

FACE INVESTIGATION

SUBJECT: Farmer Dies From Being Entangled in Unguarded PTO Unit on Hay Elevator

SUMMARY:

A 79-year-old male farm worker (the victim) died after becoming entangled in the rotating driveline of a portable hay elevator. The elevator was connected to a tractor equipped with a power take-off (PTO), which powered the chain and sprocket drive of the elevator. Neither the tractor PTO stub shaft, the drive line nor the chain and sprocket were guarded. The victim was working with his son (the farmer) and other family members in the farmyard, loading hay bales into the barn for animal feed. They had completed the loading activities, and the victim was in the process of cleaning and lubricating the elevator chain with an oiled cloth. He was standing next to the operating elevator, with his back to the PTO driveline, when his coat was caught and pulled by the rotating driveline. He was flipped over the driveline, and landed on the ground on the other side of the tractor, tearing his left arm off at the shoulder. A family member heard him yell and looked in the direction where the victim had been working. She saw him lying on the ground, called for help and ran to assist him. The farmer shut off the tractor and applied direct pressure to the wound while the family member called for emergency services. The ground ambulance and helicopter ambulance arrived within twenty minutes, and sheriff's deputies arrived soon after. The victim was transported to a regional trauma center by the air ambulance, where he was pronounced dead on arrival. The FACE investigator concluded that, to prevent similar occurrences, farm machine/equipment operators should:

- ! identify rotating or moving machinery/equipment components, such as PTO drivelines, and ensure that appropriate guards are installed**

- ! observe and follow all applicable safety precautions when operating machinery driven by tractor power take-off equipment, including disengaging the PTO and stopping the tractor engine before approaching the machinery**

- ! avoid wearing clothing that is loose-fitting, or has portions that could be caught by moving machine parts and lead to entanglement**

In addition, farmers should:

- ! include safety management as an integral part of their business operation**

INTRODUCTION:

On September 23, 1995, a 79-year-old male dairy farm worker died after being entangled in the PTO-driveline of a hay elevator. The Wisconsin FACE field investigator was notified by the Wisconsin Department of Industry, Labor & Human Relations, Workers Compensation Division, on October 23, 1995. On May 29, 1996, the field investigator visited the farm and met with the victim's wife and son. The FACE investigator also obtained the death certificate, the sheriff's report and the state climatologist's weather report of the day.

The dairy farm in this incident had been purchased by the farmer, his wife and family about ten years prior to the

incident. The farmer had limited experience with farm operation prior to that time so his father (the victim) and his mother moved to a mobile home on the farm property to help out with the farm operation. The victim had retired from his job with the post office about 15 years before the incident, then operated a greenhouse with his wife for about four years. He had not received any formal training on operating farm equipment, but learned through on-the-job training provided by his son and neighbors. The farmer's wife and teenage children also performed farm chores, but the farmer had no additional employees. There were no written safety policies or procedures for the farm activities. Prior to the incident, there were no fatalities on the farm.

INVESTIGATION:

The farm property consisted of a farmyard with dairy barn, silos, and feed and equipment storage buildings, with 120 acres of crop and hay fields surrounding the farmyard and farmhouse. The tractor and hay elevator involved in the incident were purchased from a farm neighbor about 10 years prior to the incident and were used each harvesting season since then. The tractor was about 40 years old, and the elevator was manufactured at least 35 years ago. The driveline of the hay elevator was attached to an unguarded PTO stub on the tractor. Sprockets, chains and a driveline were unguarded and exposed on the left side of the elevator. A sprocket was attached to two chains that moved the slatted conveyor bed and hay bales to the top of the elevator when it was in operation. The chains tended to rust, so the farmer or his father oiled them after each use. On this farm, it was usual practice for the victim to oil the chains by squeezing an oil-soaked cloth over the chains while the elevator was operating.

