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

REPORT#: 15MI064 **REPORT DATE:** 10/23/18

Owner of Farm Land Pinned Under Tractor While Clearing Fence Line

INCIDENT HIGHLIGHTS

DATE:
Winter 2015

TIME:
Between 10am-11am

VICTIM:
Farm Land Landlord

INDUSTRY/NAICS CODE:
Real Estate & Rental & Leasing/53

EMPLOYER:
Self-Employed

SAFETY & TRAINING:
Previous Dairy Farmer, familiar with tractor operation

SCENE:
Farm Field Tree Line

LOCATION:
Michigan

EVENT TYPE:
Machine/Struck By

SUMMARY

In winter 2015 a male owner of farm land in his 60s died when a John Deere 2240 tractor fell onto him. He was using the tractor, which was equipped with a bucket, to move small trees and brush he had previously cut from the fence row. While backing up the tractor, it became stuck and elevated slightly, most likely from a tree. He got off the tractor and walked back to his house to pick up a screwdriver and a bushman's saw (similar to a hack saw). Returning to the tractor, he went under the tractor with the tractor in gear and PTO running, to saw the log/tree that had contributed to the tractor to becoming stuck. When the log/tree was sawn through, the tractor fell ... READ THE FULL REPORT> (p.3)

CONTRIBUTING FACTORS

Key contributing factors identified in this investigation include:

- The tractor was running, in gear, with PTO rotating when he went under the tractor.
- Front tractor tires not chocked or blocked
- Elevated tractor not supported when decedent worked under the tractor.

LEARN MORE> (p.4)

RECOMMENDATIONS

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

- Utilize proper tractor shut-off procedures prior to exiting the tractor seat.
- Always provide secondary support when working under an elevated piece of equipment. LEARN MORE> (p.5)

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Michigan Fatality Assessment and Control Evaluation (FACE) Program

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SUMMARY

In Winter 2015 a male owner of farm land in his 60s died when a John Deere 2240 tractor fell onto him. He was using the tractor, which was equipped with a bucket, to move small trees and brush he had previously cut from the fence row into one of the fields he rented out. While backing up the tractor, it became stuck and elevated slightly, most likely from a tree. He got off the tractor and walked back to his house to pick up a screwdriver and bushman's saw (similar to a hack saw). It is unknown if the tractor was left running when he went back to the house. Returning to the tractor, he went under the tractor with his body near the left rear tractor wheel. The tractor was in gear and PTO running. Using the bushman's saw he sawed the log/tree that had contributed to the tractor to becoming stuck. After the tree was sawn through, the tractor fell to the ground. Based on both clothing damage and injuries, he may have come into contact with the rotating power take off (PTO). He was found by a family member under the left rear tractor wheel. Emergency response was called and he was declared dead at the scene.

INTRODUCTION

MIFACE personnel contacted the family of the deceased who agreed to be interviewed by MIFACE personnel. MIFACE reviewed the death certificate and police report during the writing of this report. Pictures used in the were taken by the MIFACE researcher at the time of the site visit.

EMPLOYERS

The decedent had been involved in dairy farming since the 1950s. He worked off the farm as a truck driver for another dairy farm and came back to the family farm in 1978, and with other family members, ran it full time. He sold the family dairy farm approximately 2 years ago and now leased out the 88 tillable acres of the total 120 acres to another farmer who grew soybeans. The decedent performed fence line maintenance as part of his agreement with the lease.

WRITTEN SAFETY PROGRAMS and TRAINING

It was not known by the family if the decedent had the tractor's operating manual.

WORKER INFORMATION

The decedent had been raised on a dairy farm. He was familiar with the 4-wheel drive John Deere 2240 tractor operation; he had been using the tractor for the past five years. According to his family, the decedent worked at a fast pace, was "impulsive" and "in a hurry to do things".

