The National Institute for Occupational Safety and Health (NIOSH)

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Part-Time Farmer Dies in Tractor Rollover – West Virginia

FACE 9320

SUMMARY

On June 26, 1993, a 35-year-old part-time farmer (the victim) died when the tractor he was operating rolled over on top of him. The victim was mowing hay in a field located on hilly terrain at approximately 9 p.m. The victim began the first cut at the top end of the field, on level ground; however, as the tractor progressed across the top of the field, the ground sloped into a 45 degree bank, which was approximately 6.5 feet high. Evidence at the scene, such as indentations in the ground and tractor tracks, suggest that, at the highest point of the bank, the tractor rolled over twice then righted itself. The tractor then traveled approximately 250 feet before coming to rest against a large tree. NIOSH investigators concluded that, to prevent similar occurrences, tractor owners and operators should:

- **contact the county extension agent, local equipment dealer, or equipment manufacturer to see if retrofit rollover protection and operator restraint systems are available for their equipment**
- **evaluate the terrain before beginning any farming opera- tions that involve farm machinery**
- **ensure that adequate daylight is present before performing farming operations.**

INTRODUCTION

On June 26, 1993, a 35-year-old male part-time farmer (the victim) died after the tractor he was operating rolled over on top of him. On July 2, 1993, officials of the county sheriff's office contacted the National Institute for Occupational Safety and Health (NIOSH), Division of Safety Research (DSR), and requested technical assistance in evaluating the tractor involved in the incident. On July 9, 1993, a DSR safety specialist and an engineering intern traveled to the county impound garage (where the tractor was being held) and the incident site to conduct an investigation. The tractor, its attachments and the incident site were photographed. Photographs of the incident site taken by the sheriff's department immediately following the incident were reviewed. The incident was also discussed with the investigating officer.

The victim was a part-time farmer. He did not own the tractor involved in the incident or the property where the incident occurred. The emotional status of the victim's spouse precluded an interview to obtain further victim information.

INVESTIGATION

The victim approached the owner of a field, approximately 3 acres in size, and asked if he could mow the field for hay. The owner of the field gave his permission, noting that he was not going to mow the field because of its location on a steep hillside and its uneven terrain. The field owner offered the use of his tractor and the victim accepted.

The victim drove the tractor from the owner's barn to the field approximately 200 yards away. The tractor (a 1950 Oliver Model 2220) was equipped with a rear-mounted, power take-off driven (PTO), mower assembly with a 7-foot-long cutter bar. The tractor had no rollover protection system (ROPS) or operator restraint system. These features were not required at the time the tractor was manufactured.

At approximately 9 p.m. on the day of the incident, the victim began mowing the field (with the tractor lights on) at one top corner of the field and mowed around the perimeter of the field without incident to the other top corner of the field. The ground at this top corner of the field was level; however, as the tractor progressed around this corner and across the top of the field, the field sloped into a 45 degree bank which was approximately 6.5 feet high. As the tractor approached the top of the bank (the left rear tire track was approximately 1 foot from the top), the tractor overturned in a downhill direction on top of the victim. The tractor overturned a second time, then righted itself and traveled approximately 250 feet before coming to rest in a wooded area against a large tree.

The field owner noted the location of the tractor lights from inside his house and, sensing something was wrong, went to check on the victim. The field owner found the tractor still running with its lights on, then followed the tractor tracks back up the hill and found the victim. Upon checking the victim, he could detect no vital signs. The field owner went to a house across a county road and told the residents to call the emergency medical squad (EMS) and the sheriff's office.

When EMS personnel arrived at the scene at approximately 9:20 p.m., they summoned the coroner, who pronounced the victim dead at the scene.

Although the event was unwitnessed, the tractor tracks and indentations in the ground indicated that the tractor rolled over twice. The location of the victim suggested that the tractor rolled over onto him on the first roll.

The tractor was evaluated at the county impound building as part of the NIOSH FACE investigation. The tractor and mower assembly sustained structural damage during the rollover. The outer tractor housing received some damage; however, the gas tank was not damaged and was not leaking. The steering ring and spokes of the steering wheel were broken off, though the steering column remained intact. The tractor fenders were dented and pushed toward the tires, but did not rub against the tires. The tractor seat was broken off of its support and the right rear tire had lost some fluid and air and was partially deflated.

The cutter bar had broken away from the mower assembly and the cutting blade was badly damaged. The front power take-off knuckle was pulled out of the mower assembly and remained attached to the tractor. The stabilizer bar for the mower blade was broken in two. Because of the physical damage to the cutting assembly, it could not be functionally tested.

After the gas, engine oil, and hydraulic oil levels were checked, the gas was turned on at the carburetor bowl and the tractor was started. The hydraulic system was engaged and functioned properly. No leaks could be detected, and fittings, connections and hoses were in good operating condition.

Although the steering ring was broken off, the steering column and assembly could be turned. The steering functioned properly and no excess play was present in the steering system. The power take-off was engaged and was found to be functional. The tractor's transmission was cycled and was in proper working condition.

The tractor's braking system functioned and was sealed properly. No excess or leaking brake fluid could be detected. The investigating officer from the county sheriff's office stated that the parking brake was in the set, or on, position when the tractor was found. If the brake had been set at the time of the incident, it may have affected steering; however, it could also have engaged when the rollover occurred.

No excess oil or fluid was present on the tractor engine block. All of the tractor connections, fittings and hoses were free of visible physical damage and the electrical system seemed to be in good working order.

It is possible that in the semi-darkness, and with the hay chest high, the victim could not visually identify the steeply sloped bank. It is likely that environmental conditions most likely contributed significantly to the incident.

CAUSE OF DEATH

The coroner listed the cause of death as crushing injuries to the head and chest.

RECOMMENDATIONS/DISCUSSION

Recommendation #1: Tractor owners and operators should contact their county extension agent, local equipment dealer, or equipment manufacturer to see if retrofit rollover protection and operator restraint systems are available for their equipment.

Discussion: The tractor in this incident, manufactured in 1950, was not equipped with a ROPS or an operator restraint system, which protect equipment operators in the event of a rollover. These safety features were not required on tractors until 1976, when OSHA Standard 29 CFR 1957.28 went into effect. However, retrofit ROPS and operator restraint systems are available for many older model tractors. Tractor owners should contact their county extension agent, local equipment dealer, or equipment manufacturer to obtain information on sources of retrofit ROPS and operator restraint systems.

Recommendation #2: Tractor owners and operators should evaluate the terrain before beginning any farming operations that involve farm machinery.

Discussion: The field being mowed in this incident was located on a fairly steep hill, which had a very uneven surface. The chest-high hay made it very difficult, if not impossible, to determine the lay of the ground surface. Additionally, the hay made the bank look less steep than it was. Before beginning operations that involve the use of machinery, a walk-around inspection should be made to identify potential problems in the area where the operations are going to be performed.

Recommendation #3: Tractor owners and operators should ensure that adequate daylight is present before performing farming operations.

Discussion: The semi-dark conditions in this incident would both limit both visibility and the operator's ability to identify potential hazards such as uneven ground surface. Although this tractor was equipped with operational running lights, the lights would not provide enough illumination to identify potentially hazardous areas. The semi-dark conditions would also make it difficult to see the cutter bar, since it was mounted behind the tractor and the running lights.

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