

## Manure Storage Dangers at Dairy Farms

### Incidents may be infrequent but are often fatal:

- A worker drove a front-end loader over the edge of an outdoor earthen manure storage basin and into the manure. The loader tipped over and the worker drowned.
- A worker entered an outdoor manure pit by ladder to retrieve a pump. A coworker warned about poisonous gases in the pit but the worker entered anyway because of uneventful entries in the past. While attempting to attach a rope to the pump, the worker was overcome by manure gases and fell off the ladder and into the manure. The coworker summoned rescue personnel and the owner of the farm. The owner attempted rescue but was also overcome. Both died at the scene.
- While attempting to redirect the agitation spout of a manure pump, a farmer's clothing became entangled in an unshielded rotating shaft while reaching over the shaft and towards the hand crank of the pump. The farmer was pulled into the rotating shaft and died at the scene.



Driving farm equipment too close to manure storage areas can result in tip overs with fatal consequences. Concrete blocks and other types of barriers can prevent this.

Photo courtesy of: L&I.

### Know the hazards and risks

The potential hazards of manure pits, tanks, basins, ponds and lagoons include:

#### **Risk of falling into manure and drowning:**

Vehicle operators can drive into manure storage ponds, lagoons and pits. Earthen edges around basins, ponds or lagoons may appear deceptively "solid" or become invisible to workers when edges blend in with surroundings. Risk increases during low light

conditions, for example, during evening work or in poorly lit areas. Tractor-scraper drivers can tumble into pit openings from push-off platforms or ramps. Individuals walking or working at ground level near boundaries of pits, separator lagoons, and sometimes other types of manure storage, can also stumble and fall into manure. Unstable or poorly maintained ladders can also cause falls into pits.

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**Manure gases that can suffocate, poison or ignite:** Stored manure consumes oxygen and releases hazardous gases, including hydrogen sulfide, carbon dioxide, methane and ammonia. The low oxygen and accumulated gases above the manure can swiftly overcome workers and farmers without warning. Atmospheric conditions in and around pits and other manure containment may be safe on some days and deadly on others. Don't rely on past luck with uneventful entries. Your sense of smell will not keep you safe from manure gases. Risk for harm is generally higher in enclosed or confined structures like tanks or pits. High levels of manure gas are released during activities that disturb the manure, such as pumping and agitating it. Even sludge and residue at the bottom of drained pits, tanks and other containment can emit dangerous amounts of

manure gases. Gas production will increase at warmer temperatures. Some manure gases, like methane, are potentially ignitable and explosive.

**Moving parts on machinery and equipment:** Workers are at risk for amputations, broken bones, getting crushed and other severe injuries when working around manure pumps, agitators and rotating shafts (e.g., power-take-offs/PTOs). These and other hazard sources can quickly snag and draw in workers' loose clothing, long hair, jewelry, fingers, or feet.

**Bacteria and other pathogens:** Solid or liquid manure harbors pathogens that can cause infection or illness through direct contact. Getting splashed in the eye or mouth may transmit pathogens and cause serious infection.



Danger, drowning hazard! All it takes is a stumble on uneven ground or getting struck by moving equipment to launch a worker over the edge of manure separator lagoon like this one. When this is possible, proper railings or barriers can keep workers safe and working.

Photo courtesy of: L&I.

## Prevent drownings

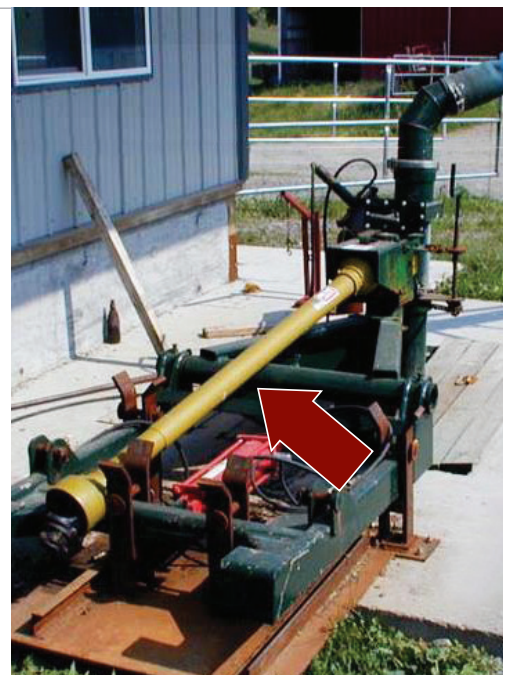
- Make manure pit, pond, basin and lagoon boundaries visible. Safely fence or block off boundaries to prevent unsafe access. Add appropriate safety covers for tanks and access openings to manure pits and other confined spaces to keep people out.
- Post and maintain appropriate warning signs around manure storage. Use reflective tape or bright paint for better visibility in low light. Inform workers about signs and explain how they can fall into pits and die so they know to stay away.
- **Prevent rescuers from becoming additional victims.** Make plans on what to do should emergency rescue become necessary. Contact your local fire department to determine if they can provide rescue services. Any individual involved in rescue or retrieval must have special training and equipment and follow all applicable safety procedures.

