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FROM: Minnesota Fatality Assessment and Control Evaluation (MN FACE) Program
Minnesota Department of Health

SUBJECT: MN FACE Investigation 03MN015
Farmer Dies After Being Pinned Beneath The Hopper of a Rock Picker

SUMMARY

A 54-year-old male farmer (victim) died after he was pinned beneath the hopper of a rock picker. It had three main components, a three-bar reel, a pick-up head and a steel collection hopper. The pick-up head was controlled by two hydraulic cylinders, one located on each side of the unit. These cylinders controlled the pick-up head and also raised and lowered the hopper to empty the unit.

The day before the incident occurred, an employee of the victim used a tractor and the rock picker to clear rocks from a field until a failure occurred in the unit's hydraulic system. The employee left the tractor and rock picker in the field and notified the victim of the break down.

The next day, the victim drove his pickup truck to the field where the rock picker was to repair it. Although a failure had occurred within the hydraulic system, he was able to raise the hopper to its dumping position. He also hooked one end of a chain to the front edge of the hopper and the other end to the hitch of his truck.

After raising the hopper he entered the area directly behind the pick-up head which is the area the hopper occupies when lowered. Several wrenches were found near the victim which indicated that he entered the area to repair the hydraulic system. Apparently while repairing the unit, something changed such that the raised hopper could not be held by the parked truck. The hopper lowered to its down position and the victim was pinned beneath it.

Two employees of the victim happened to drive by the field, thought things seemed out of place and investigated. They found the victim pinned beneath the hopper and placed a call to emergency personnel who arrived shortly after they were contacted. They checked the victim for signs of life and determined that he was deceased. They placed inflation bags under the rock picker, inflated the bags and removed the victim. MN FACE investigators concluded that, in order to reduce the likelihood of similar occurrences, the following guidelines should be followed:

- equipment should be designed with safety devices to support raised components while maintenance or general repair work is being performed; and

- workers should never enter areas around or under machines unless the machine and/or all machine components are securely locked so as to prevent workers from being injured.

INTRODUCTION

On May 6, 2003, MN FACE investigators were notified of a farm work-related fatality that occurred on May 4, 2003. The county sheriff's department was contacted and a copy of their report of the incident was obtained. A site investigation was conducted by a MN FACE investigator on July 23, 2003. 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.

The victim was a fourth-generation farmer who worked with his brother operating a large farm in east-central Minnesota. Their farming operation consisted of growing sweet corn, corn, soybeans, seed corn, peas and potatoes on over 10,000 acres of land in five Minnesota counties.

INVESTIGATION

On the day of the incident, the victim was working in a farm field attempting to repair the hydraulic system of a rock picker. The rock picker was a Schulte Model 2500 Giant that was manufactured in 2000 and was bought new by the victim and his brother. The unit had a 2.5 cubic yard hopper and weighed approximately 4970 pounds. It was designed to be pulled and operated by a 75 horsepower or larger farm tractor.

The rock picker had three main components, a three-bar reel, a 60 inch wide grated pick-up head and a steel collection hopper with a grated bottom. The reel was positioned directly above the pick-up head and was driven by a hydraulic motor. When in use, the reel rotated at approximately 35 revolutions per minute. The pickup head was raised and lowered by two hydraulic cylinders, one of which was located on each side of the unit. These cylinders controlled the pick-up head and also raised and lowered the hopper to empty the unit.

The unit was designed to pick up rocks that range in size up to about 26-28 inches in diameter. When pulled through a field, the reels slowly turned and the pick-up head was positioned several inches above the surface of the ground. As the unit was pulled near a rock, the two hydraulic cylinders, via operator control lowered the leading edge of the pick-up head. The pick-up head was pushed at a slight angle into the ground and under the rock as the unit was slowly pulled forward. When the rock began to slide up the pick-up head, a bar of the rotating reel contacted the rock and slid it up the pick-up head until it dropped into the hopper.

