

REPORT#: 17MI098

REPORT DATE: 10/22/19

INCIDENT HIGHLIGHTS



DATE:

Summer, 2017



TIME:

Unknown



VICTIM:

Farm owner in his 50s



INDUSTRY/NAICS CODE:

Real Estate/Renting &
Leasing/53



EMPLOYER:

Sole Proprietor/Landlord



SAFETY & TRAINING:

None



SCENE:

Farm Field



LOCATION:

Michigan



EVENT TYPE:

Machine/Drowning

Farm Owner Drowned in Ditch When Tractor Overturned to Side and Pinned Him

SUMMARY

In Summer 2017, a farm owner in his 50s died when the John Deere 2320 tractor he was using to mow the edge of a hay field rented to another farmer overturned to the side, pinning him in water at the base of a 10-foot deep ditch. The tractor was equipped with front forks and a PTO-driven brush hog mower attached to the rear of the tractor. When the decedent's spouse returned home from work, he did not greet her at the house as was his usual practice. She checked the home and surrounding outbuildings and could not find him. His spouse called for help to find him. Family members began to walk the property.... [READ THE FULL REPORT](#) (p.3)

CONTRIBUTING FACTORS

Key contributing factors identified in this investigation include:

- Rollover protection structure removed and not replaced with an equivalent means of protection.
- Field crop planted two- to three-feet from ditch wall edge.
- Alcohol consumption prior to operating the tractor.

[LEARN MORE](#) (p.6)

RECOMMENDATIONS

MIFACE investigators concluded that, to help prevent similar occurrences, tractor operators should:

- Tractor owners/operators should ensure their tractors have a manufacturer approved, certified, tractor specific rollover protection structure (ROPS) and seatbelts installed.
- Conduct a field survey to identify hazards, including hidden obstructions and to establish crop-planting limits/boundaries to maintain farm machine access to other fields/areas

[LEARN MORE](#) (p.7)

<https://oem.msu.edu>





MICHIGAN

State **FACE** Program

Fatality Assessment & Control Evaluation

Michigan State University

Department of Medicine • Occupational and Environmental Medicine

909 Fee Road, 117 West Fee Hall • East Lansing, MI 48824

1-517-353-1846 • <https://oem.msu.edu>



Michigan Fatality Assessment and Control Evaluation (FACE) Program

MIFACE (Michigan Fatality Assessment and Control Evaluation), Michigan State University (MSU) Occupational & Environmental Medicine, 909 Fee Road, 117 West Fee Hall, East Lansing, Michigan 48824-1315; <http://www.oem.msu.edu>.

This information is for educational purposes only. This MIFACE report becomes public property upon publication and may be printed verbatim with credit to MSU. Reprinting cannot be used to endorse or advertise a commercial product or company. All rights reserved. MSU is an affirmative-action, equal opportunity employer.

SUMMARY

In Summer 2017, a farm owner in his 50s died when the John Deere 2320 tractor he was using to mow the edge of a hay field rented to another farmer overturned to the side, pinning him in water at the base of a 10-foot deep ditch. The tractor was equipped with front forks and a PTO-driven brush hog mower attached to the rear of the tractor. There was approximately a two-foot space between the hayfield and ditch edge. He was working alone. When the decedent's spouse returned home from work, he did not greet her at the house as was his usual practice. She checked the home and surrounding outbuildings and could not find him. His spouse called for help to find him. Family members began searching the property without success. As it was getting dark, they returned to a family member's home. One family member continued to look. This family member noticed something "green" in the ditch and found the decedent's overturned tractor with the decedent pinned under the tractor. Emergency response was summoned. The decedent was declared dead at the scene. When the tractor was raised from the base of the ditch, the tractor had a flat driver's side rear tire. Post-mortem toxicology results found the decedent to have a 0.204% blood alcohol concentration (BAC) (legal limit to drive a motor vehicle is below 0.08 % and there is increased penalty for BAC of 0.17 % or greater).



Photo 1. View of field looking west. Cross placed at site of incident.

INTRODUCTION

In Summer 2017, a farm owner in his 50s died when he was pinned under an overturned tractor at the base of a ditch. MIFACE learned of his death from the newspaper. MIFACE personnel contacted the decedent's family members, who agreed to be interviewed. MIFACE reviewed the death certificate, police and medical examiner's reports during the writing of this report. Pictures used in the report are courtesy of the responding police department and the MIFACE researcher.

