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Farmer Dies Following a Tractor Rollover in West Virginia

SUMMARY

On July 26, 1997, a 61-year-old male farmer (victim) died of injuries sustained when the tractor he was driving rolled end-over-end and then barrel-rolled down a steep slope. The victim had gotten his tractor out of deep ruts in a field road and was driving uphill when his back tires slid over the edge of the hillside precipitating the rollover. He was working alone at the time of the incident. The tractor did not have rollover protective structures or a seat belt. The victim's sister became concerned when he did not arrive home before dusk and, along with a neighbor, searched the field in which he had been working. Upon finding the victim, they went to the victim's home and called the EMS. The EMS arrived within 27 minutes. With the approval of the sheriff's office, the EMS transported the victim to the local hospital where he was officially pronounced dead. The coroner estimated that the victim had been dead several hours before he was found and that he had died immediately after sustaining his injuries. Damage to the steering wheel and to the victim's head, neck, and chest suggest that the tractor steering wheel crushed the victim during the roll before he was ejected. The WV FACE Investigator concluded that, to reduce the likelihood of similar occurrences, the following guidelines should be followed by tractor owners:

- ***Equip all tractors with rollover protective structures (ROPS) and a seat belt.***
- ***Evaluate environmental conditions and terrain prior to using field roads and make necessary adjustments to accommodate for them.***

INTRODUCTION

On July 31, 1997, the WV FACE Program was notified by the county coroner of a farm work-related fatality that occurred on July 26, 1997. The WV FACE investigator and a West Virginia University medical student traveled to the jobsite on August 6, 1997 with the county coroner to review the fatality incident site. Photographs were taken at the site. The death certificate, medical examiner's report, sheriff's report and photographs taken by the sheriff's department were obtained. The victim's sister was interviewed regarding the farmer's work history.

The victim had worked with his father on the farm as a young man (approximately 20 years of farming experience) and worked other jobs until retirement. After retirement, he resumed activities on his father's farm. These activities primarily related to keeping fences intact on land rented to a neighbor. The victim had driven tractors for many years and his training with regard to farming had been "on-the-job" provided by his father. There was no written safety program, and the victim was responsible for any safety decisions that were made.

INVESTIGATION

On the morning of the incident, a 61-year-old male farmer (victim) used a farm tractor to drive through an orchard to get to a line fence he was repairing. His sister reported that he walked home for lunch around noon and said he had gotten the tractor stuck in a soft spot in the field road which lay above the orchard. It is not clear why the victim used the steep field road as opposed to the orchard route on his return home. It may have been a shortcut. Around 3:30 p.m., the victim's sister dropped him off at the pasture gate with a come-a-long (hand winch) and a chain which he would use to pull the tractor out of deep ruts in the field road. He told the sister he did not need any help.

The tractor involved was a 1978-80 Massey Ferguson Model 245, which is a small tractor measuring 9 feet 4 inches front-to-end (measured from middle of back wheel to middle of front wheel). The rear tires were spaced approximately 6 feet 2 inches apart; the front tires measured approximately 4 feet 4 inches apart (measured from center of the wheel tread to center of wheel tread). The rear tires had been placed with rims facing inside to add to the rear width dimension and to improve stability. The tractor was not equipped with ROPS or a seat belt. According to relatives, the tractor was in good operating condition.

The soft spot where the tractor was stuck was approximately one fourth mile from the pasture gate where the victim had been dropped off. The road lay parallel to a steep 12° slope. The field road was rarely used and in poor condition with several one-and-one-half to two inch deep ruts on each side where machinery had traveled in the past and rains had further eroded the road.

The fatal event was not witnessed; however, the following description affords a plausible explanation of what may have occurred. The farmer had gotten his tractor stuck in deep ruts on the field road. He placed a chain around a nearby tree (uphill and to the right of the front of the tractor) and using a come-a-long connecting the chain and the front axel of the tractor, he was able to ease the tractor up and out of the ruts. Wheel marks from the front tires indicate that the tractor was positioned diagonally across the field road after it had been pulled out. The back tires were located near the edge of the steep downhill slope. There was very little room to maneuver the tractor because the hillside rose to the right of the tractor and sloped down to the left as it faced toward the intended destination, the pasture gate. The field road itself was approximately 12 feet wide, and there were ruts that had to be avoided in order to move forward. The farmer unhooked the come-a-long from the tractor and got on to drive it up the field road and toward the pasture gate. Tracks show that the rear tires slipped and the tractor moved down the slope which lay behind and to the left side of the tractor. The center of gravity apparently moved to the rear tires and allowed the tractor to roll end-over-end and then barrel-roll twice down the steep slope. The tractor was found on its left side (approximately 60 feet down the slope), and the victim was found lying approximately three feet from the tractor.

