

FACE INVESTIGATION #04WI019

SUBJECT: Farmer Dies when Tractor rolls over on sloped Terrain

SUMMARY:

On April 9, 2004, a 52 year-old male died after his tractor rolled over on a sloping terrain in his barnyard. The victim was hauling manure on his farm with his Farmall 806 tricycle-front-end tractor. (Figure 1) The victim's wife was gardening approximately 100 yards away and saw her husband motion to her that he had one final load to take to the field before he was done for the day. His wife returned to her work and within seconds she heard the tractor start to roll over. She saw the tractor roll upside down over her husband. She ran over to the tractor and yelled to her 11-year old son to call 911. She called for help as she tried to get him out from under the tractor. There were no neighbors in sight at the time. She ran to the house and notified the emergency medical system (EMS). She quickly returned to her husband and stayed with him until the emergency personnel arrived. They arrived within six minutes after they received the call. A medical helicopter arrived and their physician pronounced the victim dead at the scene. FACE investigators conclude that to help prevent similar occurrences, farmers should:



Figure 1. A Farmall 806 tricycle-front-end tractor like the one used in this incident.

- **retrofit all tractors with rollover protection structures (ROPS) and seatbelts.**
- **wear a seat belt when operating a tractor equipped with ROPS.**
- **use extreme care when operating tractors on or near sloped terrain.**
- **be aware of the dangers of fatigue and weariness when operating tractors and take frequent breaks.**

Introduction:

On April 9, 2004, a 52 year-old male died after his tractor overturned on a sloping terrain in his barnyard. The victim was hauling manure on his farm with his Farmall 806 tricycle-front-end tractor. His tractor rolled over while he was hauling manure. The farm was situated on hilly terrain. The manure pit was situated next to the barn on a small sloping hill approximately 100 yards from the family home. The Wisconsin FACE program director learned about the incident through the death certificate on May 19, 2004 and reviewed the death certificate, coroner and sheriff's reports. The field investigators interviewed the victim's wife on December 9, 2004.

The victim lived and worked on a 50- acre farm that he and his wife owned for the past 15 years. The farm was registered in the Federal Conservation Reserve Program (CRP), so at the time of the incident, they did not farm much of the land. The farm was used primarily to raise 30 head of cattle. The victim did most of his farming in the evenings during the spring and fall. The victim had a positive attitude and was an agile man with no previous farming injuries or accidents. He had grown up on a large dairy farm and loved being outdoors. He learned about farm safety and how to operate machinery while growing up on the farm. After serving in the military, he owned a larger farm prior to moving to his smaller farm in Wisconsin. He knew how to repair any type of machine and was always willing to help others.

The couple bought the Farmall 806 tractor about five years prior to the incident. They used it twice a year, in the autumn for baling/hauling hay and in the spring for hauling manure. The victim and his wife had discussed the dangers of having a tractor with narrow front wheels, especially on hilly terrain, and they thought about buying a wider wheeled tractor; however, they felt they did not use the tractor enough to warrant newer farm equipment.

The victim worked on a wheel crew for the railroad five days a week, so he traveled throughout the state. His day usually began at approximately 6:30 a.m. and he was home by 3:30 p.m. most days. He was a dedicated worker with the railroad for a total of 26 years. During the last fifteen years, the victim participated in many safety-training activities and at one time served on the railroad's safety committee.

INVESTIGATION

On the day of the incident the victim had the day off from the railroad and the weather was mild. He spent time relaxing with his family in the morning before he began working on hauling manure about mid-morning. His 19 year-old son came over to help him. The manure pit was situated next to the barn in a small valley approximately 100 yards from the family home. The victim and his son worked for several hours hauling manure from the barnyard up a sloping hill to spread on the upper fields not far from the farmhouse. In order to pick up the manure, the victim had to maneuver the tractor down a slight incline after coming from the field, and make a left turn facing back up the hill to get the manure spreader in the right position to load the manure from the barnyard. By mid-afternoon, after the victim and his son had taken approximately 25 loads to the field, his son went home and the victim continued to work on his own.

The victim's wife rode on the tractor with him for one load, and then she went to start working in the yard with their 11 year-old son. At approximately 3:00 p.m., the victim told his wife he was going to take only a couple of more loads of manure out to the fields before quitting for the day. A little more than an hour later, the victim was coming down the hill toward the barnyard from the field. He was on a relatively flat portion of the barnyard when he motioned to his wife he had one more load before he was done. He was maneuvering the tractor down the slight incline and making the turn to the left to face back up the hill to get the manure spreader in the right position to load the manure from the barnyard. The victim maneuvered the tractor and was returning back up the slight incline on a small sloping area to position the manure spreader when the tractor turned over, pinning him under the rear fender. The manure spreader became unhitched and slid back down the incline.

Simultaneously, the victim's wife had her back turned and was raking leaves in the yard less than 100 yards from her husband. Upon hearing the tractor start to turn over, she ran quickly towards him and tried unsuccessfully to lift the tractor off the victim. She yelled to their son to call 911. The victim's wife screamed for help, but none of the neighbors could hear her. Emergency personnel received the call at 4:18 p.m. and arrived within six minutes. A medical helicopter arrived and their physician pronounced the victim dead at the scene. The Medical Examiner was contacted and arrived approximately 40 minutes later.

Cause of Death

The final cause of death as stated on the death certificate was traumatic asphyxiation due to chest compression.

