

TO: Director, National Institute for Occupational Safety and Health

FROM: Iowa FACE Program

SUBJECT: Farmer dies after getting caught in auger of a combine header -- Iowa.

SUMMARY: An 84 year old farmer was killed while cleaning dirt out of an old combine header. The victim was working alone combining beans in a remote field. He had purchased a used early 1970's self-propelled combine the previous year. This was the first time he was using it in the field. He had difficulty operating the combine; it did not separate the beans properly and the cutting height was too high at times and too low in some places where he had been combining. The combine header on the left side had become clogged with field dirt while traveling too close to the ground. The farmer had apparently disengaged the header using a control lever in the cab, then climbed down and proceeded to clean the sickle and auger of dirt. He left the engine running because it had a bad battery. Apparently the header slipped into gear on its own while he was cleaning the dirt. The reel and auger had thrown him around to the right side and pulled his left leg into the auger. The chain driving the reel and auger broke while he was caught between the reel and auger leaving the sickle still running. He was found unconscious lying on the sickle with significant leg injury and loss of blood. An emergency crew used the jaws of life to cut through the reel to access the victim, but he died enroute to the hospital.

RECOMMENDATIONS following our investigation were as follows:

- 1. *The operator should disengage the header and other moving parts as well as shut off the engine before cleaning, maintenance, or working close to the combine.*
- 2. *Machinery dealers should ensure that their machines are in safe working order when sold and that the operator is familiar with safety and operation of the machine.*
- 3. *Owners/operators should keep combines in good working order so they can shut off the engine during cleaning or routine maintenance of the machine.*

INTRODUCTION

In October 1995 an 84 year old Iowa farmer was killed while combining beans with an early 1970's self-propelled combine. The Iowa FACE Program became aware of the incident from reading a newspaper article. Additional information was gathered from a police report, emergency medical report, an interview with the victim's wife, interviews with neighbors, and an interview with the implement dealer who sold the combine. A site visit was conducted on November 16 by two investigators from the Iowa FACE program and photographs were taken of the machine.

The victim was a lifelong farmer who had been working at the same location for the last 55 years. He was in good health and had worked the 240 acre farm alone with his wife. It was a typical small farm operation rotating corn and beans; livestock included ~50 head of cattle. The man was working alone when the accident occurred in a remote part of a field on his property. An implement repairman who happened to visit the farm found the victim lying on the combine sickle with significant loss of blood.

This was the first time the victim had used this self-propelled combine. He had recently purchased this machine and was inexperienced with its handling and operation. Previously he had operated pull-type combines. The implement dealer who sold this machine stated that extensive training in combine operation and safety prior to the sale was required and that the victim had received such training. The dealer also stated to have helped the victim set up the machine in his field and supervised his initial efforts at combining beans. Before the accident he had combined 8-10 acres and he had obvious trouble adjusting the cutting height, frequently cutting too high or scooping up dirt. The beans in the tank were not separated properly showing that the combine was not adjusted correctly for combining beans.

The victim had had two other accidents this fall, one involving a pickup rollover in a ditch and the other a grain bin accident which left him buried in corn. His wife stated he was not physically injured in these incidents, and he was physically and mentally alert on the day of his death.

INVESTIGATION

The victim farmed 240 acres rotating corn and soybeans. Usually he had more corn, but this year due to wet spring and late planting time he had planted more beans. The place of the accident was a field on the north edge of the victim's farm. This part of the field was low and not visible from the farm yard or most parts of the roads. The terrain was rather flat and the weather conditions at the time were favorable for work. There were no eyewitnesses to the accident.

The victim bought the combine in the fall of 1994 after the harvest. The combine was estimated to be 20-25 years old, Massey Ferguson 510. The implement dealer who sold the victim this combine stated that it was in proper working order at the time of sale. The dealer also stated that the victim was given extensive training in the field to operate the machine.

The victim had combined 8-10 acres of beans, and he had obvious problems adjusting the cutting height. The header had scooped dirt at the first row on the left edge of the header, looking from the operators seat. The victim had disengaged the moving parts of the header by pulling up on a clutch lever in the cab, then dismounted the cab while the engine was still running. The neighbor who was first on the scene and later operated the combine stated that the battery was not able to start the combine. This was one reason why the operator left the engine running, which is against safety instructions for all combines.

The victim had the header reel in an unusually low position while cleaning. He did not have

adequate room to work under it, but had to reach through the reel cross bars to reach the auger. At this point the lever in the cab must have shifted down enough to the engaged position to make the header “slip into gear” causing the auger and reel to begin rotation. This is known to happen sometimes in older combines, and is one of the main reasons why the engine should always be shut off. According to the neighbor, who had owned the same combine model, the header control lever did not operate normally. It had about six inches of play, and disengaged the header drive mechanism only in the last half inch of its travel. It took unusually large force to pull the lever to the area where it disengages the header operation. It is possible that the victim did not get the lever all the way in the disengaged position, and it moved due to vibration.