## Prevent manure gas deaths

- A key prevention solution is to build new facilities with effective ventilation or improve ventilation at existing facilities. Mechanical ventilation may be necessary to replenish oxygen and remove hazardous manure gases, especially when manure is being agitated or pumped. Select ventilation system specifications intended to keep workers safe in pits, tanks and other confined spaces. Explosion-proof equipment may be necessary.
- If workers must enter pits, tanks or other manure storage, purchase or rent direct-reading multi-gas monitors that at least measure oxygen, hydrogen sulfide, and methane or the Lower Explosive Limit (LEL). Follow established procedures on how to safely and effectively conduct gas monitoring before any entry.
- In addition to ventilation and gas monitoring, follow other permit-required confined space requirements.
- Address manure gases as part of your required Hazard Communication Program. Inform workers about manure gas hazards, the consequences of ignoring hazards, and required safety measures.

## Prevent other injuries and illnesses

- **Mechanical:** Before you rent or buy machines, look for safety features such as barriers that cover dangerous moving parts. Keep all safeguards in place and maintained. Tell workers about how machinery and equipment, such as pumps and agitators, can harm them and demonstrate proper lockout/tagout procedures and how to safely start up, use, shut off, unclog, retrieve, clean, and repair equipment. Provide locks and other safety equipment. Follow safety guidance in the equipment operator's manual.
- **Pathogens:** Stay clear of activities that agitate and splash manure solids or liquids. When contact with manure is unavoidable, wear proper safety gear such as eye protection and face shields that can prevent splashed manure from contacting your eyes and mouth. Other personal protective equipment (PPE), like coveralls and gloves, can prevent pathogens from infecting skin and causing health problems. Provide washing facilities to promote handwashing and other hygiene practices that help reduce the spread of contamination to food, eyes and work surfaces. Train workers on PPE use and care and proper hygiene practices.



Exposed and spinning shafts used to operate manure pumps have the power to kill and maim. The shaft shown is covered by a safety shield (see arrow).

Photo courtesy of: CDC/NIOSH.

## Strengthen Your Safety Program:

- Make sure your required **Accident Prevention Program (APP)** addresses manure storage dangers and safety.
- Manure pits, tanks, and possibly other manure containment, are often considered to be **permit-required confined spaces**. Check all manure storage areas on the farm to identify any confined spaces and follow applicable safety rules and requirements.
- **Worker understanding is essential to preventing deaths!** Make sure you provide any safety information (e.g., signs and safe work procedures) and training in the worker's primary language.
- Make pit safety "the norm" for everyone on the farm. Don't let supervisors or workers become complacent, cut corners, take a chance or ignore their own safety or the safety of others. Safe work may go slow at first but will go smoother with practice.

## Other resources you can access

Find an electronic copy of this [Hazard Alert](#).

[L&I Safety Web page](#)

For more information, visit [Dairy Industry](#).

For other related rules, visit the [Safety Rules Web page](#).

### How can I get help from Labor & Industries?

The Department of Labor & Industries provides consultations, training, and technical assistance at no cost to employers. Call today to schedule a free confidential consultation or go to [Request Consultation](#) for more information.

You may also call 1-800-423-7233 or find your [local L&I office](#) and ask for the Consultation Manager.

*This alert was developed by L&I's Division of Occupational Safety and Health (DOSHS) to alert employers, labor groups, and employees to potential hazards associated with work activities. **This is not a rule and creates no new legal obligations.** The information provided includes suggested guidance on how to avoid workplace hazards and describes relevant mandatory safety and health rules. DOSHS recommends you also check the related rules for additional requirements.*