

Fatality Assessment and Control Evaluation Project

Public Health

KY FACE #98KY049

15 October 1998

TO: Michael Auslander, DVM, MSPH, Kentucky Department for Public Health, Division of Epidemiology, Surveillance and Investigations Branch

FROM: Tim Struttman, MSPH, KY FACE Project Investigator, and Vickie Brandt, BS, RN, Community Partners for Healthy Farming Nurse

SUBJECT: 53-year-old Dies in Tricycle Tractor Overturn while Transporting Round Bale

SUMMARY

A 53-year-old full-time farmer (the victim) was crushed to death when the tractor he was operating overturned. At 1:45 pm, the victim was moving a large round bale of hay with a hay spike mounted on the front of a tractor. The tractor was not equipped with a rollover protective structure (ROPS) or a seatbelt. The farmer, who was sharecropping, was moving rolled hay from a field to a wagon in preparation for transportation to his farm. Hydraulics were used to lift the approximately 1500-pound spiked bale, and the farmer began driving toward the wagon. He proceeded along a tobacco field road, which was bordered on the left by a tobacco field and on the right by a three-acre grass covered sinkhole. (See figure 1.) The field road was approximately 12 feet wide and went along the upper rim of the sinkhole at a slope of nearly 25 degrees downward into the sinkhole. The tractor overturned 180 degrees, resting on the left wheel and pinning the victim against the ground. A farmer in a neighboring field witnessed the event and immediately came to assist the victim. Unable to assist, he went for help. The victim was pronounced dead by the coroner at the scene. In order to prevent similar incidents, it is recommended that:

- tractors be retrofitted with rollover protective structures (ROPS) and seatbelts;
- tractor operators evaluate field roads and determine a safe travel route prior to use of such roads; and,
- tractor operators consider using rear-mounted attachments to transport round bales.

INTRODUCTION

On July 17, 1998, a farmer was killed in a tractor overturn. On July 20, the deputy coroner notified the Kentucky Injury Prevention and Research Center of the incident and a site investigation was scheduled. On July 27, a FACE investigator, along with a nurse from the Community Partners for Healthy Farming (CPHF) Project and the deputy coroner, traveled to the scene. Interviews were conducted with the deputy coroner, the landowner's son, and the tractor owner's son, who was an eyewitness to the overturn. Photos taken by the deputy coroner were reviewed. During the course of the investigation a copy of the Emergency Medical Services (EMS) report was obtained. The tractor and scene were photographed. An equipment manufacturer's safety representative and an agricultural engineer were consulted.

The victim in this case had been a full-time farmer for ten years but had farmed part-time all his life. He had previously been employed at a tobacco warehouse. No prior farm injuries had been reported. The victim was taking medication for high blood pressure at the time of the incident but was otherwise in good health.

INVESTIGATION

At about 7:00 am on July 17, 1998, the victim borrowed a 460 Farmall International tricycle tractor from a neighbor to move large round hay bales from another neighbor's property to his own. This was the second cutting this year. He had planned to move three of the large round bales to his property. The witness reported that the victim's usual custom was to drive along the upper perimeter of the sinkhole to transport the bales to a wagon, and then drive a tractor and wagon on the public roadway to his farm. (See figure 1.) The side of the sinkhole was bordered by a tobacco patch and was the route he chose to take on the day of the incident. His normal route, to go around the sinkhole, was about three times as long as the direct route he chose the day of the incident. As he drove the tractor on the upper rim of the sinkhole (25-degree slope), the tractor overturned to the right, causing the left wheel to come to rest on the victim's back, compressing his chest and pinning him between the rear tire and the ground.

The witness, who was in a neighboring field, went to the victim, checked for vital signs and then summoned help by calling 911. EMS received the call at 1:58 pm and arrived at 2:11. The rescue squad and sheriff were also dispatched to the scene. A hydraulic jack was first used to try to lift the tractor off the victim, but it was unsuccessful. Air bags were then used to successfully lift and support the tractor so the victim could be removed. The coroner pronounced the victim dead at 2:20 pm as a result of asphyxia.

