

Fatality Investigation Report

OR 2003-19-1

Farmer is killed when he falls beneath moving combine.

Summary

A 32-year-old farmer was killed when the combine he was operating ran over him. He had completed making initial adjustments to this machine and was just beginning to use it to harvest grass seed. Another worker operating a second combine in the same field witnessed the incident from a distance. The victim is reported to have exited the still moving combine and was observed walking slowly towards the rear of the machine as the combine continued to travel past him. The other operator and the victim's father believe that he may have stepped off the machine to observe its operation or check on something. The victim fell under the left rear wheel and was crushed. The reason the victim fell remains undetermined but it is believed that he stumbled or tripped on the uneven ground.



Recommendations:

- ✓ Farm operators should not assess for seed loss while the combine is operational or moving.

Stop the engine before doing any checks, adjustments, repairs, lubricating or clearing any obstruction, or when leaving the cab or operating platform for any reason.

- ✓ Always maintain a safe distance from all moving machinery.
- ✓ Rural emergency medical systems must have the ability to rapidly locate trauma victims and transport them to the appropriate level of care. Federal, state and local agencies should work together to encourage the development and deployment of Enhanced 911 (E-911) technology and systems.

Introduction

This incident occurred on July 8, 2003. The OR FACE team received notification of the fatality through a local news service on July 20, 2003. On July 30, 2003 contact was made with the county sheriff's deputy who responded to the scene. The father of the victim, who witnessed the event, was interviewed on September 4, 2003 at the farm where it occurred. The OR FACE investigator also visited the combine manufacturer's local dealer and spoke with a knowledgeable sales representative regarding local farming practices and the operation of this machinery. Two other local farm operators who use similar models of combines were interviewed as part of this investigation.

The report was compiled from information obtained from the local sheriff's office, EMS dispatch records, and the interviews. The medical examiner's report and the death certificate were also obtained.

Investigation

This incident occurred on a privately owned family farm in Eastern Oregon. The victim's father has owned and operated the farm with the help of other family members since 1990. The farm was previously owned by the victim's grandfather. The primary crops are wheat and grass seed, and there were four self-propelled combines (same manufacturer and model, but different years) parked in the barnyard on the day of the site visit.

According to the father, the victim had considerable experience repairing, operating and maintaining farm machinery and was aware of the potential hazards of working around large farm machinery. His equipment training was largely acquired by talking with other more experienced farmers, sales representatives and on the job, and the information was passed down through the family. The victim's father reported that farm machinery is not operated unless all guards and shields are in place and the equipment was operating properly.

On the morning of the incident, the victim had completed setting up several of these combines to be used in the field that day. Another combine operator had already begun processing grass seed in the field. The coworker's combine was at the opposite end of the field when the victim entered the grass field on a second combine.

The victim's combine had received some initial coarse adjustments during set up, as had his coworker's combine, prior to entering the field. It is customary, however, to make final adjustments to the combine to minimize crop loss sometime early during the first passes. Through this investigation it was determined that farm operators often assess seed loss by evaluating what is being discharged from the rear of the combine while it is moving and operational. The father of the victim acknowledged that this practice had been done on this farm operation. Further investigation from two other farm operators and the factory representative indicate that this work practice may be widespread.

The operator on the first combine reported seeing the victim exit the combine's operator platform while the combine was moving. This combine is equipped with a hydrostatic drive system and the engine transfers its power through a series of pulleys and large belts to the front wheels. It is possible for the operator to leave the cab of the combine, while it is still slowly moving forward and

processing crop. The rear steering wheels allow the slow moving machine to track well over short distances. The combine continued down the row while the victim walked slowly to the rear so that the combine appeared to travel past him, according to the other operator and the father. As the victim approached the rear of the combine he is reported to have either fallen or tripped into the area immediately in front of the left rear steering wheel.

The father reported that his son was wearing a western style “cowboy boot” on this day instead of his more typical sports shoe or “sneaker” and felt that this may have contributed to him falling or tripping. Grass fields often contain “clumps” of dense grass making them difficult to walk in. He did not appear to be carrying a shovel that was routinely used to sample for seed loss therefore his father believes that he was checking the overall operation of the combine rather than assessing the amount of seed loss. Due to the nature of his injuries it appears that he may have stumbled, and as he stumbled tried to catch his balance by reaching out for a part of the body of the combine. The victim fell onto the left rear tire and was pulled under and run over.

The father reported that he had heard the ambulance sirens go by the field before arriving at the accident scene. It was later determined that there was confusion finding the field because access roads to the location had recently changed and maps had not reflected the change. The other combine operator was dispatched out to the road entrance to signal the ambulance crews to the incident location. Upon arrival, emergency workers attempted to stabilize the victim. The victim, however, expired during field resuscitation attempts.

Cause of death: Blunt trauma to the chest

Recommendation/Discussion

Recommendation 1: Farm operators should not assess for seed loss while the combine is operational or moving. Adjustments should only be made to a combine that is completely shutdown with its engine turned off.

Discussion:

Discussions with the manufacturer’s representative and a review of the operating manual provided the following recommended procedure for adjusting the combine to minimize seed loss. The manufacturer suggested that the combine should be operated a sufficient distance (this may be interpreted minimally to be 3-4 lengths of the combine) to assess its performance after the initial set-up adjustments are made. The operator should then shutdown the combine and turn off the engine before leaving the operator’s platform. The operator should observe the area immediately behind the header and in front of the drive wheels, looking for seed that might be on the ground. Next, the operator should check behind the combine approximately 1-2 lengths to again assess for seed loss. If there is more seed on the ground behind the combine (than behind the header) the farmer may want to make adjustments to the machine to retain more product. Adjustments should only be made to a combine that is completely shutdown with its engine turned off. Reassess after making adjustments, until satisfied with the results.

