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Iowa Farmer Today

Safety Watch: Various risks associated with pressure washing

By Stephanie Leonard Nov 21, 2015

Leon Sheets describes the fire and explosion that occurred when he was pressure washing a finishing barn room with foaming manure in the pit below. A pilot light provided the ignition source for explosive methane gas that was released into the air when the foam layer was disrupted by water spray.

Photos courtesy National Pork Board

When was the last time you had your pressure washer checked for safety and maintenance?

Is it one of those pieces of equipment you only think about when you need it, and on the deferred maintenance list?

Are you and your coworkers familiar with potential hazards and safety precautions?

Pressure washers used at the farm and in livestock buildings are designed for rugged service, but they may also be stored in wet or dirty conditions, bounced around in trailers or truck beds or used in buildings without installed ground fault circuit interrupter (GFCI) protection.

Overlooking warning signs that indicate equipment malfunction, operating electric washers without GFCI protection and properly grounded outlets, or using them in areas with inadequate ventilation or potential for explosive gases can result in injury or death.

In 2008, Isidro Martinez, 34, received a fatal electric shock while using an electric pressure washer to clean a swine finishing building. Ten months later, Daniel Bordwell, 30, was electrocuted while pressure washing hog crates.

Martinez had cleaned half of the finishing room. He was electrocuted when he touched the metal surface of the energized washer at the same time his leg was in contact with a steel gate in the finishing room. While in contact with both of these surfaces, his body became part of the fault current path to ground.

Iowa OSHA's investigation of Martinez's death included inspection of the 4-year-old pressure washer that was used:

- A sealant bead on the front of the electrical panel was missing, allowing water to enter the panel.
- Heat had burned insulation on the conductors inside the electrical panel box; this contributed to internal shorts and an electrical fault that energized the metal housing of the electrical panel, the frame of the washer and all metal components in contact with it, including the spray wand.
- Rubber insulation on the outside of the high pressure hose was nicked and cut, leaving the steel braiding exposed.
- Neither the pressure washer nor the building's electrical circuitry was equipped with GFCI protection devices (see sidebar).

Prior to the fatality, the pressure washer had tripped circuit breakers and caused room lights on the same circuit to dim. Employees had received shocks while handling the wand and high-pressure hose.

In any situation where pressure washers overheat, trip circuit breakers or operators receive shocks, the equipment should be taken out of service and evaluated by a qualified technician or electrician so the cause of malfunction can be correctly identified and repaired.

Other safety hazards may exist even when pressure washers are in proper working order

Using gas-powered washers in confinement buildings, garages, barns, sheds and trailers can be fatal, even if doors or windows are open. Gas powered washers should never be used indoors or in semi-enclosed spaces because they produce poisonous carbon monoxide gas.

In recent years, pressure washing activities in finishing and nursery buildings have triggered sudden release of explosive methane gas trapped in manure foam, resulting in flash fires, explosions and

injuries, including the May 2015 fatalities of Sharla Drew, 50, and Kristy Giesler, 32, of Jasper, Minn.

Leon Sheets of Ionia, Iowa, vividly recalls the September 2014 fire in his finishing building.

He had emptied the four rooms in his 1,200-head swine finishing barn and had washed down two of them earlier in the day. Before leaving the building, he decided to give the floor of his “work room” — an 8x40-foot maintenance room in the center of the building that housed supplies, equipment and utilities, including an LP heater — a quick rinse off.

Sheets was aware manure in one of the four pits beneath this building had a foaming issue (the other three pits did not).

The pit with foaming manure was in the finishing room next to his work room, and spanned partially under the slatted floor of the work room.

“About 90 seconds” after starting to rinse off the floor with his cold-water electric washer, he “heard a whoom and a boom,” he said, and was engulfed by a fire ball that burned 20 percent of his body, including his arms, hands and face, and melted his glasses.

He was able to get out of the building — the closed door to the work room was blown off in the explosion — and shut off the building’s breakers, gas line and generator before calling 911.

The fire destroyed the building. Sheets spent nearly three weeks in the hospital.

The cause of this flash fire was methane gas released into the air when water spray broke the foam bubbles below the slatted floor.

The LP heater in the room hadn't cycled on, but its open pilot light provided the ignition source when methane rapidly reached the lower explosive limit concentration in the closed room.

Sheets considers himself lucky.

His precautions prior to pressure washing now include making sure all doors, windows and curtains are open with fans running for maximum ventilation to dissipate gases; all heaters, pilot lights and automated feeding systems must be turned off to eliminate ignition sources; and he maintains a lower level of manure depth in the pit with the foaming phenomenon.

Stephanie Leonard is an industrial hygienist and occupational safety manager with WORKSAFE IOWA, the Iowa Fatality Assessment and Control Evaluation (IA FACE) Program, and the Great Plains Center for Agricultural Health at the University of Iowa Department of Occupational and Environmental Health. Contact her at stephanie-leonard@uiowa.edu or 319.335.4611.