



Agricultural Safety and Health News

Department of Agricultural and Biological Engineering

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Livestock Manure Handling Dangers: Study Identifies Causes and Offers Recommendations

An article published in the *Journal of Agromedicine* provides a summary of the frequency and characteristics of deaths related to on-farm manure storage and handling facilities for the period 1975 – 2004. Sources included published government reports, national and local media, online searches, published farm fatality reports, and prior litigation.

The data included 77 fatalities and 21 severe injuries in the United States and 14 fatality cases from outside the States. The largest percentage of deaths (34%) occurred to persons conducting repair or maintenance activities on manure handling equipment, while the second largest group (22%) was attempting to perform a rescue of another person.

Here are some of the highlights of that research, which was conducted by Dr. William Field, Department of Agricultural and Biological Engineering, Purdue University and Randy Beaver, MS, loss control representative for Nationwide Agribusiness in West Lafayette, Indiana.



Manure storage systems

There are three types of manure storage systems in which injuries or deaths could potentially occur:

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Lost Opportunities

By now most people know that there was no money in the 2010-11 state budget for farm safety. The most directly affected were the 13 farm safety & health small grant applicants that were tentatively approved to receive funds to support safety programs in their communities, and several volunteer fire and rescue companies that are not able to finance agricultural rescue training for their squads. This is a lot of lost opportunity for want of a few dollars. It would appear the need for farm safety programs has not diminished since we have had at least nine fatalities in July and August alone.

Corn silage harvesting activities should be in full swing as you read this newsletter, with grain harvesting not that far behind. The majority of articles in this newsletter relate to fall harvest safety. Whether it is with silage choppers or blowers, ATVs, farm equipment on public roads, air compressors, or grain handling equipment, there is ample opportunity to get in a hurry and take unnecessary risks. Perhaps the most important thing to remember about taking risks is that by definition, someone has to lose—otherwise it wouldn't be a risk. When it could be a limb or even your life, the question to ask your self is, "Is it really worth it"?

Dennis J Murphy

- * Manure storage tanks located directly underneath a livestock housing area
- * Manure storage located away from the livestock housing areas (e.g. open lagoon or pond)
- * Aboveground, silo-type, manure storage structures

According to the authors, the most hazardous and common types of manure storage rescues involved below-ground manure storage pits, usually under hog or dairy confinement buildings. These events become more tragic when others have attempted to carry out rescues without appropriate precautions--and thus become secondary victims.

Back in 1993, the National Institute for Occupational Safety and Health (NIOSH) issued a warning that emphasized the severity of the hazards associated with manure storage and handling facilities. This notice indicated that the number of fatalities was likely underreported, due to imprecise or insufficient farm fatality surveillance mechanisms.

Reporting problems contributed to the confusion. For example, the terms "suffocation" and "asphyxiation" were used interchangeably by medical examiners and coroners to categorize deaths in both grain storage structures and manure storage facilities.

Warm weather equals more fatalities

Research suggests that conditions at manure handling and storage facilities become worse in the presence of heat and humidity. NIOSH has warned that warmer or more humid weather and increasing barometric pressure can accelerate the production and accumulation of hazardous gases. Sixty percent of the cases identified in this research occurred in the months of May through August. And 20 of the documented deaths (26% of all cases) occurred in August, typically the hottest and most humid month of the year.

Types of livestock operation and facilities

Of the 77 U.S. fatality cases, 42 (or 54.5%) were associated with dairy operations, 34 (44%) with swine operations, and one (1.5%) was unknown. This is interesting to note since more attention is given to this topic in swine-focused periodicals and journals than those in dairy-related ones.

Below-ground, enclosed manure storage structures and sump pits accounted for 65 (84%) of the 77 fatal cases, while open lagoons only accounted for eight of the documented cases. The potential for a highly toxic environment within these enclosed spaces, and difficulty of rescue, would contribute to this high percentage of fatal cases.

What was the victim doing?

In terms of what the worker was doing at the time of death, there were seven general categories, including an unknown category. The largest category was "repair," and this included clearing, cleaning, repairing, moving, retrieving, fixing and checking the equipment and facility components. The "rescue" classification identified those activities undertaken by other victims who were attempting to rescue a relative, employee or other person.

There were 13 cases in which witnesses stated that prior to the time of the incident, the victim was "playing" and was discovered missing. In all of these cases, the victims were children.

Recommended safety practices

Here are some prevention strategies to keep in mind.