EMPLOYERS

The decedent was a sole proprietor. He had lived at this residence and farmed the land for the past 30 years. His spouse described his job post-retirement activity as "being a landlord" and "putzing around the farm". The decedent currently rented land to other farmers and maintained the perimeter of the rented fields.

WRITTEN SAFETY PROGRAMS AND TRAINING

The decedent was not required to have a written safety program. His level of safety training regarding safe tractor use was unknown.

WORKER INFORMATION

The decedent had worked as a maintenance supervisor in the food processing industry until his retirement approximately one year prior to the incident. He had 40 years of experience driving tractors; he used this tractor to perform his farm work, to maintain his yard, and according to his spouse, to "putz" around the farm. He maintained the edges of the fields he rented to farmers. When he had farmed, he had grown soybeans, corn and wheat on approximately 120-130 acres.

Michigan State University
Department of Medicine • Occupational and Environmental Medicine
909 Fee Road, 117 West Fee Hall • East Lansing, MI 48824 • 1-517-353-1846 • <https://oem.msu.edu>

While working his full-time job, he also rented a portion of his land to other farmers. After retirement, he rented the remainder of his land. The decedent was still very active and usually worked by himself most of the day; his spouse worked at a job requiring 12-hour days.

INCIDENT SCENE

His residential property included his home, a large lawn, several outbuildings, a barn, and a large garden (Photo 2). The incident occurred in the field north of his residence. There was a ditch with steep banks separating the residence lawn and the hay field. Responding police estimated the depth of the ditch as 10 feet. The base of the ditch was filled with



Photo 2. Overview of backyard/field configuration. Dotted arrows show path of decedent. Dashed line shows location of ditch.

water; the depth of the water was not recorded in the police report. To gain access to the fields to the north, there was a wide strip of grass.

The police report indicated it appeared that the hayfield had been recently mown and that there was an unmown 2-foot space between the field and the ditch edge. Grass and weeds grew up the side and over the trench edge.

The John Deere 2320 tractor involved in the incident was purchased in 2009-2010. The tractor was purchased equipped with 42-inch long front forks and a roll over protection structure (ROPS). For reasons unknown, the decedent removed the ROPS. When mowing, the decedent attached a PTO-powered brush hog to the rear of the tractor (Photo 3).



Photo 3. Brush hog used on day of incident

WEATHER

Weather Underground was utilized to check the weather conditions on the day of the incident. The temperature on the day of the incident was in the low to mid 70s, cloudy skies, and variable winds ranging from 3-7 mph. Four days prior to the incident, there was heavy rain with an accumulation of 0.18 inches. Weather conditions post the rainy day were cloudy, with temperatures in the high 60s to low 70s. [[Weather Underground](#)]

Michigan State University
Department of Medicine • Occupational and Environmental Medicine
909 Fee Road, 117 West Fee Hall • East Lansing, MI 48824 • 1-517-353-1846 • <https://oem.msu.edu>

INVESTIGATION

The decedent's spouse last saw and spoke with decedent at approximately 5:30 a.m. and then left for work. She returned home from work at approximately 5:30 p.m. Uncharacteristically, her spouse was not there greeting her as she walked in the door.

The decedent's spouse looked for him around the house, the outbuildings, and yard. She noted that the decedent's car was still at the residence, but the tractor was gone. Not finding him, she called and then drove to a family member's home. Together they searched the woods and surrounding area for approximately one hour. It was getting dark, so they returned to the family member's home. Another family member continued to look.

At approximately 9:15 p.m., the family member drove along the edge of the field and spotted something "green" in the ditch, which was the decedent's tractor upside down and submerged in the water-filled ditch (Photo 4). The family member called the decedent's spouse and then called 911 after finding the decedent trapped in the water, under the tractor. All family members were at the scene when the emergency responders arrived.



Photo 4. Overturned tractor in the ditch. Green oval is location of decedent under the tractor.

A towing company with the assistance of emergency responder removed the tractor and the decedent's body from the ditch. After the tractor was removed from the ditch, police found that the driver's side rear tire was flat.

It appeared that the decedent had been driving eastbound adjacent to the bank mowing the weeds. Police noted that the incident site had an area that clearly showed where the vegetation had been knocked down at the bank of the drainage ditch at the incident scene (Photo 5).