INCIDENT SCENE

The incident occurred in farm field fence line approximately one-quarter mile from the decedent's home. The decedent was in the process of moving the cut/downed trees and brush into the adjacent farm field. There was approximately 5.0 inches of snow on the ground. The family stated the ground was muddy under the snow. The decedent was working alone. He had borrowed the tractor bucket attachment from the farmer who rented his fields.

WEATHER

Weather Underground was utilized to check the weather conditions on the day of the incident. The temperature was 24^0F with scattered clouds and north winds between 11-12 mph, resulting in a wind chill index temperature of 12^0F-13^0F. [Weather Underground]

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INVESTIGATION

The decedent had been clearing fence rows for two days around his rented fields to expand the land available for rent. On the day of the incident, at daylight he went to incident field. He cut down several trees and cleared out some brush. He backed the tractor into the fence row and lifted/carried/pushed the downed trees and brush from the fence row into the field to permit easier cleanup. He was wearing a heavy coat, gloves and a "dew rag" on his head.

While backing up-his tractor (See Figure 1), the tractor became stuck and elevated slightly, most likely from a tree. The front wheels of the tractor were on the ground, but the back wheels were not on the ground and it appears that the tractor could not gain traction to move in either direction. The decedent climbed off the tractor and walked back to his house approximately one quarter of a mile away to pick up a screwdriver and Bushman bow saw (similar to a hack saw). A family member took him back to the field with his tools; the family member waited in his vehicle, parked near the field. After returning to the tractor, the decedent went under the tractor with his body near the left rear tractor wheel. The tractor was in gear and PTO was running. Using the bushman's saw he sawed the tree/brush that had contributed to the tractor to becoming stuck. After the tree was sawn through, the tractor fell to the ground. Because the tractor was running and still in gear, it moved forward pinning the decedent under the left rear tractor wheel. At some point, it appears his face and clothing contacted the rotating PTO.

Figure 1. Tractor involved in incident

The family member sat in his vehicle for approximately 20-25 minutes. As the decedent worked, the family member lost sight of him. The family member returned to his home to get his coat, boots and gloves so he could walk to the decedent's location to check on him. After donning the clothing, he walked until he came to the decedent's location. He did not see the decedent, and assumed the decedent had returned to his house for more tools or other work items. After walking around the tractor, he looked under the tractor and caught sight of the decedent's jacket. Looking further, he saw the decedent under the left rear tractor wheel, on his back in the mud/snow. The tractor had stalled by the time the family member found the decedent. The family member turned the ignition key to the off position.

The family member went back to the farmhouse and called for emergency response. The tractor was lifted from the decedent. He was declared dead at the scene. Responders found his Bushman's saw beneath him.

CAUSE OF DEATH

The death certificate listed the cause of death as asphyxiation due to or as a consequence of entrapment beneath a tractor tire. No autopsy was performed.

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 unrecognized hazards were identified as key contributing factors in this incident:

- *The tractor was running, in gear, with PTO rotating when he went under the tractor.*
- *Front tractor tires not chocked or blocked*
- *Elevated tractor not supported when decedent worked under the tractor.*
- *Working alone.*

RECOMMENDATIONS/DISCUSSION

Recommendation #1: Tractor operators should always utilize proper tractor shut-off procedures prior to exiting the tractor seat.

Discussion: Tractor operators should follow safe shut down procedures prior to dismounting the tractor. The tractor operator manual should be followed for any specific instructions. If a manual is not present, it should be requested. For their own safety and that of bystanders, operators should never leave the driver's seat of a tractor that is still running. Before dismounting the tractor, operators should always:

- Disengage the PTO and lower all implements to the ground
- Place all controls in the neutral position
- Place the transmission in park lock, or if a manual transmission, place in the lowest gear
- Set the parking brake(s)
- Stop (turn off) the engine
- Remove the key

Recommendation #2: When working under an elevated piece of equipment, always provide a secondary means of support. If wheels are in contact with the ground, block/chock these wheels to prevent equipment movement.

