Episode Title: Grain Bin Safety, Part 4: Equipment Safety

Topic: Safety for Grain Handling Equipment

Episode Summary: We wrap up our Grain Bin Safety series by focusing on hazards associated with grain handling equipment. The episode highlights the importance of raising awareness, improving communication, and reinforcing safe work practices to reduce preventable injuries and fatalities tied to grain production and storage. Listeners hear about a tragic Nebraska incident in which a farmer was electrocuted while exiting a grain bin after a portable electric auger became energized due to faulty wiring. Safety professional Rich Gassman joins the episode to discuss building a strong safety culture, emphasizing awareness of surroundings, clear communication, and strict lockout/tagout procedures when working around dangerous equipment. Iowa State Extension agricultural engineer Kristina TeBockhorst also returns to explain common mechanical hazards such as fast-moving augers, conveyors, belts, and PTO components.

Expert: Kristina TeBockhorst, Iowa State Extension, Rich Gassman

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Episode Quote:

"When we're moving grain with augers, unloading it or cleaning out a bin, just be aware of lockout tagout. People can get stuck in grain up to their knees in 10 to 15 seconds."

– Kristina TeBockhorst, Iowa State Extension

Transcript

00:10 E Presnall

Welcome to the *FarmSafe* Podcast brought to you by the Great Plains Center for Agricultural Health. In the blink of an eye, an injury can change your life and your farm forever. During each episode, we share first-hand stories and real-life tips for making safer and healthier decisions while on the farm.

00:32 A Howard

Grain Bin Safety Week is an annual campaign recurring the third full week of February to promote grain bin safety on farms and commercial grain handling facilities. Grain Bin Safety Week was created to raise awareness about grain bin dangers, provide education and share best safety practices. The hope is to reduce the number of preventable injuries and deaths associated with grain handling and storage. The best way to spread awareness is to talk about it., safety, safety. The wives need to remind their husbands. Parents need to talk to their kids. Employers need to discuss it with their employees often. Communication is key.

01:18 E Presnall

In our last episode for this series, Kristina TeBockhorst helped raise awareness about how good, stored grain management can keep those working in or around grain bins safe by avoiding grain spoilage and therefore minimizing or eliminating the need to enter into a bin. This week, we will continue our conversation on the hazards associated with grain bins, with a focus on grain handling equipment.

E Presnall

The purpose of this grain-related safety series is to bring awareness to the dangers of grain production and handling in light of Grain Bin Safety Awareness Week. Too many families have suffered loss at the hands of grain. As health and safety professionals in ag, it is not only our mission, but our responsibility to be a part of the effort to stop the rising number of grain-related incidents and fatalities.

02:10 E Presnall

This week, we will be sharing an incident that happened in Nebraska, where a farmer was electrocuted while exiting a grain bin.

E Presnall

The goal of the Fatality Assessment and Control Evaluation, or FACE workplace investigation, is to prevent future work-related deaths or injuries, by a study of the working environment, the worker, the task the worker was performing, the tools the worker was using, and the role of management in controlling how these factors interact. This report is generated and distributed solely for the purpose of providing current, relevant education to employers, their employees and the community on methods to prevent occupational fatalities and injuries.

02:53 E Presnall

A 43-year-old farmer was killed when he was electrocuted while exiting a metal grain bin. The victim had been scooping shelled corn into a portable electric auger, which moved the corn outside to another auger powered by a power-take-off (PTO) shaft from a tractor, dumping it into a grain truck. A loose wire inside the portable auger's electric motor caused the metal auger housing which laid across the bin's access door frame to become energized. When the victim grabbed hold of the frame and stepped backward out of the bin, his foot made contact with the ground, creating a completed circuit, causing the electrocution. The victim was pronounced dead at the scene.

E Presnall

The Nebraska Workforce Development, Department of Labor's Investigator concluded that to help prevent future similar occurrences, farmers should do the following: ensure all electrical wiring and fixtures, both permanent and temporary are in good repair; ensure that all electrical wiring and fixtures (including outlets, extension cords, and pull boxes) are of the type best suited for the environment in which they will be used; ensure that adequate means of grounding are provided for all structures and equipment; lastly, consider installing either permanent or portable Ground Fault Circuit Interrupters or GFCIs.

04:21 E Presnall

This week, we will be joined by Rich Gassman again, who was featured in our introduction to stored grain management episode. Today, Rich will share some advice for working around grain based on his experiences, including how to encourage workers to follow the established safety protocols.