Some combine operators are known to sample the output of the combine for crop loss while the combine is operational. The operator, or a co-worker, may attempt to sample the discharge using a box, shovel, or some other container. The operator on the first combine and the victim’s father both stated that the victim often assessed for seed loss using a long-handled shovel thereby allowing him

to be away from the rear steering wheels. Working around an operating combine, however, is very dangerous and must be avoided.

More recent models of combines have had engineering improvements to reduce the risk of this kind of incident: (1) the rear steering wheels have been placed more forward on the combine and track with the front drive wheels, and (2) the width and length of the deflection shield (Fig. 3) has been increased to throw chaff and seed further behind the rear wheels making it unnecessary to stand near or in front of them. Additionally, by placing the rear wheels towards the front of the combine the space between the rear wheels and body of the combine is reduced preventing operators from entering into this area while the combine is moving.



Photo 2. Space between rear tires and combine body and short narrow deflection shield.

Remote sensing devices are available in newer models of combines that allow the operator to monitor and adjust for seed loss from the comfort of the cab. These seed monitoring systems are available and sold as options by most combine manufacturers. Owners should check with the manufacturer's field sales representatives on their availability and cost on new combines or for retrofitting older models. When using equipment that does not have optional sensing devices, operators must follow recommended procedures while inspecting machine operation.

Recommendation #2: Always maintain a safe distance from moving machinery.

Discussion:

The manufacturer of this combine warns: **Stop the engine before doing any checks, adjustments, repairs, lubricating or clearing any obstruction, or when leaving the cab or operating platform for any reason.**

Do not attempt to troubleshoot moving equipment problems alone or from a position where you could become entangled in the machinery or its moving parts. When troubleshooting moving equipment, stay well away from the moving parts.

Always stop moving equipment and shut down operations before attempting to make adjustments or repairs. Carry or hang chock blocks on the combine to be used under tires to prevent inadvertent movement while the machine is stopped and repairs or adjustments are being made.

Recommendation #3: Rural emergency medical systems should have the ability to rapidly locate trauma victims and transport them to the appropriate level of care. Global positioning systems (GPS) could be used to provide precise locations of victims. GPS technology could be incorporated into cell phones, radios, and other electronic devices to assist in emergency response.

Discussion:

Witness reports and EMS records suggest that there was some confusion as to which road the farm field was near, and this delayed arrival of emergency treatment. Farming operations often take place

in isolated or remote locations and using an address to locate the victim can be impractical or confusing. Ongoing residential development of rural agricultural areas, the construction of new roads to farming areas, or poorly marked roads or changing road names, can make finding the farm or scene of the accident difficult for arriving emergency personnel.

Enhanced-911 (E-911) technology allows emergency dispatch operators to provide position information for wireless callers. The Federal Communications Commission (FCC) mandated that cell phone manufacturers include E-911 functionality in all wireless products by 2001.

The wireless E911 system deployment is divided into two parts. Phase I requires wireless carriers to report the telephone number of a wireless 911 caller and the location of the antenna that received the call. Phase II requires wireless carriers to provide far more precise location information, within 50 to 100 meters in most cases.

The deployment of E911 requires the development of new technologies and upgrades to local 911 PSAPs, as well as coordination among public safety agencies, wireless carriers, technology vendors, equipment manufacturers, and local wireline carriers. The FCC established a four-year rollout schedule for Phase II, beginning October 1, 2001 and to be completed by December 31, 2005.

The FCC has undertaken several additional programs to promote wireless E911 and public safety. In 2001 it commissioned the [Hatfield Report](#) to examine technical and operational issues affecting E911 deployment. The report concluded that both the wired and wireless 911 systems in the United States were terribly antiquated and insufficient to meet the emergency preparedness needs of the nation. In 2003, the FCC launched the [E911 Coordination Initiative](#) to bring together relevant stakeholders to share experiences and devise strategies for expediting wireless E911 deployment.

Federal, state and local agencies should work together to encourage the development and deployment of Enhanced 911 (E-911) technology and systems.

Until Enhanced 911 systems are deployed and operational, rural employers should have an emergency response plan that includes consideration of the response time and distance to emergency medical services. Establishing contact with fire or emergency medical service providers in advance of an incident to discuss response times and locations (for example, road changes due to urban development) is a necessary component of the emergency response plan. CPR and first aid capability may be required when response times or distances are greater than 3-5 minutes in rural areas.

References:

<http://www.fcc.gov/911/enhanced/>



Note. Newer models like the one in these photos, direct the outflow behind the rear steering wheels. Newer models also have deflection shields that are much wider than those on older machines. Wider shields are better at getting the chaff over the rear axles and past the rear steering tires. Proximity to the spinners makes it extremely dangerous to be in this area for any reason.

Photo 3. Above/Below. Newer combine and larger straw deflection shield.



Photo 4. Combine processing seed.

For More Information

The Center for Research on Occupational and Environmental Toxicology at Oregon Health & Science University performs Fatality Assessment and Control Evaluation (FACE) investigations through a cooperative agreement with the National Institute for Occupational Safety and Health (NIOSH), Division of Safety Research (DSR). The goal of these evaluations is to prevent fatal work injuries in the future by studying the working environment, the worker, the task the worker was performing, the tools the worker was using, the energy exchange resulting in fatal injury, and the role of management in controlling how these factors interact.

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