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FOR IMMEDIATE RELEASE

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ELECTRICITY: DON'T BECOME ITS CONDUCTOR

When its properly harnessed, electrical power is a valuable tool. However, if electricity is conducted through the human body, even small amounts of it can be deadly.

Identifying electrical safety principles is one of the aims of Central States Center for Agricultural Safety and Health (CS-CASH). This University of Nebraska Medical Center group is conducting two research projects (funded by National Institutes of Occupational Safety and Health) that are designed to make a positive impact on the sustainability of cattle feedyards through increased safety and health efforts.

In the feedyard, the mill, which houses high voltage equipment used to process feed, is a primary source for potential electrical accidents. Excessive amounts of dust that collect inside the mill over time can be a source for these accidents.

“Dust in a control panel in the mill could serve as a conductor that causes an electrical issue, such as an arc flash related injury inside the mill,” Chuck Pirie, CEO and Content Creation Expert at Safety Made Simple, says.

Its common to find 480-volt systems in a typical feedyard mill’s motor control room. Because of the dangers posed by such high voltage, only trained, qualified personnel (as defined by the National Electrical Code) should work in the control room.

“That kind of electrical power is nothing to mess around with,” Pirie says. “A motor control room is the kind of environment where an arc flash could occur.”

An arc flash is a flashover of electric current which leaves its intended path and travels through the air from one conductor to another, or to a ground. This kind of incident can result in serious injury and/or death.

An arc flash can be caused by many elements, including:

- Dust
- Dropping tools
- Accidental touching
- Condensation
- Material failure
- Corrosion
- Faulty installation

Results of an arc flash typically include:

- Burns
- Fire
- Flying objects (often molten metal)
- Blast pressure upwards of 2,000 pounds/sq. inch
- Sound blast
- Heat upwards of up to 35,000 degrees (Fahrenheit)

“The sun’s surface is about 10,000 degrees,” Pirie says. “So, you can imagine how devastating an arc flash can be. Statistics show that about 80% of electrical injuries and fatalities among qualified electrical workers are caused by an arc flash. Feedyard workers have to realize that we don’t know what we don’t know. Warning signs must be posted at the entrance to the mill’s motor control room and only qualified persons should be allowed to work on any of that equipment.”

Lockout/tagout procedures are a key practice for preventing electrical accidents related to a unexpected equipment startup in a mill. In years past, electrical shutoffs needed for lockout/tagout were often installed in inconvenient locations. Upgraded mills now feature controls located near the area where they are needed, such as the top of the mill leg where tasks such as replacing a belt on a motor may take place. This makes it less tempting to take a risky shortcut when it comes to lockout/tagout. The National Electrical Code now requires new or upgraded shutoff installations in the area where employees are working.

“A common mindset is, ‘I’ll just do this real fast, so I don’t have to take time to shut things down.’ This kind of thinking can only lead to tragedy,” Pirie says. “Comfort, ease and convenience often lead to taking shortcuts. If nothing bad happens, the shortcuts become our new normal and we learn the hard way how important safety practices are.”

In his training, Pirie points to the personal experience of a Kansas feedmill operator who needed to repair a bin wall. Because he had entered the bin several times without lockout/tagout procedures, he felt comfortable in doing so again.

What he didn’t realize was that communication with fellow employees would go wrong, he would reach for dropped tools, and then quickly become buried up to his chin inside the bin. His cries for help were muffled by the noise of the equipment and he came very close to losing his life.

In terms of voltage, household appliances, with currents of 110 volts have been known to cause death by electrical shock. The amount of shock intensity is found in the amount of current forced through the body. Currents high enough to produce severe burns and unconsciousness may not result in death if the victim receives proper medical attention.

Electrical hazards can be posed by deteriorating wiring, faulty electrical outlets, problems with extension cords, plugs, receptacles and switches. Any of these issues could lead to electrical shock or cause a fire.

Stray voltage, electrical power that travels through unintentional conductors (such as the metal housing on a fan) can be caused by poor or faulty wiring, improper grounding or deteriorating electrical systems. The human body, since it contains a significant amount of water, can become an unintended conductor of stray voltage, quickly leading to death. Even a small amount of electrical power can cause muscles to lock, making it impossible for someone to let go of an electrical power source.

If this occurs, immediately turn off the power source. Do not attempt to touch or free the victim until the power is turned off or the electric current will travel through your body, too.

Electric shock can result in a variety of symptoms, which include:

- Loss of consciousness
- Muscle spasms
- Numbness or tingling
- Breathing problems
- Headache
- Vision or hearing problems
- Burns
- Seizures
- Irregular heartbeat
- Damage to internal organs
- Permanent muscle, nerve or brain injury

Contact with even a small amount of electricity can lead to serious physical consequences as well as explosions and fires. Even static electricity, if in contact with a flammable substance, can result in physical injury or fire.

Because electric current can interrupt heart rhythm, the heart can stop or become irregular due to electric shock. The safest way to approach any task related to electricity is to turn off the power before touching anything.

“At the end of a long, challenging day, it’s not uncommon for feedyard workers to become distracted by fatigue or stress and bypass safety practices,” Pirie says. “If shortcuts worked in the past, it’s even more likely that safety practices will be set aside when workers are affected by fatigue and tension.

“When it comes to working with electricity, we must be especially vigilant,” Pirie adds. “Errors and mistakes can quickly lead to terrible consequences.”

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