04:40 R Gassman

First and foremost, be aware of where you're at. Be aware of your surroundings, know what's there. Things, especially if you're inside a grain bin, can happen very, very quickly. Just being aware of where you're at and making sure you're communicating with anybody else. The positions that I've had, we've had quite a few employees just letting everybody know whether it be through lockout tag out, doing those kind of things, just to make sure nothing goes wrong because like I said, it will happen in a heartbeat when it happens.

05:04 E Presnall

Do you ever have challenges with worker compliance when it comes to what you have set in place for protocols to follow?

05:12 R Gassman

We always hear this especially in the safety world. It only takes a minute, right? We hear that a lot. There can be some compliance issues. As long as you create a good culture where safety is a priority, they're fairly easy to overcome. With all the places that I've been and the things that I've seen and done, lockout/tagout is one policy that I will not allow anybody to violate. Whether it be here with heavy manufacturing or having my past in the grain industry, lockout tagout was a primary process that we followed.

05:40 E Presnall

Where would you recommend that people go for information on how to safely handle grain?

05:46 R Gassman

First and foremost, the centers you know, got to throw a plug in for I-CASH, Iowa's Center for Ag Safety and Health. Great Plains Center does a wonderful job of getting information and helping get it disseminated. Extension is a good place, especially if you want to look at how to condition your grain and the best practices for doing that, and then the manufacturers. The grain bin manufacturers are

good places to go. They know it a little bit better than all the rest of us do, quite frankly, and they're able to help pass that on and get that information where it needs to be. And one of the issues we always see is getting the information where it needs to be. There's lots of good information out there, it's just getting it where it needs to be.

06:21 E Presnall

We will also hear from Kristina TeBockhorst again. Kristina has been a big part of this series on grain-related safety, and today, she is going to walk us through some of the hazards associated with grain handling equipment and what farmers should be aware of when working with or around this equipment.

06:40 K TeBockhorst

Hopefully when you grow up around farms, that's something you hear a lot about is staying away from those fast-moving pieces of machinery. And those are something that people maybe understand a little bit better than like engulfment or something. That's a hazard that you can see and you can hear that loud equipment and you can see it moving really fast. There's a lot of grain moving equipment that rotates very fast, so any type of loose clothing or hair or gloves or anything like that, we want to make sure that we're away from that equipment. When we're preparing our bins, go and check out our grain moving equipment as well.

K TeBockhorst

Make sure that any of that fast-moving equipment has the guards in place. And they're as good as they need to be, they're not broken or damaged, that they're not going to protect you. So, checking all the guards, making sure the motors are working properly before we want to be using that equipment and then when we are doing any maintenance to any of that grain-moving equipment. We want to make sure, if there's stored grain, that we've got that equipment locked out before we're operating it so that nothing gets turned on. When there's grain being stored, and if someone might be around that stored grain, but also turning off and locking out the power to that grain moving equipment before we've got our hands in there and doing any maintenance that we might need to do. Those are really the big ones, maintaining and making sure we have guards and lockout equipment ready to go.

08:14 E Presnall

So, if there's a guard missing. How do you go about replacing it and do you know what the expense would be to do that?

08:23 K TeBockhorst

I mean that would really depend on the particular piece of equipment in looking through the kind of operator's manual or manufacturer might have instructions specific to that piece of equipment on replacing that guard and what's kind of the minimum needed to be safe enough to operate. It's really dependent on the piece of equipment and it's probably manufactured dependent too.

08:45 E Presnall

I'm sure it's cheaper than any hospital costs and lost work time, but yeah, it's something that I was interested in knowing, so I might have to look into that a little bit more and check it out.

08:58 K TeBockhorst

I bet if you look into some of the specific equipment manufacturers, they would have something online that you'd be able to pull up for different pieces of equipment. What you kind of need to have in place for guards. I bet it's based on the manufacturer. They'd have some of that information.

09:16 E Presnall

OK, good to know.

09:18 K TeBockhorst

I guess the other thing for grain handling equipment to think about when we're moving grain with augers, unloading it or cleaning out a bin, just being aware of, you know I mentioned the lockout tag out, but just how important that is just with how fast we can move grain or unload it out of a bin now, people can get stuck in grain up to their knees in like 10 to 15 seconds. So, it does not take very

much time. So, it seems like just an extra step to go and lock out a piece of equipment when you want to just get in there and brush down a few, you know, feet of grain. But if there's a miscommunication, or the equipment gets turned on or power outage or power flips back on that. That can happen really quickly that you could get stuck or even buried in the grain. Those extra steps can be really important if we do ever have to get in a bin.