- Identify manure and waste pits as confined spaces.
- Construct manure storage to allow someone to service all components from outside the pits.
- Equip manure storage systems with a powered ventilation system. A new consensus standard will soon be available to help with this.
- Never enter manure storages or pits without a self-contained breathing apparatus, a safety harness attached to a tripod lifting device, and a helper standing by.
- Cover entrances to waste pits with a grate-like cover.
- Instruct workers to never enter a manure pit or any other confined space to attempt a rescue without appropriate safety equipment.
- Be sure manufacturers of manure waste pit systems include hazard warnings.
- Limit or restrict access to lagoons and other outside pumping or treatment facilities.
- Place sufficient "DANGER" and "WARNING" signs to notify a potential rescuer.
- Use air-monitoring equipment to identify a potentially hazardous atmosphere.



With Youth In Mind



Keep Safety in Mind With Fall Festivities

Pick-your-own farms and hayrides are popular activities for kids and parents alike during the fall season. Keep safety in mind while you're having fun this fall. Below are some safety tips for parents who bring their children along to pick-your-own farms from www.theproducelady.org.



- * Be sure to supervise kids at all times. Climbing on farm machinery and getting too close to large livestock can be dangerous for children who may be visiting a farm or ranch for the first time.
- * Don't allow your children to climb ladders that may lead to high places and hazards.
- * Bring water, snacks and hand wipes. Or pack a picnic to enjoy at a designated location on the farm after a morning in the field.
- * Bring a cooler with ice packs if you have other plans between picking and returning home. Keep the fruit cool and shaded to protect its "just-picked" quality.
- * Leave your pets at home to minimize food safety risks for everyone. Family pets don't usually get along with livestock found on farms.

- * Wear a hat, sunscreen, comfortable clothes for bending, and supportive shoes for long hikes.
- * Bring shallow containers that are easy to carry. If you have deep buckets, do not fill them as the fruit can become extremely heavy to carry long distances.

Hayrides

Hayrides are popular in small orchards and tree farms, as well as larger agritourism venues. Keep your family safe by observing these hayride rules.

- * The tractor and the hayride wagon each need a slow-moving vehicle (SMV) emblem on the back. There also needs to be appropriate lighting and reflectors for the tractor and wagon.
- * To ensure safe hitching of the wagon to the tractor, safety chains should be attached.
- * Check the route ahead of time. Be sure it's a safe trail for your family.
- * Never climb onto a hayride that has more than one wagon being towed by a tractor or lead vehicle. It's more common for the "snaking" action of two or more wagons to sideswipe obstructions or to overturn.
- * Is there an assistant in addition to the driver who can help enforce rules?
- * Operators of a hayride should have safety equipment available, such as a fire extinguisher, two-way radio or cell phone, and a first-aid kit.
- * An escort vehicle in front of and behind the tractor and wagon provides extra safety for short periods of time when the rig must cross or access a highway.
- * Don't smoke in or around the wagon. Lighters and matches aren't allowed either.
- * Keep arms and legs inside the wagon at all times.

- * Riders should not bring a flashlight. Shining a light at another vehicle at dusk or after dark could temporarily blind another driver.
- * Remember that no alcohol is ever allowed on hayrides.
- * Supervise kids at all times, and be sure that they don't stand up or place themselves too close to the edge of the transporting vehicle.

The bottom line for a safe hayride is to ensure that it is well-planned, well-coordinated, and well-supervised for the safety and comfort of everyone.

Buckle Up or Eat Glass Farm Safety 4 Just Kid's Buckle Up or Eat Glass (BUEG)

[PowerPoint presentation](#) has been updated with current statistics, a slide on distracted driving, and information for the presenter in the notes section. If you have a FS4JK BUEG educational packet with a CD included, you may want to replace it with this updated version.

Use this [PowerPoint presentation](#) when giving an overview about rural roadway safety. The presentation has many pictures but was purposely designed without a fancy background or animation. Please feel free to add or change pictures to depict locations within your community. Or add a background that represents the topography of your area.

For more youth safety information, check out www.fs4jk.org.

Harvest Safety This Fall Know the Signs of the Times

Things to Know



and lock out electrical power before entering.
* If you must enter a grain bin, use a safety harness and safety line. Always have a second person standing by in case of trouble.

A Watts Township, Pennsylvania man survived a combine rollover late last Fall. He was working into the evening on a steep hill on his 220-acre farm when the combine tipped over. According to an article in the *Perry County Times*, the bin on top of the combine was getting full, but the farmer wanted to keep working. The machine rolled over, and the farmer was trapped under the combine. Only his waist and feet were visible, with his upper half concealed under the crushed cab. Fortunately, the farmer wasn't working alone. His nephew summoned help, and he was airlifted to Hershey Medical Center. He suffered eight broken ribs, a torn sternum, and head and arm lacerations.

This example serves as a reminder to review Fall harvest safety tips. This includes knowing and reviewing safety signs and what they represent. Here are three safety areas to think about this Fall season.

