



Centers for Disease Control and Prevention
CDC 24/7: Saving Lives, Protecting People™

The National Institute for Occupational Safety and Health (NIOSH)

Promoting productive workplaces
through safety and health research / **NIOSH**

Farmer Dies After Being Struck By Rock That Fell From Loader

MN FACE Investigation 01MN15

DATE: August 27, 2001

SUMMARY

A 73-year-old male farmer (victim) died of injuries he sustained after he was struck by a large rock that fell from a loader. On the day of the incident, the victim used a farm tractor equipped with a front-end loader to remove a large rock from a farm field. The front-end loader was equipped with a hydraulically controlled general purpose bucket. The loader's hydraulic control levers did not always operate smoothly but would sometimes stick and cause either the loader to continue to rise or the bucket to continue to tilt until the operator was able to move the levers to their neutral position.

The victim drove the tractor toward a rock that was on the surface of an unplanted farm field, lowered the loader to the ground and scooped the rock into the bucket. After the rock was in the bucket of the loader, the victim apparently raised the loader. After raising the loader the hydraulic control lever for either the loader or the bucket apparently stuck. This caused the rock to eventually fall backward out of the bucket and tumble down the loader lift arms. The rock struck the victim and pinned him in the seat of the tractor. He victim was not able to free himself from the rock and was found later in the afternoon by his wife who went to the field to look for him. She returned to the farm house and placed a call to emergency personnel who arrived at the scene shortly after being notified. They removed the rock from the victim and transported him to a local hospital. He was then transported to a major medical facility where he died several hours later. MN FACE investigators concluded that, in order to reduce the likelihood of similar occurrences, the following guidelines should be followed:

- all items, such as equipment, machines, construction material, rocks, etc., hauled in loader buckets should be tied or chained securely to the bucket;
- tractors equipped with loaders should also be equipped with an enclosed rollover protective structure or a general purpose cab;
- while in motion, tractors with loaders should be operated with the loader in the lowest possible position; and
- all equipment should be adequately maintained and serviced to keep it in safe and proper operating condition.

INTRODUCTION

On June 15, 2001, MN FACE investigators were notified of a farm work-related fatality that occurred on May 31, 2001. The county sheriff's department was contacted and a releasable copy of their report of the incident was obtained. Although a site investigation was not conducted, the sheriff's department report and copies of their photographs taken at the incident site provided specific and comprehensive information concerning this fatality. Also, first responders who were at the scene

shortly after the incident occurred were interviewed on August 13, 2001 and provided additional details of the incident. During MN FACE investigations, incident information is obtained from a variety of sources such as law enforcement agencies, county coroners and medical examiners, employers, coworkers and family members.

INVESTIGATION

On the day of the incident, the victim used a 65-70 horsepower farm tractor equipped with a front-end loader to remove a large rock from a farm field. The tractor and loader were approximately 20-25 years old. The tractor was not equipped with a general purpose enclosed cab or a rollover protective structure. The two-wheel-drive tractor had a wide front wheel configuration. The tractor was equipped with wheel weights on each rear wheel. The front-end loader was equipped with a hydraulically controlled general purpose bucket. The hydraulic control levers for the loader were located a few inches to the right of the tractor seat. The controls consisted of two levers, one for the hydraulic cylinders that raised and lowered the loader and another lever for the cylinders that controlled the tilt of the bucket.

Photographs of the tractor and loader indicated that they were in working condition, however general maintenance appeared to be less than optimal. This was evident from a bent and faded slow moving vehicle sign on the back of the tractor and an accumulation of oil and dirt that covered the tractor's rear axle and the lift arms of the three-point hitch. An accumulation of dirt and grime as had occurred on this tractor is usually caused by small leaks of oil from hydraulic oil line fittings and connections that often leak if they are not properly maintained. In addition, during the investigation it was learned that the hydraulic control levers did not always operate smoothly. They would sometimes stick and cause either the loader to continue to rise or the bucket to continue to tilt until the operator was able to move the levers to their neutral position.

Although the victim owned the land where the incident occurred, he rented it to another farmer who planted and harvested crops on the land. The farmer who farmed the land had recently dug out a large rock prior to tilling the field for spring planting. The disk shaped rock was approximately 24-28 inches in diameter and 14-16 inches thick at its thickest point. Although the weight of the rock could not be determined, it probably weighed at least several hundred pounds. The field was nearly barren except for small traces of corn stalk residue from the previous years crop. The field was somewhat uneven due to small ridges that were created when the previous years corn was cultivated.