The hydraulic cylinders were then used to raise the pick-up head out of and slightly above the ground as the operator drove on to the next rock. This process allowed one person using a tractor and the rock picker to remove rocks that were either on the surface or partially buried in the ground.

When the hopper was full the unit was pulled to a dump site. While stopped at the dump site, the operator activated the hydraulic controls for the two cylinders located along the sides of the unit. The pick-up head lowered until it contacted the ground. The cylinders then continued to extend however since the pick-up head was contacting the ground, the front of the hopper began to raise. The hopper was raised until the rocks were dumped from the hopper, similar to how a hydraulically controlled dump truck is emptied.

The day before the incident occurred, an employee of the victim used a tractor and the rock picker to clear rocks from a farm field. While using the rock picker, one of the hydraulic hoses for one of the unit's cylinders that raised and lowered the pick-up head developed a leak. The employee left the tractor and rock picker in the field and notified the victim that it had broken down.

The next day, the victim drove his pickup truck to the field where the rock picker and tractor were and attempted to repair it. He drove the tractor and rock picker to a field road where he had parked his truck. Although a hydraulic hose had developed a leak, he was able to raise the hopper to its dumping position. He also hooked one end of a chain to the front edge of the hopper and the other end of the chain to the hitch of his pickup truck.

After raising the hopper to its vertical or dumping position, he entered the area directly behind the pick-up head which is the area the hopper occupies when lowered. Several wrenches were found near the victim which indicated that he apparently entered the area to remove the leaking hydraulic hose.

While working on the unit, something happened such that the raised hopper could not be held by the parked truck. Although the chain was still hooked to the front edge of the hopper and the hitch of the pickup, the weight of the hopper was too great to be held by the parked truck. The hopper lowered or dropped suddenly and slid the parked truck toward the rock picker. The victim was unable to escape the hopper as it descended and was pinned beneath the bottom of the hopper and the ground.

Two employees of the victim happened to drive by the field shortly before he was found. They were driving to a nearby farm site to check several grain bins. They again drove by the scene about ten minutes later and thought things seemed out of place and stopped to investigate. They discovered the victim pinned beneath the hopper and placed a call to emergency personnel.

Rescue personnel arrived at the scene shortly after they were contacted. They checked the victim for signs of life and determined that he was deceased. They placed inflation bags under the axle of the rock picker, inflated the bags and were able to remove him from beneath the rock picker.

CAUSE OF DEATH

The cause of death listed on the death certificate was mechanical asphyxia due to being pinned beneath rock picker machine.

RECOMMENDATIONS/DISCUSSION

Recommendation #1: Equipment should be designed with safety devices to support raised components while maintenance or general repair work is being performed.

Discussion: Modern equipment is often designed with built in safety devices such as locks or bars to protect workers from the unexpected movement of components. Safety devices are generally provided whenever a machine component must be positioned in a raised or elevated position so workers can gain access to components for either general maintenance or repairs. In this case, the cylinders that raised the hopper were not equipped with any type of safety device to lock the hopper in its raised position. Although the area directly behind the pick-up head is not an area where workers would normally position themselves, in this case, the victim entered this area when the hopper was raised. If the hydraulic cylinders that controlled the pick-up head and the dumping of the hopper had been equipped with safety bars to prevent it from lowering and they had been locked in place prior to the victim entering the area where he was working, this fatality might have been prevented.

Recommendation #2: Workers should never enter areas around or under machines unless the machine and/or all machine components are securely locked so as to prevent workers from being injured.

Discussion: Whenever any repair work or general maintenance must be done on machines or equipment, workers may be exposed to additional risk of injury. This is especially true if a worker or workers are required to position themselves either under a machine or under a raised component of a machine. If it is necessary for workers to position themselves under a machine or machine component, they should do so only if available safety devices are engaged or if adequate blocking is in place to prevent the machine or machine component from falling on them. In this incident, the victim positioned himself in the area occupied by the hopper of the rock picker when in its lowered position. Although the victim had hooked a chain to the front edge of the hopper and to the hitch of his truck, it did not prevent the hopper from dropping to its lowered position while he worked on the machine.

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