Grain Bin

Be safe when storing and handling large volumes of grain. Flowing grain can trap and suffocate you in seconds. Here are some tips to keep in mind.

- * Install safety signage on grain bins to warn of entrapment hazards.
- * Lock entrances to grain handling areas to keep bystanders and children out.
- * Install ladders inside bins to make them safe for inspections.
- * Don't enter grain bins that are being loaded or unloaded.
- * If it's necessary to enter a bin, shut off

* Never attempt to walk on crusted grain. It may have cavities beneath the surface that can collapse, leading to entrapment and suffocation.

Grain Auger

Grain auger systems are typically integrated into farm machinery, such as combines or feed mixers. It can also be an independent component used to transfer grain to a bin or wagon. Entanglement in an auger often results in traumatic injuries. Here are some recommendations for auger safety.

- * Always perform a pre-operation safety inspection, checking fastener tightness, belts, chains, oil levels, the winch cable, etc.
- * Make repairs and adjustments prior to starting up the auger.
- * Never allow inexperienced workers to operate an auger without direct supervision from an experienced operator.
- * Before starting an auger, be sure all original equipment guards are in place and in good condition.
- * Before service or repair, shut power off, then "lock" and "tag" the auger's power source. Lockout prevents restoration of power while maintenance is in progress. Tagging out the switch indicates that power is disabled and the reason why.
- * Never wear loose clothing, jewelry, or have long hair untied while operating a grain auger.
- * Never step or jump on or over an auger while it's in operation.
- * Always observe the presence and location of power lines before raising or moving an auger into position.
- * Ensure good footing is maintained while working around augers.
- * Place portable augers on dry, level ground, or a gravel pad. Remove spilled grain between loads, and be sure the equipment is turned off each time.
- * Never use your hands or feet to redirect the flow of grain or other material into the auger.
- * Observe all entanglement hazard-warning labels and signs.

Slow-Moving Vehicle (SMV) Emblem

A slow-moving vehicle emblem is a unique identifying marker that indicates a vehicle is traveling 25 mph or less. The SMV emblem is a yellow-orange fluorescent triangle that provides daylight and night time identification of slow-moving vehicles. Studies show that slow-moving vehicles are often involved in rear-end collisions. Here are some tips regarding the SMV emblem.



- * Place the emblem on the rear of the vehicle, as near the center of mass as possible. It should be between 2 to 6 feet above the ground.
- * Use an SMV emblem only on vehicles that travel 25 mph or less on public roadways and highways. Most implements of husbandry and animal-drawn vehicles would fall into this category.
- * Use the SMV emblem in addition to any other marking lights or lighting devices required by law.
- * Other drivers should be able to see the emblem from at least 1000 feet during the day and at night. The fluorescent yellow-orange center is the most visible color in daylight. And the red reflective border is highly visible in headlight beams after dark.
- * Replace a worn SMV emblem with a newer one as soon as it begins to fade.
- * Cover the SMV if your tractor will be traveling more than 25 mph. Some newer tractors are capable of this higher speed.

Sources

Perry County Times; pennlive.com/perry-county-times
The Texas Department of Insurance, Division of Workers' Compensation Resource Center; www.tdi.state.tx.us; (512) 804-4620
Penn State Agricultural Safety and Health Web Site at www.agsafety.psu.edu. Click on "Safety Fact Sheets" and then on "Slow-Moving Vehicle Emblem."

Smoke Alarms: A Sound You Can Live With Fire Prevention Week Is October 3-9

In 23 percent of home fire deaths, smoke alarms were present but did not sound. This year's Fire Prevention Week 2010 has the theme "Smoke Alarms: A Sound You Can Live With" and focuses on reminding people to install and maintain smoke alarms. Smoke alarms provide an early warning system for people to get out of their house in a fire.

Fire Prevention Week is sponsored by the National Fire Protection Association (NFPA). You can go to the NFPA Web site at www.firepreventionweek.org to view a safety video. Click on "videos and public service announcements." Tips include where to install smoke alarms in your home; buying interconnected smoke alarms so that when one sounds, they all sound; buying an alarm that has been tested by an independent testing laboratory; how often to test an alarm and when to change its batteries; and the different types of alarms that are available to purchase.

Smoke alarms cut the risk of dying in a reported fire in half. Fire safety educators across the country will bring important safety messages to their communities, showing them simple ways to install and test smoke alarms. For more information about this year's campaign, visit www.firepreventionweek.org.

Updated Fact Sheet Highlights Lighting and Marking Recommendations for Buggies and Wagons

Horse-drawn buggies have been used by the Amish as the primary means of transportation for generations. While this use of buggy transportation has remained constant, rural populations have grown, and tourism in Amish communities has increased. This leads to many motorists sharing the same roads with buggies. Amish acceptance of a universal buggy lighting and marking practice may be one way to increase public awareness of buggies on the roadway and decrease buggy/motor-vehicle crashes.