Discussion: Rule 34 (Machine Guards and Devices) of the MIOSHA General Industry Safety Standard, Part 1, General Provisions offers farm owners sage advice. Rule 34, Subpart (12) states that "an employee shall not place his/her body beneath equipment, such as vehicles, machines or materials, supported only by a jack, overhead hoist, chain fall, or any other temporary single supporting means, unless safety stands, blocks or other support system capable of supporting the total imposed weight is used to protect the employee in case of failure of the supporting system." The decedent did not provide any method of secondary support while working under the tractor.

When working on a large piece of equipment that is elevated, consideration should be given to the center of gravity of that object. An elevated load is unstable to begin with and an un-level surface will allow the center of gravity of the load to shift more rapidly to the down side. Any movement caused by work being performed on the load could also cause the load to slip off a support, especially if it is not properly blocked or cribbed.

Always take the time to adequately support an elevated piece of equipment when performing repairs or adjustments to prevent being crushed. Even a very small, quick adjustment such as tightening a bolt warrants using appropriate support methods when you are under raised equipment. **Using suitable supports, such as cribbing and blocking under the raised tractor, in addition to turning the tractor off before dismounting could have prevented this fatal injury.**

Recommendation #3: When working under equipment, if wheels are in contact with the ground, block/chock these wheels to prevent equipment movement.

Discussion: Blocking the wheels prevent the tires from rolling. Blocks and/or wheel chocks should be selected according to the equipment's tire size, percent grade the equipment is being serviced on, the surface conditions and the vehicle's weight. It is best to use two blocks/chocks on the weighted axle since the weighted axle keeps the tire on the ground against the block/chock. In this incident, the weighted axle was at the front wheels of the tractor which were still on the ground. If the block/chock is placed at the unweighted axle, the tire on the unweighted axle can ride up and over the block. Use blocks/chocks in pairs, one set at each tire. For most farm equipment even pine timbers will have sufficient strength to keep from crushing or rolling. Rolling can be a problem on the farm during field repair. MIFACE recommends 4"x 6" blocking rather than 4" x 4" to minimize rolling. The 6" blocks also fit more jacks. See Attachment A for further information about cribbing and blocking equipment.

To learn more about selecting and positioning wheel chocking/blocking, an internet search revealed the following brochure from *Monster Motion Safety: Wheel Chock Guidelines*.

Recommendation #4: When working alone, establish a check-in procedure/written plan to help assure prompt emergency assistance.

Discussion: Agricultural workers, including farmers, regularly work alone on the farmstead. Therefore, it is important to establish an effective communication system for the individual who is working alone to contact other people who can provide emergency assistance. The frequency of checking in to another individual should be appropriate based on the hazards to which the isolated worker is exposed. The check-in procedure can be initiated by a family member or the individual who is working alone and should be established based upon what is practical for the worksite circumstances. In agricultural settings, the availability of cell phone coverage should be established if that is the means of communication selected.

Agriculture is not the only industry where workers work alone. Industries such as construction and utilities are establishing procedures and/or programs to monitor "lone workers". Tucked into the MIOSHA Construction Safety Standard Part 1, General Rules is a rule covering First Aid, including first aid requirements for a remote location or single employee worksite (R 408.40132 (4)): Where a remote location or a single employee worksite exists, an employer shall provide a written plan that includes alternate methods of assuring available treatment for employees at a remote location or single-employee worksite. The plan shall be communicated to all affected employees.

Although it may not have prevented his death, MIFACE recommends that any business develop a plan to establish a check-in procedure when an individual is working alone. Monitoring "lone workers" could prevent an injury from becoming a fatality.

REFERENCES

Weather Underground [2015]. Weather history for nearby weather station. The Weather Channel Interactive, Inc.

