

MICHIGAN HAZARD ALERT



MICHIGAN STATE UNIVERSITY: Prevention of work-related injuries & illnesses through research & investigation

PREVENT ENTANGLEMENTS BY PREVENTING HARVEST MACHINE CLOGS

Farmers face many challenges during harvest; factors which individually, and together, can pose serious safety concerns for the equipment operator. These factors include suboptimal ground conditions, concerns related to crop condition/yield/loss, time pressures, weather pressures, concerns related to nutrition and hydration pressures, fatigue and inattentiveness, and, of course, equipment breakdowns. Crop clogs are one type of breakdown that can cause serious injuries or death. Clogs can occur due to operating speeds, changing crop conditions across the field, as well as the condition and level of maintenance of the harvest equipment. Older machines may struggle to effectively harvest today’s hybrid crops – and be required to move slower to compensate. Newer machines have more safety options and components installed to prevent injury AND may have built-in technology to adjust and assist with unclogging. However, operating any machine at a speed too fast for field and crop conditions can lead to a clog requiring the operator to manually unclog the machine. **For all harvest activities....SLOW DOWN! Don’t push your machine to the limit! Preventing a clog from forming is the key step to preventing an entanglement!**



Photo 1 courtesy of responding police. Reference: MIFACE Investigation Report 23MI119: [Farm worker found entangled in round baler](#). Blue circle and line indicate location of deceased

In Michigan, since 2010, six individuals have died when they became entangled in their harvest machine while unclogging it. Four individuals died during unclogging a corn harvest machine and two died while harvesting hay.

EXAMPLES OF ENTANGLEMENT DEATHS WHILE MANUALLY UNCLOGGING A HARVEST MACHINE

- A farm worker in his 20s died when he became entangled in a New Idea 4854 round baler. The hay owner was not present when the worker started the job. Rainfall was predicted for that night. When the hay owner arrived at the field, the tractor was found stopped, but running at high idle with the baler engaged. The baler service door was found open. The hay owner turned off the power take off (PTO). Cracking the door to the baler, the farm worker was found entangled in the machine (See Photo 1).
- A farmer in his 30s died of blunt force injuries due to entanglement in a corn combine auger (See Photo 2). The decedent, after having 3-4 beers, left his home around 8:00 p.m. to harvest corn. Responding police noted the combine key was in the “On” position with the auger controls engaged. Divots in the ground behind the combine indicated the unit had become plugged.
- A farmer in his 60s died when his hand and clothing were caught in a sprocket/gear located on the right side of the combine while attempting to clear a clog. The decedent's clothing was pulled to the point that the snug clothing shut off his airway. The decedent was wearing multiple layers of clothing due to cold outdoor temperatures.



Photo 2 courtesy of responding police. Reference: MIFACE Investigation Report 22MI131: [Farm Worker Entangled in Combine Auger During Harvesting](#). Blue circle indicates location of deceased

PREVENTING HARVEST MACHINE UNCLOGGING ENTANGLEMENT FATALITIES

Step 1 in prevention is ensuring BOTH the equipment, and the operators are prepared for the harvest.

ALL FARMS: A written safety program/plan for each harvest machine using the manufacturer’s operator and maintenance/ service manual will be useful in preparing the machine and training its operators so they can return home safely.

- **Read, understand, and comply with the operator’s manual and service/maintenance manual** safety instructions for each piece of farm equipment. If the manual has been lost, contact a local dealer or the equipment manufacturer and request replacements. If the manufacturer does not have the manual(s) for your older equipment, check the internet.
- **Ensure all warning labels and safety signs are present and legible** on the machine. Pay attention to them!

