it may not be safe to enter silos. SCBA-equipped respirators should be worn anytime you are entering full or partially full silos.⁴ A safety harness should also be worn, and personnel should be available outside the silo to monitor the entrant's progress.⁵ If you must enter silos during the first four to six weeks after filling stops, or anytime the silo is full or partially full, wear a SCBA-equipped [respirator](#). A regular respirator or dust mask will not protect you in an oxygen-deficient atmosphere.⁴

- Run the blower for at least 20 minutes before entering⁵ to ventilate the silo.
- If you start coughing or experience throat irritation, get away from the area immediately, inform your employer, and seek medical attention.⁴
- Lock access to silos to keep bystanders and children out.⁵

Sources

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