DATE: October 22, 1998

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

SUBJECT: MN FACE Investigation 98MN03101
Farm Equipment Worker Dies After Being Struck By Frame Of Sprayer

SUMMARY

A 53-year-old male farm equipment worker (victim) died after he was struck by the metal frame of a sprayer. The victim and a coworker were attempting to attach the sprayer to the three-point hydraulic lift of a tractor. The sprayer's frame was hinged in two locations to enable the width of the machine to be reduced during transport on roadways and to reduce the size of the storage area for the machine. Two stacks of wooden blocks were placed under the frame of the sprayer when it was unhooked. The coworker backed the tractor to the sprayer while the victim stood near the unit in front of the raised left wing of the sprayer. The tractor operator apparently failed to position the tractor so all three hitch points were aligned. When he moved the tractor forward to reposition it, the left most hitch point on the sprayer caught on the corresponding hitch point on the tractor. The left side of the sprayer was pulled forward slightly and it began to tip from the wooden blocks. The operator stopped the tractor but the sprayer tipped against the tractor and the frame of the raised left wing struck the victim. The operator got off the tractor but was unaware that the victim had been struck. When he walked to the victim's location, he noticed the victim leaning against the rear tractor wheel. The victim was bleeding from a small cut on his head. The coworker helped the victim sit down on the ground and instructed him to remain seated while he placed a call to emergency personnel. Emergency medical personnel arrived shortly after being notified of the incident. The victim was transported to a local hospital and immediately transferred to a major medical center 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:

- portable machines and equipment should be designed and built with permanent adjustable support stands;

- blocks used to support machines and equipment should be positioned to provide maximum stability.; and

- employers should design, develop, and implement a comprehensive safety program..

INTRODUCTION

On June 8, 1998, MN FACE investigators were notified of a work-related fatality that occurred on June 6, 1998. The county sheriff's department was contacted and a copy of their report of the incident was obtained. Although a site investigation was not conducted, the detailed sheriff's department report, which included a transcript of their interviews that were conducted at the incident site and copies of their photographs taken at the incident site, provided specific and comprehensive information concerning the cause of this fatality. 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 and a coworker were attempting to attach an agricultural crop sprayer to the three-point hydraulic lift of a large farm tractor. The new sprayer was located in the equipment lot of a farm machinery dealership. The spray was designed as a semi-mounted piece of equipment versus a pull-type unit that would be hitched to the tractor's drawbar.

The sprayer was approximately 30 feet wide when extended to it's full width for use in farm fields. However, the sprayer's frame was hinged in two locations to enable the width of the machine to be reduced to approximately 10 feet during transport on roadways and to reduce the size of the storage area needed for the machine. Attached to each hinged section of the frame was a carriage wheel that extended forward and prevented the sprayer from tipping forward when the unit was extended to its full operational width. However, when the unit was folded up, as it was at the time of the incident, the carriage wheels did not contact the ground and prevent it from tipping forward. Two stacks of wooden blocks to prevent the unit from tipping forward

were placed under the frame of the sprayer when it was unhooked. The blocks were positioned with their longest dimension parallel to the sprayer frame. This increased the risk of the blocks tipping as the result of any forward or backward movement of the sprayer as it was being hitched to the tractor.

The victim's coworker backed the tractor to the sprayer while the victim stood near the sprayer in front of the raised left wing. The tractor operator apparently failed to position the tractor so all three hitch points were proper aligned. When he began to move the tractor forward to reposition it,
the left most hitch point caught on the corresponding hitch point on the tractor's hitch. This caused the left side of the sprayer to be pulled forward slightly and it began to tip the sprayer from the wooden blocks. The operator stopped the tractor but the sprayer had already tipped against the tractor and the frame of the raised left wing struck the victim in the head.

The operator got off the tractor but was not aware that the victim had been struck. He walked to the victim's location and noticed the victim leaning against the rear tractor wheel. The victim was bleeding from a small cut on his head but had not lost consciousness or fallen to the ground after being struck. The coworker helped the victim sit down on the ground and instructed him to remain seated while he placed a call to emergency personnel. Emergency medical personnel arrived shortly after being notified of the incident. The victim was transported to a local hospital and immediately transferred to a major medical center where he died several hours later.

CAUSE OF DEATH

The cause of death listed on the death certificate was blunt force craniocerebral injuries..

RECOMMENDATIONS/DISCUSSION

Recommendation #1: Portable machines and equipment should be designed and built with permanent adjustable support stands.

Discussion: Manufacturers should design permanent adjustable stands for machines and equipment that is not self supporting such as the sprayer associated with this incident. Adjustable steel support stands that slide within metal collars welded to equipment frames would provide greater stability against tipping than stacks of wooden blocks or similar items. Steel

support stands would also reduce the risk of tipping while the equipment is either hooked to or unhooked from towing equipment such as the farm tractor in this case. Adjustable stands typically use locking pins to secure the stands in either a completely retracted position when the stands are not being used or in a fixed extended position when needed to support equipment that is unhooked from towing equipment. The existence of support stands permanently attached to equipment ensures that the stands are available wherever and whenever equipment is unhooked and eliminates the need for locating or carrying along temporary support items such as wooden blocks.

Recommendation #2: Blocks used to support machines and equipment should be positioned to provide maximum stability.

Discussion: In this incident, wooden blocks had been placed under the frame of a crop sprayer while the sprayer was setting on the ground in the lot of a machinery dealership. The blocks were required to hold the sprayer in an upright position to enable it to be hooked to a tractor when needed. Two stacks, each containing three blocks were used to support the sprayer. Each block was approximately 6 inches by 6 inches by 20 inches long. The blocks were positioned with their longest dimension parallel to the sprayer frame. This increased the risk of the blocks tipping as the result of any forward or backward movement of the sprayer as it was being hooked to the tractor. Rotation of the blocks 90 degrees so the length of the blocks was perpendicular to the sprayer frame would have provided greater stability and reduced the risk if the unit tipping due to slight forward or backward movement of the sprayer while either hooking it to or unhooking it from a tractor.

Recommendation #3: Employers should design, develop, and implement a comprehensive safety program.

Discussion: Employers should ensure that all employees are trained to recognize and avoid hazardous work conditions. A comprehensive safety program should address all aspects of safety related to specific tasks that employees are required to perform. OSHA Standard 1926.21 (b) (2) requires employers to "instruct each employee in the recognition and avoidance of unsafe conditions and the regulations applicable to his work environment to control or eliminate any hazards or other exposure to illness or injury." Safety rules, regulations, and procedures should include the recognition and elimination of hazards associated with tasks performed by

employees.

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