- **Develop a written procedure for clearing clogs** utilizing manufacturer recommendations. Post and/or keep the written procedure in easy reach of the operator (in the harvest machine/tractor cab or on the PTO-powered harvest machine).
- **Train employees and family members** in the safe operation of the equipment using the manufacturer's recommended operating procedures. Training should include the importance of following the written unclogging procedures and importance of machine guarding and the risks of removing safety equipment (e.g., removing access door while equipment is operational can inadvertently catch clothing and pull you in).
- **Ensure machine settings are calibrated according to crop type and conditions prior to each day's harvest activity.** Check the operator's manual to determine the optimal harvest/crop settings or recommendations that may address adverse conditions to prevent clogging. If the manual does not have recommendations, reach out to your local dealer to identify a resource or review the recommendations provided by Iowa State Extension in the Resource section of this document.
- **Minimize operator fatigue:** once every hour, shut down the machine following manufacturer instructions, and move around (e.g., perform stretching exercises) to improve circulation, minimize stiffness and improve blood flow. During one of your breaks perform a walk-around visual inspection to check for loose components, leaks, misalignments, etc., that could cause equipment failure. **Recognize that alcohol, drugs, and operator fatigue can reduce reaction time and impair fine motor skills.**
- **Establish a pre-harvest and post-harvest equipment maintenance program** to minimize harvest equipment breakdown and crop clogging. Perform regular inspections of engines, hydraulics, and electrical systems, lubrication, filter replacement, etc.
- If machine is equipped with an **operator presence seat sensing system**, do not disable! Test the system prior to use and maintain it in good, functional condition. Investigate if an operator presence seat sensing system is available as an after-market install.

Step 2 in prevention is preventing a clog from forming.

During Corn Harvest

- Monitor corn condition prior to harvest. Wet or icy corn is more likely to clog the feeding mechanisms of both corn pickers and combines and is more likely to fall over (downed corn). To minimize clogging of:
 - High moisture corn, check out [Tips for setting combines to handle wet corn](#) from FarmProgress.
 - Downed and wind damaged corn, utilize [Tips for Harvesting Downed and Wind-Damaged Corn](#) (Credit: Integrated Crop Management News, and Iowa State University Extension and Outreach).
 - Lodged corn, [Combine Adjustments for Harvesting Lodged Corn](#). (Credit: Integrated Crop Management News and Iowa State university Extension and Outreach)
- For useful information on how to maximize yield while using safe harvest practices read [Chapter 37: Combine Adjustments to Reduce Harvest Losses](#) written by South Dakota State University Extension.

During Hay Harvest

- Adjust mower to an appropriate cutting height for the type of hay to reduce clog formation by diminishing contamination from soil and debris.
- [Properly managed windrows](#) play a crucial role in minimizing clogging.
 - Windrow width: Adjust windrow width based on hay's moisture content, weather conditions, and available equipment. Don't make windrow width wider than the baler.
 - Windrow shape: Aim for a uniform, fluffy windrow that allows air to circulate through the hay.
 - Windrow orientation: Consider aligning windrows to take advantage of prevailing winds for faster drying.
 - Windrow turning: Use rake equipment to gently turn windrows if necessary to promote even drying.
- Prior to the baling operation, determine the hay's moisture content to ensure appropriate baler adjustments are made to prevent clogging, for example belt tension. Ensure hay is evenly distributed into the baler chamber

Step 3 in prevention is safely unclogging the machine. If despite your best efforts, a crop clog occurs and the machine cannot be "unclogged" from the operator's seat, knowing what actions are necessary to manually safely unclog the machine will prevent you from being injured or killed. If a clog occurs:

- **Shut down the equipment according to manufacturer instructions. Verify all power sources (mechanical, hydraulic and electrical) are disengaged prior to leaving the operator's seat.**
 - In general, to shut down the equipment, place the equipment in neutral or park, engage parking brakes, lower any attachments, turn off the engine and remove the key before dismounting. Prior to attempting to unclog the machine, wait until all parts of the machine have stopped moving.
 - When using a PTO-powered harvest machine, the PTO must be disengaged and machine movement stopped before proceeding with the steps in the previous bullet point.

REFERENCES AND RESOURCES

- MIOSHA: [Agricultural Operations Standards](#)
- Minnuo Agro: [Self-Check Manual for Common Combine Harvester Problems](#)
- Penn State Extension: [Guarding Against Corn Harvesting Incidents](#)
- South Dakota State University Extension: [iGrow Corn Best Management Practices for Corn Production](#)
- Calmer® Corn Head [website](#) has videos to assist in corn harvest troubleshooting, including setting adjustments, feeder house congestion and harvesting downed corn to prevent clogging throughout the machine and diminish harvest loss.
- Hanna, Mark. [2016] [Consider Combine Adjustment for Wet Field Conditions](#). *Integrated Crop Management News*, Iowa State University Extension and Outreach