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# Open-air manure storage safety

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Prior research and outreach focus has been given to injuries and fatalities that occur in "confined space" manure storages. Such enclosed storage areas may be below animal quarters, or below-ground reception and pump-out pits.

Attention should also be given to non-enclosed storages such as open-air manure pits, which are more common in southern dairy-producing states. Research has demonstrated that manure gases and oxygen-depletion are major factors in enclosed manure pits, but research addressing open-air pits is limited.



Non-enclosed manure storages are open to the atmosphere, but still meet the definition of a "confined space" according to the Occupational Safety and Health Administration (OSHA) definition.

The OSHA definition hinges on the space being large enough and so configured that a worker can enter and perform work; has limited or restricted means for entry or exit; and is not designed for continuous human occupancy. The hazards contained within a confined space manure storage may include a lack of oxygen, toxic and flammable gases, and exposure to drowning.

Once a person has entered a manure pit, it is often too late to mitigate the associated hazards. The human senses of smell and sight are not helpful since the gases being generated by the manure are colorless, may be odorless, and are easily masked by other common farm smells.

For example, hydrogen sulfide, one of the most dangerous manure gases, has an odor but it is often not detectable above 100 parts per million (PPM) because it deadens the sense of smell. The characteristic colorless and odorless factors and undetected low oxygen levels often fool even the most experienced farmer or worker.

Due to their design, getting out of an open-air pit can be next to impossible. For this reason, open-air manure pits are considered confined spaces by safety professionals. According to a Penn State Extension safety bulletin on open-air manure storage pits, some safety hazards may include the following:

A thick liquid and floating crust that make swimming, buoyancy or even moving around very difficult.

Steep and slippery slopes and straight sides that can make getting out of manure storages difficult or impossible.

Localized layers of hazardous gases existing above manure surfaces, especially on hot, humid days with little to no breeze.

A speeding up of manure gas release from movement, agitation, removal or addition of manure to a storage pit, pond or tank.

Not having sufficient oxygen to breathe if a person is “treading” in manure because of an inability to get out.

Not being able to see into depths of manure like you can with clear water.

A slow response time for adequate emergency actions because of site isolation and remoteness.

Some safety guidelines to follow:

Make sure everyone that needs to be near manure storage structures understand the hazards that exist, including the effects that the various gases have on them.

Make sure the open air manure storage has a fence installed around the perimeter and access gates are locked to keep unauthorized personnel from entering the area. Ladders for climbing to the viewing platform on above ground tanks should be padlocked or kept 8 feet off the ground.

The open air storage should have manure drowning hazard signs and no trespassing signs on all sides of the storage.

If you must go into the fenced area of the open manure storage, wearing a safety harness with life line attached to a safely located solid object or anchor will enhance your chances of rescue.

Never work alone. The second person’s role is to summon help in an emergency and assist with rescue without entering the storage.

Rescue equipment, such as flotation devices and lifelines, should be attached to every manure pump.

Move slowly around manure storages as the ground can sometimes be uneven and may cause a person to trip or stumble.

Bystanders and non-essential workers should stay away from pump out or other accessible areas.

There should be no horseplay near the open manure pit or pumping equipment.

Explosive gas may be lurking near where agitation or pumping is occurring. No smoking, open flames or sparks should be allowed. If equipment malfunctions during agitating or pumping of the manure, shut all equipment off and remove it from the storage before servicing or repairing.

If you feel unsure or uncomfortable with what you are getting ready to do near the open manure pit, step back, contact someone and review the situation before proceeding.

Be prepared to call 911 if an emergency happens. Being prepared means accurately describing the incident, number of victims, and giving specific directions to the site of the emergency. ***PD***

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