The Ohio State University has updated its safety Fact Sheet titled "Lighting and Marking Recommendations for Buggies and Wagons." The Fact Sheet includes information about the Slow Moving Vehicle (SMV) Emblem, as well as buggy and wagon lighting and marking from the side, front and rear. It also provides a chart of recommendations that includes information from Ohio State University Extension at the state and county levels, law enforcement officers, a safety committee from the Amish community, and the American Society of Agricultural and Biological Engineers.

To view this updated Fact Sheet, go to the U <http://ohioline.osu.edu/>. Click "Fact Sheets," and type in key word "buggy." For additional safety information, go to www.agsafety.osu.edu.

Celebrate National Farm Safety & Health Week

The National Safety Council (NSC) marks its 67th year of its annual fall focus on agricultural safety. This year, National Farm Safety & Health Week is September 19–25. The 2010 theme is "ATVs: Work Smart. Ride Safe."

This year, the National Education Center for Agricultural Safety (NECAS), the National Safety Council's agricultural partner, has assumed responsibility for rural and agricultural activities, including National Farm Safety & Health Week. NECAS has encouraged farmers and farm safety professionals to write an article or public service announcement or to share a video or another resource that has been developed for a safety promotion. You can view these submissions at the NECAS Web site at www.necasag.org. Just click on the National Farm Safety & Health week logo.

National Farm Safety & Health Week is an annual promotion of the NSC and commemorates the work ethic and sacrifices of farmers and ranchers. NECAS is a partnership between the NSC and Northeast Iowa Community College and is an active member of the National Institute for Farm Safety.

The NECAS Web site also provides fact sheets and articles on a variety of topics related to agricultural safety. Agriculture continues to rank as one of the most dangerous industries in North America and across the world. For more information about this safety week, contact NECAS at (888) 844-6322 or at www.necasag.org.



Keep them safe

Know the Dangers of Compressed Air

Air compressors are found in most farm shops. Farmers use compressed air for a wide variety of tasks. However, the hazards of compressed air are usually ignored or are not known by many workers. Air under pressure can be very hazardous. If it contacts your body, it can cause serious injury and even death. Here are some examples:

- * Air pressure at 12 pounds per square inch (psi) can dislodge an eyeball from its socket.
- * Compressed air inadvertently blown into the mouth can rupture the lungs, stomach or intestines.
- * Compressed air that hits the ear directly can cause permanent hearing loss. Air at 40 psi or greater can rupture the ear drum if it passes within 4 inches of the ear or less. This type of rupture could lead to brain hemorrhage and death. The loud noise of compressed air can also cause hearing damage.
- * Compressed air can be blown into a small cut on a person's hand. If there is dirt or other contaminants around the wound or oil particles in the compressed air, these foreign objects get pushed into the person's body and can cause a dangerous infection.

Using compressed air for cleaning is a dangerous practice. In addition to causing particles to be blown around at high speeds, this practice can create a lot of dust, which can be a respiratory hazard. It's much safer to use brushes or a vacuum to clean equipment. If you fall under OSHA, OSHA regulations allow the use of compressed air to clean equipment but only when the pressure is reduced to less than 30 psi and then only with effective chip guarding and personal protective equipment (29 CFR 1910.242(b)).

While working on your equipment this fall, make sure that you use compressed air safely. Take the time to train your family members or workers on the hazards associated with compressed air.

This article written by James Carrabba, Agricultural Safety Specialist, The New York Center for Agricultural Medicine & Health (NYCAMH). You can contact Jim at (800) 343-7527 extension 239, or at jcarrabba@nycamh.com. NYCAMH, a program of Bassett Healthcare, is enhancing agricultural and rural health by preventing and treating occupational injury and illness.

Follow these basic safety precautions when working with compressed air.

- * Never point an air hose at anyone, even yourself. Treat it as if it were a loaded gun.
- * Never, under any circumstances, use compressed air to clean your clothes or body.
- * Never engage in horseplay with an air hose. Horseplay has caused serious injuries. Clothes offer no protection against compressed air.
- * If you do use compressed air for cleaning, wear good eye protection. This includes safety goggles or safety glasses with side shields.
- * If cleaning with an air nozzle, make sure it has a proper nozzle to reduce the pressure to 30 psi or less. Use shields to contain the debris. Check to see that other workers are not in the area.
- * Before using, check all components for damage or wear. Make sure connections are tight and hoses are in good condition.
- * Keep air hoses off the floor. This reduces tripping hazards and damage to the hose. Air hoses left on the ground can be damaged by dropped tools, vehicles, etc.
- * Before you disconnect an air line, shut the air off, and then bleed the remaining air out of the line.

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