On the day of the incident, the farmer, his wife and parents were moving a load of hay from a wagon in the yard into the barn haymow. They had finished that task by 9:30 A.M., with no apparent problems in the operation of the hay elevator. The air temperature was about 40E F. with no precipitation. At the time of the incident, the victim's wife was in the haymow, while the farmer, his wife, and the victim were working in the vicinity of the conveyor and tractor. The victim was oiling the conveyor chains, while standing at the side of the conveyor with his back turned to the exposed sprockets, drive chains, and the PTO driveline. He was wearing a hip-length jacket with frayed hem and sleeves. His jacket apparently was caught and pulled by the rotating driveline. He was flipped over the driveline, and landed on the ground on the other side of the tractor, tearing his left arm off at the shoulder. The farmer's wife heard him yell and looked in the direction where the victim had been working. She saw him lying on the ground, called for help and ran to assist him. The farmer, who was a trained EMS responder, applied direct pressure to the wound while the family member called for emergency services. The ground ambulance and helicopter ambulance arrived within twenty minutes, and sheriff's deputies arrived soon after. The victim was transported to a regional trauma center by the air ambulance, where he was pronounced dead on arrival.

CAUSE OF DEATH: The death certificate listed the cause of death as exsanguination due to traumatic amputation of the left arm as a consequence of a farm accident.

RECOMMENDATIONS/DISCUSSION

Recommendation #1: Farm machine/equipment operators should identify rotating or moving machinery/equipment components, such as PTO drivelines, and ensure that appropriate guards are installed.

Discussion: In this case, moving sprockets, chains and a driveline were exposed during the equipment's operation. The 35-year old hay elevator had been purchased without guards from another farmer, and no guards had been installed in the 10 years since the purchase. Unguarded moving belts, sprockets, chains, and rotating drivelines expose workers to entanglement resulting in injuries and even death. If retrofit guards had been installed over the exposed driveline, the incident may have been avoided. To prevent installation of an inadequate guard, machine/equipment owners should consult with the manufacturer or dealer before installing any guard.

Recommendation #2: Farm machine/equipment operators should observe and follow all applicable safety precautions when operating, maintaining or repairing machinery driven by tractor power take-off equipment, including disengaging the PTO and stopping the tractor engine before approaching the machinery.

Discussion: In this incident, the victim was oiling a hay elevator driven by a PTO, and became entangled in the unguarded PTO driveline and died. When working with PTO-driven equipment, the PTO should be disengaged and the tractor engine shut off before approaching the equipment. These precautions provide the operator protection from contact with the moving machine parts and from the unexpected engagement of power when an operator is cleaning, servicing, adjusting, or repairing the equipment. It was customary practice at this farm to oil the conveyor chains by holding an oil-soaked cloth over the chains while they rotated. This task might have been accomplished by disengaging the PTO, oiling the exposed section of chain, then briefly resuming PTO operation to rotate the chain until the next section was exposed for oiling. If the PTO had been disengaged and the tractor engine stopped before the victim approached the conveyor, this fatality would have been prevented.

Recommendation #3: Farm machine/equipment operators should avoid wearing clothing that is loose-fitting, or has portions that could be caught by moving machine parts and lead to entanglement

Discussion: When working around equipment, particularly rotating drivelines, workers should wear well-fitting clothing that is free of drawstrings, tabs and loops, loose threads or flaps of cloth that could be caught by a machine part. The victim in this incident was wearing a loose-fitting hip-length jacket with frayed hem and sleeves. His jacket apparently was caught and pulled by the rotating driveline. The incident might have been prevented if the victim's clothing did not have loose, frayed edges that could be easily caught in the machine.

Recommendation #4: Farmers should include safety management as an integral part of their business operation.

Discussion: Components of an effective safety management system include a written safety program, hazard analysis and control, training programs and safety committees. Each of these components should be developed to meet the specific needs of individual farms, and be incorporated into the farmers' business operating plan. The financial cost of implementing the program may be considered expensive, but the business investment would prevent many farm fatalities. In this case, the entanglement would have been prevented by using equipment that

was properly guarded. Although the practice of purchasing and using older-model equipment without guards may be regarded as acceptable on small family farms, the hazard of entanglement is present and should be avoided.

REFERENCES

Safety Management on the Farm, Mark A. Purschwitz, 1996, Department Bulletin of University of Wisconsin-Madison College of Agricultural and Life Sciences, Madison, WI