The incident was unwitnessed, and the exact sequence of events is unknown. Several hypotheses were developed based on potential scenarios: 1) The tractor struck concrete debris obscured by tall and/or lush grass (Photo 6). The impact either bounced the tractor or turned the steering toward the ditch leading to a slide down the slope enhanced by the tractor's "turf tires." Near the bottom the tires caught beginning an overturn that ejected the operator into the water. Due in part to the removed/disabled upper ROPS section the tractor completely flipped, landing on top of the operator and pinned the operator in a submerged condition; 2) the passenger side tractor wheel(s) were too close to the edge and the bank sheared, causing the tractor to slide down



Photo 5. Incident scene showing ditch bank and water level.

Michigan State University
Department of Medicine • Occupational and Environmental Medicine
909 Fee Road, 117 West Fee Hall • East Lansing, MI 48824 • 1-517-353-1846 • <https://oem.msu.edu>

the hill and overturn; 3) while the decedent was looking over his shoulder to the rear of the tractor, either to check the mower position or possibly an issue with the rear driver's side tire, he inadvertently turned the steering wheel toward the ditch bank; 4) due to his level of intoxication, he may have had difficulty controlling the tractor and/or fell asleep, causing the tractor to enter the ditch.

When the tractor was removed from the ditch, the tractor bucket was elevated (Photo 7). It is unknown if the decedent had been operating the tractor with the bucket elevated or if this was caused when the tractor rolled into the ditch. Post mortem examination found evidence that he may have been, at one point during the rollover, under one of the rear tractor tires.

Responding police estimated, based on the condition of his body, that he had been deceased approximately 4-5 hours or more.

The medical examiner noted possible tire marks on the decedent's left anterior chest and abdomen.

MIOSHA Citations

MIOSHA did not conduct a fatality inspection for this incident.

CAUSE OF DEATH

The death certificate listed the cause of death as drowning. Post-mortem blood toxicology was negative for illicit drugs and other medications. The decedent had a BAC of 0.204% and vitreous alcohol concentration of 0.23%.

CONTRIBUTING FACTORS

Occupational injuries and fatalities are often the result of one or more contributing factors or key events in a larger sequence of events that ultimately result in the injury or fatality. The following hazards were identified as key contributing factors in this incident:

- Rollover protection structure removed and not replaced with an equivalent means of protection.



Photo 6. Concrete block at ditch edge that may have been a factor in this incident



Photo 7. Condition of tractor after being removed from ditch. Note elevated bucket and flat driver's side rear tire.

Michigan State University
Department of Medicine • Occupational and Environmental Medicine
909 Fee Road, 117 West Fee Hall • East Lansing, MI 48824 • 1-517-353-1846 • <https://oem.msu.edu>

- *Field crop planted two- to three-feet from ditch wall edge.*
- *Alcohol consumption prior to operating the tractor.*
- *Possible terrain conditions at field/ditch edge (soft from heavy rain four days prior).*

RECOMMENDATIONS/DISCUSSION

Recommendation #1: Tractor owners should ensure their tractors have a manufacturer-approved, certified, tractor specific rollover protection structure (ROPS) and seatbelts installed.

Discussion: Although the farm was on flat terrain, a rollover hazard existed at the confluence of the ditch edge and field. Rollover protective structures (ROPS), when used in combination with a seatbelt, are 98 percent effective in preventing death and serious injury in the event of a tractor overturn. The tractor had originally been equipped with a factory-installed rollover protection structure, but the ROPS was removed by the decedent. If the ROPS and seatbelt were used as intended, the decedent might have been able to exit the tractor seat after the tractor came to rest at the base of the ditch because the ROPS may have provided enough clearance between the tractor seat and the base of the ditch.



Figure 1. ROPS protecting operator in tractor overturn to side

To maintain the operator safety, tractor operators should ensure that all tractors are equipped with a tractor-specific ROPS and seatbelt certified/approved by the manufacturer. To maintain the zone of protection provided by the ROPS, the seatbelt must be used. Operators should assure any unit where the ROPS has been removed for authorized operations is only used for those operations. Older tractors manufactured prior to 1976 do not come equipped with a ROPS. To assist farmers in finding a ROPS for these older tractors, the University of Kentucky Extension program developed the Kentucky ROPS Guide, which can be used by any US or Canadian farmer to locate retrofit ROPS for older tractors or even “gray market” tractors (i.e., non-U.S. made tractors imported without manufacturer authorization). The guide is available online at <http://www.ca.uky.edu/rops>.