The tractor, a Farmall International tricycle gasoline powered tractor (42 hp PTO), manufactured between 1958 and 1963, was not equipped with a rollover protective structure (ROPS) or a seatbelt. The tractor was equipped with a PTO guard. Both rear tires were fluid-filled with calcium chloride, and each had two 150-pound wheel weights. The tractor's brakes and clutch were in good working condition. Wheels were of non-solid cast iron, approximately 7/8-inch thick, with eight projections from the center of each tire's rim. A front end loader was attached to the unit. It projected along the sides of the tractor and extended out in the front where a hay

fork was mounted. Distance between the rear tires was 75 inches. Distance between the rear and front tires was 90 inches. Rear tires measured 58 inches in diameter. The victim had borrowed this tractor and used it many times in the past for similar work. The current owner of the tractor had owned it for about five years. Overall the tractor was in good condition for one 35-40 years old.

The site of the incident was a grass-covered 8-acre hayfield that bordered a tobacco field. The victim was transporting a moist round bale weighing approximately 1500 pounds along the upper ridge of the sinkhole next to the tobacco field. Slope of the land at the point of overturn was about 25 degrees. Reportedly the right rear tire went into a slight depression in the ground, causing the tractor to overturn. The witness reported that the victim did not have the bale higher than necessary to allow free clearance from the ground.

Due to the overturn the tractor seat was damaged and the muffler was broken off. The rear rim of the right tire was broken along four of the projections. The front end loader attached to the tractor was not damaged. The steering wheel was broken. The right rear cast wheel was broken. It is not known if the wheel broke and caused the overturn or if the overturn caused the wheel to break.

CAUSE OF DEATH

The victim died of compression asphyxia due to multiple injuries sustained in a tractor overturn. No autopsy was done.

RECOMMENDATIONS/DISCUSSION

Recommendation #1: Tractor owners and operators should contact their county extension agent, local equipment dealer or equipment manufacturer to see if rollover protective structures (ROPS) and seatbelts are available for their tractors.

Discussion #1: The tractor in this incident, manufactured between 1958 and 1963, was not equipped with a ROPS or a seatbelt, which protect the operator in the event of an overturn. ROPS first became available as optional equipment on farm tractors in 1971. Since 1976 employers have been required to provide ROPS and safety belts for all farms with 11 or more employees. Since 1985, all new tractors sold in the US have been equipped with ROPS and safety belts. The cost for a ROPS for a 460 International Farmall is about \$1,225 plus shipping and installation. In this case a ROPS could have been installed on the tractor but it would have been necessary to remove the front end loader first because each attachment uses the same mounting point on the axle housing. A custom-fit ROPS could be manufactured, tested and mounted for about \$5,500. The estimated value of the tractor is \$2,000.

Since 1994, 55 Kentucky farmers have died as a result of tractor overturns. Only one of those farmers who died had a ROPS on his farm tractor. He died because he was not wearing a seatbelt and fell and was crushed. Seatbelts must be used with ROPS-equipped tractors to hold the operators within a zone of protection. Seatbelts should not be used with tractors which are not ROPS-equipped.

The tractor involved in this incident weighed 5,263 pounds. Even if rescue equipment is readily available at the scene, getting the victim out from under the tractor can be difficult and time consuming. Asphyxia caused by the weight of the tractor on the victim's chest - which does not allow the victim to take in air - is one of the leading causes of death in tractor overturns.

Recommendation #2: Operators should evaluate field roads and determine a safe travel route prior to use of such roads.

Discussion #2: In this case the path chosen by the victim was a shorter distance than the more level path. For an unknown reason, the victim decided to drive the tractor along the tobacco patch to the wagon. Operators should consider all hazards, such as the slope of the land and depressions in the road, when operating equipment.

Recommendation #3: Operators should consider using rear-mounted attachments to transport round bales.

Discussion # 3: Bales can be transported more safely by tractors equipped with rear-mounted attachments. The likelihood of tractor overturns sideways or backward is reduced because bales are carried in a lower position than when hauled with front end loaders. Tricycle wheels, excessive weight, and trailing equipment all contribute to tractor instability and can cause the tractor's center of gravity to shift, leading to an overturn.

References

Standard Number 1928.51, Subpart C, US Department of Labor, Occupational Safety and Health Administration, OSHA CD-ROM (OSHA A94-2), February 1994.

Unpublished FACE data 1994-1997.

Offical Guide, Tractors and Farm Equipment. North American Equipment Dealers Association. Fall 1994.

Centers for Disease Control and Prevention. "Farm Tractor-Related Fatalities--Kentucky, 1994." *Morbidity and Mortality Weekly Report.* 44:26; July 7, 1995.

Centers for Disease Control and Prevention. "Fatalities Associated With Large Round Bales-Minnesota, 1994-1996." *Morbidity and Mortality Weekly Report.* 47:02; January 23, 1998.