MIFACE INVESTIGATION: #03MI134

SUBJECT: Farmer Died When Tractor Overturns to Side While on a Hill

Summary

On Tuesday, September 2, 2003, a 78-year-old male farmer died when the tractor he was driving overturned on its side as he was attempting to change direction while on a hill. The victim had driven his International Farmall Cub tractor with an attached trailer on a paved roadway to the entrance gate to his property. He entered the property and traveled several hundred yards through a meadow to an area where there were trees with damaged limbs. The hill was on the operator's left side. His intent was to cut the damaged limbs and use them for firewood for next year's maple syrup production. The sequence of events is unknown. His wife thought he must have experienced some sort of health emergency. At some point after he stopped the tractor, he unhooked the trailer. The victim, instead of walking back to the house or driving the tractor back the way he came or taking another alternative route, attempted to drive the tractor backward up the hill, possibly as a shortcut to the house. Backing the tractor up the hill, the victim reached a point where he could turn the tractor wheels to align him in the direction of his home. His tractor tracks showed evidence that the tractor's tires were slipping in the dirt. The victim turned the front wheels to the right, positioning his tractor. After turning the wheels, the tractor rolled sideways down the hill. Rolling over two times, the tractor came to rest on top of the victim. (See Photo 1) When the victim didn't return for lunch, his wife went to look for him. She found him lying face down with the tractor seat and rear axle on the top of his back and his head against a tree stump. She ran to a neighbor's home to call for emergency response. A sheriff department officer arrived, and the officer and the victim's wife maneuvered the tractor enough to pull the victim from under the tractor. Additional emergency response personnel arrived and the victim was declared dead at the scene.

Photo 1. Final resting place of tractor

RECOMMENDATIONS

- Equip older tractors with a rollover protection structure (ROPS) and a seat belt; the local county extension agent, local equipment dealer or equipment manufacturer should be contacted to see if a retro-fit ROPS/seat belt system is available.
- Establish a farm tractor operating rule for all who use tractors on the farm to only use established roadways or paths on land with obvious slopes and hills too steep for safe tractor operation to minimize the risk of tractor overturn.
- Owners of small farms should consider ongoing or annual agricultural safety training to keep abreast of safety issues that can impact their operations.
- Consider carrying a reliable 2-way communication device for emergency communication in case of injury and emergency situations.

Key Words: Agricultural,
Machine-Related, Tractor

INTRODUCTION

On Tuesday, September 2, 2003, a 78-year-old male farmer's tractor overturned, rolling over twice and coming to rest on its side as the victim was attempting to turn while on a hill. MIFACE was informed about this work-related death by a newspaper clipping. On June 15, 2004, the MIFACE researcher interviewed the wife of the deceased, visited the incident site and viewed the tractor involved in the turnover. The victim's wife permitted the MIFACE researcher to take photographs of the incident site and the tractor. During the writing of the report, the medical examiner's death scene investigation report and police department reports and photographs were obtained. Photos 1 and 3 are police department photographs taken at the time of the incident. MIFACE took Photo 2 at the time of the site visit.

The victim grew up on a farm, although during his working years, he was employed in the automotive industry. He purchased 37 acres of farmland from another family member approximately 10 years ago. The victim grew a variety of vegetables, such as potatoes, peas, carrots, onions, etc. He also made maple syrup, tapping trees on his 37 acres.

According to the victim's wife, he had a variety of health problems. He had a heart attack and was on heart pills for water retention, and had been diagnosed with cancer in his throat. Due to the cancer, he had developed "quite a cough", that "doubled him over" when he was coughing. His wife also indicated that the victim's doctor told him that the victim was allergic to bee stings. His wife stated that the victim had been stung before and had needed medical attention in the hospital emergency room as a result of the sting. She indicated that he had experienced breathing difficulties after being stung, and each subsequent reaction was more severe than the previous reaction.

INVESTIGATION

The tractor the victim was driving was a wide-front 1948-1949 Model C60 Farmall with chloride-weighted rear tires. The tractor was not equipped with a rollover protection structure and seatbelt. The victim had purchased the tractor in "used" condition. The victim's wife had purchased the tractor's maintenance manual for him because he did all of his own tractor repair/maintenance.