Both agricultural and general industry tractor standards allow for limited conditions where the ROPS might be removed or disabled. Operators are reminded these exceptions are exclusive to the listed work activity and the ROPS is to be enabled for any other use not directly associated with that excepted activity.

While not an apparent factor in this event it is important to recognize seatbelt use is critical to the protection of the operator in case of an overturn. It is also important to recognize the use of seatbelts where the ROPS has been disabled increase the risk of being pinned in the event of an overturn.

Recommendation #2: Conduct a field survey to identify hazards, including hidden obstructions and establishing crop-planting limits/boundaries to maintain farm machine access.

Discussion: The outside row of soybeans was planted approximately two- to three- feet from the edge of the ditch edge. This limited distance between the edge of the field and the ditch narrowed the traveling room the decedent had to avoid injury to the crop. A planting boundary should be established so that the outside planting row does not impinge on an access area to other fields/areas. The grass boundary from the edge of the ditch should be at least equal to the depth of the ditch. A good rule of thumb is to stay back from the edge of the ditch as far away from the bank as the ditch is deep. The weight of the tractor could cave the bank in if too close to the shear line.

It does not appear that the ditch bank caved in, but that the decedent was operating the tractor close to the ditch. It is unknown how well the ditch edge was defined at the time of the incident. Due to the heavy rain four days prior to the incident, the ground at the ditch edge was most likely still “soft”, thus increasing the likelihood of tire slippage. The ditch edge, as shown in Photo 8 (taken at the time of the MIFACE site visit) had grass growing up and over the side of the ditch onto the field surface, making it difficult to determine the ditch edge.

Where operations are to occur where there is a likelihood of obstructions hidden by plant growth operators should consider a worksite survey to determine if obstructions are present.

Consideration should be given to field edge clearing and maintenance timing. Factors to consider include but are not limited to:

- Are there hidden hazards at the time of activity?
- Are control practices required when crops are present or can they be completed when the field is fallow, pre-plant or post-harvest?
- Can specific hazards, such as ravine edges, be effectively marked for growing season passage?

Recommendation #3: Equipment operators should not consume alcohol before operating equipment.

Discussion: An individual’s coordination, reflexes and judgment are affected by alcohol. Blood alcohol levels can be affected by age, gender, physical condition, amount of food consumed, number of drinks and alcohol content of the drinks consumed and by other drugs or medication.

Blood alcohol concentration is defined in terms of weight of alcohol in a volume of blood; usually grams of alcohol in 100 milliliters of blood. It is often reported as a percent. The decedent’s blood alcohol level was 0.204 grams alcohol in 100 milliliters of blood, the equivalent of 0.204%.



Photo 8. Looking west, field edge. Photo taken from location decedent’s tractor overturned.

Michigan State University
Department of Medicine • Occupational and Environmental Medicine
909 Fee Road, 117 West Fee Hall • East Lansing, MI 48824 • 1-517-353-1846 • <https://oem.msu.edu>

The decedent's blood alcohol level was above the legal limit to operate a motor vehicle. His coordination, judgment and perception would have been impaired. This impairment can make the operation of equipment extremely hazardous to the operator. Equipment operators should not use alcohol or other drugs (including illicit, many non-prescription or prescription medications) that could affect their ability to safely operate the equipment.

ADDITIONAL RESOURCES

- National Ag Safety Database. <http://nasdonline.org/> Utilized both Topics and Training sections of website
- MIFACE Agriculture Reports.
<https://oem.msu.edu/index.php/work-related-injuries/work-related-fatalities/miface-investigation-reports/agriculture/403-all-fatality-types>
 - o 02MI120: Farmer Killed When His Tractor Leaves Public Road Shoulder and Overturns Into a Ditch
 - o 03MI066: Farmer Dies When He Is Crushed Under Overturned Tractor in Ditch

DISCLAIMER

Mention of any company or product does not constitute endorsement by the Michigan FACE program or the National Institute for Occupational Safety and Health (NIOSH). In addition, citations to websites external to NIOSH do not constitute NIOSH endorsement of the sponsoring organizations or their programs or products. Furthermore, NIOSH is not responsible for the content of these websites. All web addresses referenced in this document were accessible as of the publication date.

REFERENCES

Weather Underground [2014]. Weather history for nearby weather station. The Weather Channel Interactive, Inc.

ACKNOWLEDGEMENT

The Michigan FACE Program would like to acknowledge the decedent's family members for providing assistance and information for this investigation.