According to an implement mechanic, once fully disengaged there is virtually no chance of the clutch slipping, however it requires a significant pull on this lever to properly disengage the mechanism. If the operator does not pull sufficiently to lock this lever in place, although the auger and reel have stopped rotating, they may slip back into gear as vibration moves the working parts of the clutch. The local dealer we talked with was unaware of any such problems in the many years he has worked on this type of combine. Proper lubrication and maintenance of the clutch are required for smooth working of this clutch.

The victim was found on the right side of the machine, lying on the sickle with his legs pointing straight out from the machine. His left leg had been drawn into the auger and was severely crushed and lacerated in both the lower and upper portions. Apparently he had grabbed onto the rotating reel which pulled him out of the auger and threw him to the front of the machine. This action put excessive strain on the drive chain to the auger and broke the chain. At the time of our investigation the machine had not been repaired. The reel had been cut apart by the jaws of life to gain access to the victim.

This accident occurred at approximately 6:00 P.M.. The victim was found by an implement repairman who was visiting the farm. He ran back to the farmhouse and called 911. Emergency crews arrived within a few minutes and easily removed the farmer from the combine using the jaws of life to cut away the reel cross bars. The victim was unconscious when found having lost a large amount of blood. He never regained consciousness and was dead upon arrival at the hospital.

CAUSE OF DEATH

The official cause of death from the medical examiner’s report was “exsanguination from farm machinery accident”. No autopsy was performed.

RECOMMENDATIONS / DISCUSSION

•**Recommendation #1** *The operator should disengage the header and other moving parts as well as shut off the engine before cleaning, maintenance, or working close to the combine.*

Discussion: Combine operator's manuals and safety instructions emphasize disengaging the motion of any moving parts and shutting off the engine before leaving the cab to do any cleaning or maintenance work on the machine. However, for various reasons operators disregard this advice. A bad battery was one reason in this case. This well known recommendation should be emphasized to the combine operators. The victim had very little experience with this combine and overestimated the reliability of the header clutch.

•**Recommendation #2.** *Machinery dealers should ensure that their machines are in safe working order when sold and that the operator is familiar with safety and operation of the machine.*

Discussion: The implement dealer stated that proper training at the buyers premises was given and the combine was adjusted and in proper working condition. However, based on the poor quality of combined beans, the machine must not have been adjusted properly at that time. It is not known whether the uneven cutting height resulted from mechanical reasons or the operators actions, however there was a significant problem adjusting the header cutting height, which caused the machine to get clogged. The machine was old and had many signs of wear and tear, such as bent sickle bar and poor header clutch linkage. It may be costly to repair old machinery to be in good running condition, however, the dealer should make every reasonable effort to ensure that the machine does not have significant safety hazards, and the operator is familiar with the use and safety of the machine.

•**Recommendation #3.** *Owners/operators should keep combines in good working order so they can shut off the engine during cleaning or routine maintenance of the machine.*

Discussion: The battery was not in adequate condition to start the combine. Therefore it was not possible to shut off the engine during cleaning without significantly interrupting the work, and getting a boost to start again. This encouraged the operator to take a risk. It is not known whether the battery was in poor condition when bought, however, condition of the battery is part of maintenance, and the owner/operator should ensure that the battery is in proper working condition during the harvest season.

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Fatality Assessment & Control Evaluation Program (FACE)

The University of Iowa, in conjunction with Iowa Department of Public Health and National Institute for Occupational Safety and Health (NIOSH), is investigating the causes of work-related fatalities in the State of Iowa. FACE is a surveillance program that identifies all occupational fatalities, conducts in-depth, on-site investigations on specific types of fatalities, and makes recommendations for employers employees, farmers and others to help prevent similar fatal accidents in the future.

Iowa is a major farming state, and therefore the Iowa FACE Program deals with many occupational deaths on the farm. It is a very hazardous profession that claims hundreds of lives nationally every year. We publish detailed reports that are disseminated to agricultural leaders in Iowa to share our concern for the safety of farmers. To reach and effectively communicate with the agricultural community, which is at high risk of fatal injuries, is a worthy challenge in Iowa.

NIOSH funded state-based FACE Programs include: Alaska, California, Colorado, Georgia, Indiana, Iowa, Kentucky, Maryland, Massachusetts, Minnesota, Missouri, Nebraska, New Jersey, Wisconsin, and Wyoming.



Additional information regarding this report or the Iowa Face Program is available from:

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