Photo 2. Path in field next to hill

On the day of the incident, the victim had performed a variety of chores, such as digging potatoes and picking apples. While his wife finished picking the apples, the victim decided to trim some trees on his property to provide firewood for the next year's batch of maple syrup. He attached a trailer to the tractor, gathered his chainsaw, and drove the tractor down a 2-lane, paved asphalt road to the entrance of a field/meadow area that was at the base of the hill. After entering a gate to enter the field, he proceeded along a mowed path in the field, which paralleled the hill. The mowed path adjacent to the hill was gently rolling. (See Photo 2) Approximately one-third of the distance to the rear of his property was a cleared area on the hill that was used by family

members as a “ski hill”. His wife stated that the victim had told family members they were never to use the ski hill as a way to get up the hill with the tractor.

Since the event was unwitnessed, the sequence of events is unknown. MIFACE developed a possible event scenario based on the wife’s interview. The victim’s wife felt strongly that that the victim must have been in a medical emergency situation, since in all of the years she had known him, he had never performed such a maneuver.

It is unknown if he stopped the tractor due to a medical emergency or if he had reached the desired place where he was going to trim the trees at the base of the hill. It is unknown when he unhooked the trailer from the tractor. The chainsaw was found nearby at the base of the tree-covered hill. The victim’s home was at the top of hill, whose slope was estimated between 20-30%. When he started up the hill, the trailer had already been disconnected from the tractor. After backing the tractor up to nearly the top of the hill, he turned the steering wheel to the left. His tractor tracks showed that the victim was able to turn the tractor and that it was “sideways” on the hill. Photo 3 shows the final resting place of the overturned tractor. There was evidence that the tractor tires were slipping in the dirt. The tractor was unstable because of the slope of the hill. The tractor overturned to the side and rolled down the hill. The seat and rear axle landed on the victim’s back and his head struck a tree stump.

Photo 3. Resting place of tractor

When the victim did not return home for lunch, his wife went to look for him. Not finding him in the places she thought he would be working in, she continued to look and found him under the overturned tractor. She went to a neighbor’s home and called for emergency response. A sheriff department officer arrived, and the officer and the victim’s wife maneuvered the tractor enough to pull the victim from under the tractor. Additional emergency response personnel arrived. The victim was declared dead at the scene.

CAUSE OF DEATH

The cause of death as stated on the death certificate was acute crush injury to chest. No autopsy or toxicology tests were performed.

RECOMMENDATIONS/DISCUSSION

- Equip older tractors with a rollover protection structure (ROPS) and a seat belt; the local county extension agent, local equipment dealer or equipment manufacturer should be contacted to see if a retro-fit ROPS/seat belt system is available.

Although the victim's farm was on a gently rolling terrain, if at anytime he wanted to cut the grass on the "ski hill" or travel at the top of the hill, a rollover hazard (side or rear) was present. Due to the model and age of the victim's tractor, a ROPS/seatbelt retrofit was not possible. Recognizing that tractors are durable and essential pieces of farm equipment, many farmers continue to use older model tractors that are not equipped with a ROPS/seatbelt. Some tractors cannot be retrofitted with a ROPS/seatbelt or the cost of the retrofit is excessive in relation to the value of the tractor. In situations where there is a possibility of tractor overturn to the side or rear MIFACE recommends that farmers using older tractors not equipped with a ROPS/seatbelt consider discontinuing the use of these tractors and conduct the work using a tractor equipped with a ROPS/seatbelt. Consider renting or leasing equipment for performing the work.

To find out if your tractor model can be retrofitted with a ROPS/seatbelt, an Internet resource to obtain approximate costs may be found from the Marshfield Clinic: http://www.marshfieldclinic.org/nfmc/cgi-bin/default.idc. The written document that the website is based on is listed in the reference section of this report. You could also contact a local farm equipment dealer in your area that may be able to order and correctly install the ROPS.

- Establish a farm tractor operating rule for all who use tractors on the farm to only use established roadways or paths on land with obvious slopes and hills too steep for safe tractor operation to minimize the risk of tractor overturn.

To prevent an overturn to the rear or side, the tractor operator must keep the tractor's center of gravity within the tractor's stability baseline. A tractor's center of gravity is the point where all parts balance one another. Stability baselines are imaginary lines drawn between points where tractor tires contact the ground (See Figure 1). If the tractor's center of gravity moves outside the stability baselines, the tractor will overturn. When a tractor (or any piece of equipment) is on a hill, the distance between the equipment's center of gravity and the stability baseline is reduced.