RECOMMENDATIONS/DISCUSSION

Recommendation #1: Retrofit all tractors with rollover protection structures (ROPS) and seatbelts.

Discussion: Tractor rollovers are the most common cause of fatal farm accidents. The Farmall model 806, like the tractor used in this incident has not been manufactured since 1967. It was not equipped with ROPS or seatbelts when it was manufactured. The Occupational Safety and Health Administration (OSHA) established the Rollover Protective Structure Standard to try to decrease the number of farm tractor overturn deaths in 1976. ROPS with a seatbelt have proven to decrease the risk of fatalities by offering a protective barrier to the victim in the case of an accidental rollover. ROPS are available for this model Farmall. It is important to use only the ROPS recommended by the manufacturer or tractor dealer. ROPS are engineered specifically for each tractor and must pass a series of dynamic and static tests. According to the National Farm Medicine Center in Marshfield, WI, "Due to dynamic forces which act upon a ROPS during a tractor rollover, it is imperative that a ROPS be properly designed, manufactured and installed. Proper materials and mounting hardware as well as engineering design are necessary to ensure safe performance. A ROPS is not something to be fabricated in the farm shop."

Recommendation #2: Wear a seat belt when operating a tractor equipped with ROPS.

Discussion: In order for the rollover protective structure to be effective, drivers must be wearing seatbelts while operating the tractor. The seatbelt will keep the operator within the zone of protection in case of an overturn or other event that could cause the operator to be ejected from the operator seat. Without wearing a seatbelt during an overturn, the operator of a tractor can be thrown from the protected area of the ROPS, and not only crushed by the tractor, but by the ROPS as well.

Recommendation #3: Use extreme care when operating tractors on or near sloped terrain.

Discussion: Tractor rollovers are likely to occur on hilly terrain when the center of gravity on the tractor becomes unbalanced. The field slope, tractor speed, turning radius, rear axle torque and center of gravity are all interrelated factors that impact the stability of a tractor. Tractors with narrow front wheels, often referred to as "tricycle" tractors, have been known to be less stable than tractors with wider front wheels. If drivers are turning on a slope, it is advised that they always turn down hill rather than up hill or at an angle, which increases the likelihood of the tractor becoming unbalanced. In this case, in addition to driving on the slope of the incline, the

farmer had hauled many loads of manure in this area. It is possible that the ground had become slick from spillage over the side of the manure spreader.

Recommendation #4: Be aware of the dangers of fatigue and weariness when operating tractors and take frequent breaks.

Discussion: The victim had successfully maneuvered the tractor in the hilly terrain many times prior to the accident. While it is uncertain exactly what caused the tractor to rollover, the victim had been taking loads of manure to the field for several hours. In research, factors such as fatigue, stress, medication and alcohol have all been associated with detracting from safe operating procedures. In this case, it is possible the victim was tired and possibly anxious to finish his last load.

Note: Based on the evidence, this incident was *not* related to stress, medication or alcohol.

REFERENCES:

A Guide to Agricultural Rollover Protective Structures. 1997, National Farm Medicine Center, Marshfield, WI. <http://research.marshfieldclinic.org/nfmc/resources/rops/default.asp>
Date accessed: April 2005.

Ayers, P.D., Liu, J. 2003. Tractor Overturn Protection and Prevention no.5.018. Colorado State University Cooperative Extension. Farm and Ranch Series. www.ext.colostate.edu.
Date accessed: January 2005.

International Harvester picture of Farmall Model 806 tractor available at:
<http://members.abilnet.com/herbie/806.htm> Date accessed: December 2004.

29CFR 1928.51 (b) Code of Federal Regulations, U.S. Government Printing Office, Office of the Federal Register.

**WISCONSIN FATALITY ASSESSMENT AND CONTROL EVALUATION
(FACE) PROGRAM**

I. FACE INVESTIGATION # 04WI019

Staff members of the FACE Project of the Wisconsin Division of Public Health, Bureau of Occupational Health, conduct FACE investigations when a machine-related, youth worker, Hispanic worker, highway work-zone death, farmers with disabilities or cultural and faith-based communities work-related fatality is reported. The goal of these investigations is to prevent fatal work injuries studying: the working environment, the worker, the task the worker was performing, the tools the worker was using, the energy exchange resulting in fatal injury and the role of management in controlling how these factors interact.

KM Monirul Islam, MD. MPH PhD.
Principal Investigator

Henry A. Anderson, MD
Co-Principal Investigator

Meredith Lins BSN
Field Investigator

Thomas Sieger, Director
Bureau of Environmental and Occupational Health

Additional information regarding this report is available from:

Wisconsin Division of Public Health
Wisconsin FACE Program
P.O. Box 2659
Madison, WI 53701
Telephone: (608) 266-0197
Email: linsmj@dhfs.state.wi.us
Website: http://www.dhfs.state.wi.us/dph_boh/FACE/index.htm

DISTRIBUTION:

NIOSH Division of Safety Research
Area OSHA Office
OSHA Region V
Wisconsin Division of Public Health (Internal Distribution)
 OSHA Consultation Program - Health
 Regional Public Health Offices
Wisconsin Coroner's Association
County Coroner
Law enforcement agency
County Health Department
Wisconsin Department of Workforce Development
 Worker Compensation Division
 Bureau of Labor Statistics
UW Agriculture Extension
Family of the victim