The victim drove the tractor toward the rock that was on the surface of the field, lowered the loader to the ground and scooped the rock into the bucket as the tractor moved forward. After the rock was in the bucket of the loader, the victim apparently raised the loader to haul it from the field. After raising the loader to a height above the hood of the tractor, the hydraulic control lever for either the loader or the bucket apparently stuck. This caused the rock to fall backward out of the bucket and tumble down the loader lift arms. The rock landed on the victim's left arm, leg and his lap and pinned him in the seat of the tractor. After the rock fell from the bucket, he apparently was able to activate the loader control lever that caused the loader to lower to the ground. As the loader lowered, the tractor continued to travel forward until the front edge of the bucket dug into the ground and stopped the tractor. The victim was not able to free himself from the rock and was found later in the afternoon by his wife who went to the field to look for him when he didn't come home for dinner. She returned to the farm house and placed a call to emergency personnel who arrived at the scene shortly after being notified. They removed the rock from the victim and transported him to a local hospital. He was then transported to a major medical facility where he died several hours later.

CAUSE OF DEATH

The cause of death listed on the death certificate was not available when this report was completed.

RECOMMENDATIONS/DISCUSSION

Recommendation #1: All items, such as equipment, machines, construction material, rocks, etc., hauled in loader buckets should be tied or chained securely to the bucket.

Discussion: The design of most general purpose loader buckets is such that they are well suited for hauling materials such as dirt, gravel, animal feeds, snow, etc. These types of materials are easily contained and carried in a loader bucket. Although they may spill from the bucket in small quantities during transport, large quantities of these items are unlikely to fall from a raised bucket and injure a tractor operator unless the material is frozen. This is not the case for large irregular shaped objects such as the rock involved in this incident. Large irregular shaped items may extend beyond the sides or edges of the bucket. In addition, they may not stand or rest in a stable position inside the loader bucket. As the loader is raised and the relative angle and position of the bucket relative to the ground changes, these items may slide, tip, turn in the bucket, or they may fall from the bucket. If the load is transported over rough ground at high speeds, the likelihood of the items falling from the bucket may be increased. If the rock had been securely tied or chained into the bucket, this fatality might have been prevented.

Recommendation #2: Tractors equipped with loaders should also be equipped with an enclosed rollover protective structure or a general purpose cab.

Discussion: The tractor used during this incident was not equipped with any type of enclosed protective structure. If it had been equipped with either an enclosed rollover protective structure or a general purpose cab, the rock might have been deflected away from the operator after it fell from the bucket. Unsecured items may fall over the back edge of a loader bucket. The potential of this happening is increased as a loader bucket is raised. If a loader bucket is raised high enough, an unsecured item may fall over the back of the bucket. It might then tumble down the raised loader and strike the tractor operator. If tractors equipped with a loader were also equipped with an enclosed rollover protective structure or a general purpose cab, items which fall from the loader might be prevented from striking and injuring the operator.

Recommendation #3: While in motion, tractors with loaders should be operated with the loader in the lowest possible position.

Discussion: A front-end loader mounted on a tractor raises the tractor's center of gravity. In addition, the center of gravity rises further as the height of the loader is increased. Raising the center of gravity increases the potential of a side rollover, especially if the tractor is driven across inclined terrain. In addition, the higher an item is carried in a front end loader, the greater the risk of the item falling from the loader and tumbling down toward the tractor operator. Therefore, it is recommended that a front-end loader be kept as low as possible whenever a tractor is in use or in motion. This is particularly important if the tractor is on inclined terrain.

Recommendation #4: All equipment should be adequately maintained and serviced to keep it in safe and proper operating condition.

Discussion: The risk of serious injury or death to workers can be reduced if machines and equipment are maintained in proper operating condition. The tractor and loader associated with this incident had been used extensively and although maintained in basic operating condition, some aspects of its maintenance were less than optimal. Various reasons for the tractor and loader being maintained in its condition at the time of the incident may have included uncertain and fluctuating financial conditions in the agriculture industry. These factors may have contributed to the hydraulic control levers not being maintained in proper working condition which may have contributed to the occurrence of this incident.

To contact [Minnesota State FACE program personnel](#) regarding State-based FACE reports, please use information listed on the Contact Sheet on the NIOSH FACE web site Please contact [In-house FACE program personnel](#) regarding In-house FACE reports and to gain assistance when State-FACE program personnel cannot be reached.

[Back to Minnesota FACE reports](#)

[Back to NIOSH FACE Web](#)

Page last reviewed: November 18, 2015

Content source: [National Institute for Occupational Safety and Health](#)