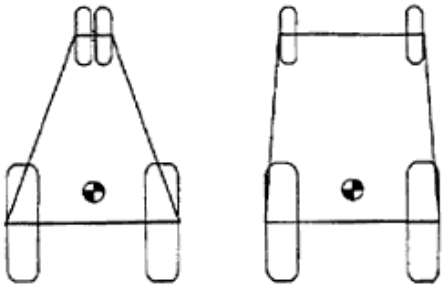

Figure 1. The stability baselines of a tricycle and a wide front-end tractor respectively

To minimize the risk of an overturn to the rear, the victim backed the tractor up the hill. Backing the tractor up the hill kept the tractor's center of gravity within the tractor's stability baselines. While on the hill's slope, he made the turn to face the tractor towards his home. The slope of the hill was sufficient to "move" the center of gravity to the outside of the stability baseline between the front and rear tire. When the center of gravity moved outside the stability baseline, the tractor overturned to the side (See Figure 2). It is unknown how fast he was driving; his speed may also have played a role in the overturn

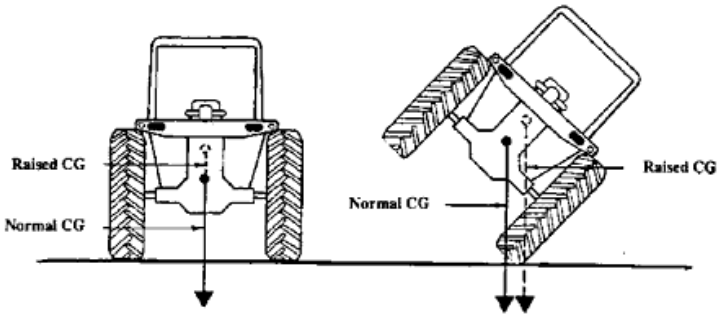

Figure 2. A higher center of gravity allows a side overturn to occur more quickly

To minimize the risk of a tractor overturn, MIFACE recommends that farm owners make it a policy to only use established roadways or paths on land with obvious slopes and hills too steep for safe tractor operation. Although the victim would not normally operate the tractor on the hill, if he had followed normal tractor driving routes to avoid the potential hazards associated with operating the tractor on the hill, he would have avoided the side-overturn on the hill.

- Owners of small farms should consider ongoing or annual agricultural safety training to keep abreast of safety issues that can impact their operations.

Although this would be considered a "small" farm operation, the benefits of taking the time to ensure a safe and healthful workplace cannot be overstated. Attending local ongoing or annual safety training seminars will promote the recognition of hazards and assist you in recognizing hazards and how to minimize them. Ongoing training will enable you to increase your awareness of hazards that you "walk by every day and never see." Identifying and correcting unsafe and unhealthful conditions keep you safe, help you avoid unplanned incidents that are costly, time consuming, stressful and inconvenient, and maximize productivity and profitability.

- Consider carrying a reliable 2-way communication device for emergency communication in case of injury and emergency situations.

Farm owners should consider carrying a reliable 2-way communication device (portable radio, portable cellular phone, etc.) especially when working alone or in remote locations. A portable radio with a Family Radio Service (FRS) Federal Communications Commission (FCC) certification may be operated without a FCC license. The communication distance for a FRS unit is usually a couple of miles and they have a lower price range than a portable radio certified for use as General Mobile Radio Service (GMRS) unit or a combination unit that has both FRS and the GMRS capability. A GMRS unit or a "dual-service" unit has a greater communication range and is also more expensive than a FRS unit. If a "dual-service" radio is operated exclusively under FRS, you are not required to have a license. If you operate a radio under the rules that apply to GMRS, then a FCC license (mail order form with fee) is required.

The victim did not carry a 2-way communication device when he went to cut the tree limbs. Although the sequence of events are unknown, if he had experienced a medical emergency and carried a communication device, he possibly could have called his wife or another family member to call for emergency response. With emergency response on the way, he may have waited at the base of the hill for help instead of backing his tractor up the hill.

REFERENCES

A Guide to Agricultural Tractor Rollover Protective Structures, A Publication of the National Farm Medicine Center, 1000 North Oak Avenue, Marshfield, Wisconsin 54449.
http://www.marshfieldclinic.org/nfmc/cgi-bin/default.idc

Murphy, DJ. Tractor Overturn Hazards, Pennsylvania State University Fact Sheet Safety –34, Pennsylvania Cooperative Extension Service, Pennsylvania State University College of Agricultural Sciences, Agricultural Engineering Department, 246 Agricultural Engineering Building, University Park, PA 16902. Publication date: 1991.
Internet address: http://www.abe.psu.edu/extension/factsheets/e/Agsafetyindex.html

Federal Communications Commission (FCC), Family Radio Service (FRS).
Internet Address: http://wireless.fcc.gov/services/personal/family/

MIFACE
Investigation Report # 03 MI 134
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Please rate the following on a scale of:

Excellent	**Good**	**Fair**	**Poor**
1	2	3	4

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1 2 3 4

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