10:12 E Presnall

First of all, we never recommend going into a grain bin if there is no one around. But you know, we know that farmers work alone a lot of the times. And so even if you're not worried about someone else coming and turning on the power, it's still important to lock that out because, there is a loss of power and then that power comes back on, it could be a problem.

10:37 K TeBockhorst

Yeah, it's definitely worth the little extra effort.

10:44 E Presnall

This fall, lower your risk of injury by using a safety checklist. Check that all exposed moving machinery parts have guards, shields or cages installed and are in good condition to prevent entanglement, including auger flighting, conveyers, belts and power-take-off components. Don’t wear loose or baggy clothing, tie back hair and remove dangling drawstrings and jewelry that could get pulled into moving parts. Lock-out the power to augers, conveyers, belts, and PTO components before performing maintenance or replacing parts so they can’t accidentally be turned on. Stay clear of flowing grain, which can trap a person knee-deep in a few seconds and can completely submerge them in less than 20 seconds. Work from outside of the bin whenever possible and use the buddy system and safe bin entry procedures when a bin must be entered. Check that everyone knows how to de-energize grain loading and unloading equipment and lock-out the power sources so that grain moving equipment can’t be turned on while someone is inside of the bin. Use hazard signage and teach kids and unexperienced people to stay out of stored grain, including bins, piles and grain transport vehicles. Keep the grain vacuum nozzle away from the area below your feet and keep an eye on the angle of the grain surface as you are removing grain. To prevent grain flow, the grain angle should be less than the grain’s angle of repose, which is around 21 degrees for corn and 23 degrees for soybeans. Check that fire extinguishers are easily accessible at the grain storage site. Grain handling facilities naturally collect dust, which can lead to explosions given the right conditions. Clean off dust accumulated in grain legs, elevators, service bearings, belts, and motors regularly. Just a paper-thick layer of dust is combustible in a confined space. Overheated equipment parts or static electricity can be an ignition source. Recheck combine settings as grain condition changes to reduce kernel damage and collection of fines and trash. Dry conditions across Iowa may cause overly dry and brittle grain or uneven conditions across farms, making regular combine adjustments important. If excess fines and broken kernels are collected, either clean the grain before it goes into the bin or core the bin multiple times during filling to remove fines accumulated in the center of the bin. Removing the center core of fines and broken grain will improve aeration in the bin and reduce the risk of grain spoilage and unloading issues down the road.

13:35 E Presnall

If anyone is instructed to enter a bin, first, ensure that they are provided with a body harness that has an attached lifeline, additional rescue equipment, and adequate training to guarantee correct use of equipment. Then, disconnect, lockout and tagout machinery. Block-off all powered equipment, specifically grain moving equipment like augers. Anytime that grain is being emptied or transferred into or out of the bin, it is critical that there is no one inside the bin. When grain is flowing inside the bin, it creates a suction that can pull them into the grain and bury them in seconds.

14:15 E Presnall

During this year’s Grain Bin Safety Week, take some time to consider all of the hazards associated with grain production and handling. With your employees, walk around your farm and identify these hazards. Think through the mechanical hazards associated with machinery involved in grain production, including tractors, cultivation, sowing and tillage equipment, combine harvesters, field and chaser bins, augers, grain bins, and spraying equipment. Other hazards associated with grain production and handling to identify on your farm include manual handling hazards, biological hazards–such as grain and other organic dusts, chemicals–such as fuels, pesticides, and grain fumigants, and electrical hazards. Review the recommended safety protocols for these hazards with your employees and implement the necessary practices to keep you and others safe while on the farm if you haven’t done so already.

E Presnall

In the resources for this episode, we have included several links that provide safety protocols for working with and around grain handling equipment.

15:16 E Presnall

Listen in on the *FarmSafe* podcast to join in on the conversation about keeping safe on the farm.

We want to hear from you. Share your stories about health and safety issues on the farm, about injuries that made you change the way you work, or about the ways you keep yourself and others safe on your farm. Also let us know if there's questions you have or topics that you want to hear about on the air. You can visit our website, gpcah.org, or email us.

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Episode Resources

- Grain Safety Shorts: Grain Handling Equipment Safety, Kristina TeBockhorst, ISU
- Avoid Risks When Working Around Grain Handling and Processing Equipment, NASD, Michigan State University Extension
- Grain Handling, OSHA

Photo