MIOSHA Standards cited in this report can be directly accessed from the Michigan Department of Labor and Economic Growth, MIOSHA website www.michigan.gov/mioshastandards. MIOSHA standards are available by writing to: Michigan Department of Licensing and Regulatory Affairs (LARA), MIOSHA Regulatory Services Section, Stevens T. Mason Building, 530 W. Allegan Street, Lansing, Michigan 48933, calling (517) 284-7740, or by FAX (517) 284-7735.

- MIOSHA General Industry Safety Standard, Part 1, General Provisions Rule 408.10034(12) Machine Guards and Devices
- MIOSHA General Industry Safety Standard Part 38 (Hand and Portable Powered Tools), Rule 408.13838, Jacks, use.
- MIOSHA Construction Safety Standard Part 1 (General Rules), Rule 408.40132, Medical services and first aid.

ADDITIONAL RESOURCES

- Ohio State University, Agricultural Tailgate Safety Training, Agricultural Safety Program, Training Module: Chock and Block, Internet address: http://nasdonline.org/127/d001676/chock-and-block.html
- MIFACE Investigation Report #03MI053: Farm Owner Crushed Underneath Rotary Mower While Changing Blades and Untangling Wire Wrapped On Cutting Blades. www.oem.msu.edu/images/MiFACE/03MI053v1.pdf
- Washington FACE: Orchard Tractor Operator Dies When Run Over by Rotary Mower After Falling From Tractor. https://www.cdc.gov/niosh/face/pdfs/13WA015.pdf
- Stoolmiller, Carson. Monster Motion Safety*: Chocking Procedures – A Step-by-Step Guide for Maximizing Safety*. https://monster-safety.com/chocking-procedures/ August 24, 2017.

DISCLAIMER

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ACKNOWLEDGEMEMENT

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Attachment A – Cribbing and Blocking

MIOSHA General Industry Safety Standard Part 38 (Hand and Portable Powered Tools), Rule 3839(4) addresses the use of "jacks". The term "jack" refers to a portable lifting unit rather than a fixed unit (normally a hoist). To properly use a jack, its rated capacity must be permanently marked on the jack and must not be exceeded during a lift. The jack must be set on or against a firm foundation or blocking. If a jack, at the point of contact with the load, can slip, a wood block or nonslip device must be placed between the cap and the load. Importantly, after a load has been raised or moved, it shall be secured by cribbing, blocks or stands before work is started under the supported load (Refer to the standard for the other requirements for the use of jacks and their inspection).

Most jacks are designed to lift heavy objects, not support them. Proper use of a jack involves knowing the weight limit and proper placement of the jack. Once a jack lifts a heavy object, the object must then be supported by either a jack stand or cribbing. A "jack stand" normally refers to a metal adjustable support with a center post that adjusts and side stabilizers that hold the device straight. Cribbing is the process whereby blocks of wood are placed under the object to support it in an elevated position. Supporting elevated objects with jack stands or cribbing ensures stability of the object especially when work has to be performed under the object. Wood selected for blocking or cribbing should be solid, straight and free of major flaws such as large knots or splits and be free of any paint or finish because this can make the wood slippery, especially when it is wet.

Blocking timbers should be used to provide a foundation for heavy loads or jacks when the jack is not placed on a firm foundation. Most jacks are designed to lift a load straight up. This is why it is essential to assure that the surface the load is on is level. Often during field equipment repair operations, the surface is not firm or even. Blocking timbers should be placed so they rest evenly and firmly on the ground.

Cribbing should be used when the equipment must be supported at a height greater than blocking can provide. Cribbing involves placing timber in tiers that run in alternate directions. To place cribbing, raise the load and without placing yourself under the elevated load, place the cribbing under the load. (See Figure 2). Then lower the load onto the cribbing. If using a jack to raise the load, make sure the jack is on a firm foundation (use blocking timbers as required), raise the load to the maximum height the jack can safely lift to, place cribbing, then lower the load.

Figure 2. Example of cribbing