The overturned tractor and victim were found by a sister and a neighbor who had searched the area for him when he had not returned home by dusk. The farmer was last seen alive by his sister at 3:30 p.m. When the sister and neighbor found the victim, they returned to the victim's home which was located nearby and called the EMS at 9:45 p.m. The EMS arrived on the scene about 27 minutes later and assessed the victim. Absence of vital signs, fixed pupils, and rigor mortis indicated that the victim had been dead for some time. The EMS was directed by the sheriff's office to transport the victim's body to the local hospital where official time of death was documented as 11:15 p.m. The coroner estimated the time of injury at approximately 4:00 p.m. with interval between injury and death to be approximately two minutes. The victim's head and chest injuries were thought to have been caused by crushing pressure from the steering wheel as the tractor rolled. The steering wheel was bent, the seat was off the tractor, and the front right spindle was broken.

CAUSE OF DEATH

The cause of death listed on the death certificate was multiple head, neck, and chest trauma.

RECOMMENDATIONS/DISCUSSION

<u>Recommendation #1:</u> Equip all tractors with ROPS and a seat belt.

[Note: Owners of older model tractors should contact their county extension agent, equipment dealer, or equipment manufacturer to determine if retrofit ROPS and operator restraint systems are available for their equipment. Such systems should be installed by the manufacturer or an authorized dealer].

Discussion: Preventing death and serious injury to tractor operators during rollovers requires the use of ROPS and a seat belt. These structures, either a roll-bar frame or an enclosed roll-protective cab, are designed to withstand the dynamic forces released during a rollover. In addition, seat belt use is necessary to ensure that the operator remains within the "zone of protection" provided by the ROPS. OSHA regulations require that all tractors built after October 25, 1976 and used by employees of a farm which employs 11 or more must be equipped with ROPS and a seat belt. In West Virginia, many older tractors (pre-1976) are in use on family farms and are used by the farm owner or used on farms that have less than 11 employees and therefore do not fall under OSHA regulations. Given the steep slopes and environmental conditions that deteriorate field roads in West Virginia, all farmers should voluntarily have their older tractors retrofit with a properly designed, manufactured, and installed ROPS and seat belt. If the tractor involved in this incident had been fitted with a ROPS and seat belt, and the seat belt had been in use, this fatality might have been prevented. A ROPS retrofit kit is available for the Massey Ferguson Model 245 tractor.

<u>Recommendation #2:</u> Evaluate environmental conditions and terrain prior to using field roads and make necessary adjustments to accommodate for them.

Discussion: The deep, muddy ruts in and around the field road and adjacent to the steep slope contributed to this incident. The field road was deteriorated by worn tracks, mud, and erosion, and this caused the tractor to become stuck. Maneuvering the tractor once it was extricated from the ruts was complicated by the steep slope at the edge of the field road and by steep terrain above the field road. Given the terrain and the environmental conditions, use of another method for removing the tractor from where it had been stuck, use of another field road to gain access to the line fence, or a choice to travel on foot to mend the fence may have prevented this fatal incident.

REFERENCES:

1. Office of the Federal Register: Code of Federal Regulations, Labor, 29 CFR Part 1928.51 (b), U.S. Department of Labor, Occupational Safety and Health Administration, Washington, D.C., April 25, 1975.

FATALITY ASSESSMENT AND CONTROL EVALUATION PROGRAM

The WVU Center for Rural Emergency Medicine, through a contract with the West Virginia Department of Health and Human Resources, conducts investigations on the causes of work-related fatalities within the state. The goal of this program is to prevent future fatal work-place injuries. West Virginia FACE intends to achieve this goal by identifying and studying the risk factors that contribute to workplace fatalities, by recommending intervention strategies, and by disseminating prevention information to employers, employees, trade associations, unions, equipment manufacturers, students, teachers, and others with an interest in workplace safety.

Please use information listed on the Contact Sheet on the NIOSH FACE website to contact In-house FACE program personnel regarding In-house FACE reports and to gain assistance when State-FACE program personnel cannot be reached.