DATE: February 10, 1997

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

SUBJECT: MN FACE Investigation 96MN07601
Farmer Dies After Becoming Entangled In The Rotating Drive Mechanism Of A Baler

SUMMARY

A 47-year-old farmer (victim) died of injuries he sustained when he became entangled in a rotating baler shaft. He used a farm tractor and a large round baler to bale corn stalks in a harvested field. The baler had a pickup mechanism and a series of steel rollers that produced the bales. The pickup mechanism and the steel rollers were driven by an unshielded horizontal shaft that extended from a gear box in the center of the baler. The victim had produced two bales and was producing another bale when the pickup mechanism became clogged with stalks. The victim stopped the tractor and dismounted from it. The tractor engine was left running and the power-take-off was not disengaged. The victim walked to the area between the tractor and the baler and apparently tried to clear the clogged stalks. While in the area of the horizontal shaft that extended from the gear box, his clothing became entangled in the rotating shaft.

One of his sons became concerned about his father's absence approximately ninety minutes after he arrived home from school. While he searched for his father, he noticed the tractor and baler in the corn field. He rode his bicycle into the field and discovered his father entangled in the baler. He climbed into the tractor cab and stopped the tractor's engine. He rode his bicycle home and placed a call to emergency medical personnel. Rescue personnel arrived at the scene shortly after being notified. They pronounced the victim dead at the scene prior to freeing him from the baler. MN FACE investigators concluded that to reduce the likelihood of similar occurrences, the following guidelines should be followed:

- operators should disengage the power-take-off before dismounting from a tractor;
- all equipment shields and guards should be kept in good condition and in place;

- operators should turn off the engine and remove the key before dismounting a tractor; and

- operators should not wear loose-fitting clothing near operating machines.

INTRODUCTION

On October 30, 1996, MN FACE investigators were notified of a farm work-related fatality that occurred on October 28, 1996. The county sheriff's department was contacted and releasable information was obtained. Information obtained included a copy of their report of the incident and copies of their photos of the equipment associated with this incident. On January 3, 1997, a site investigation was conducted by a MN FACE investigator. 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 farm tractor and a large round baler to bale corn stalks in a harvested field. The power-take-off driven baler was hooked to the tractor's drawbar. The baler was purchased used by the victim approximately seven months before the incident. He did not have a manufacturer-supplied operators manual for the baler. The primary features of the baler were a pickup mechanism that extended across the front of the baler and a series of steel rollers that produced the bales. The pickup mechanism and the steel rollers were driven by an unshielded horizontal shaft (See Figure 1.) that extended from a gear box in the center of the baler to a drive sprocket on the left side (when facing forward) of the baler. Although the baler was originally equipped by the manufacturer with a shield that covered the horizontal shaft, the shield was not on the baler at the time of the incident.

The victim drove the tractor and baler to a harvested corn field and produced two bales that were found at random locations in the field. While producing another bale, the baler's pickup mechanism became clogged with stalks that would not enter the bale chamber. The victim stopped the tractor and dismounted from it. The tractor engine was left running at nearly full speed and the power-take-off was not disengaged. The victim walked to the area between the tractor and the baler and apparently tried to clear the stalks that clogged the baler. While he leaned over the horizontal shaft that extended

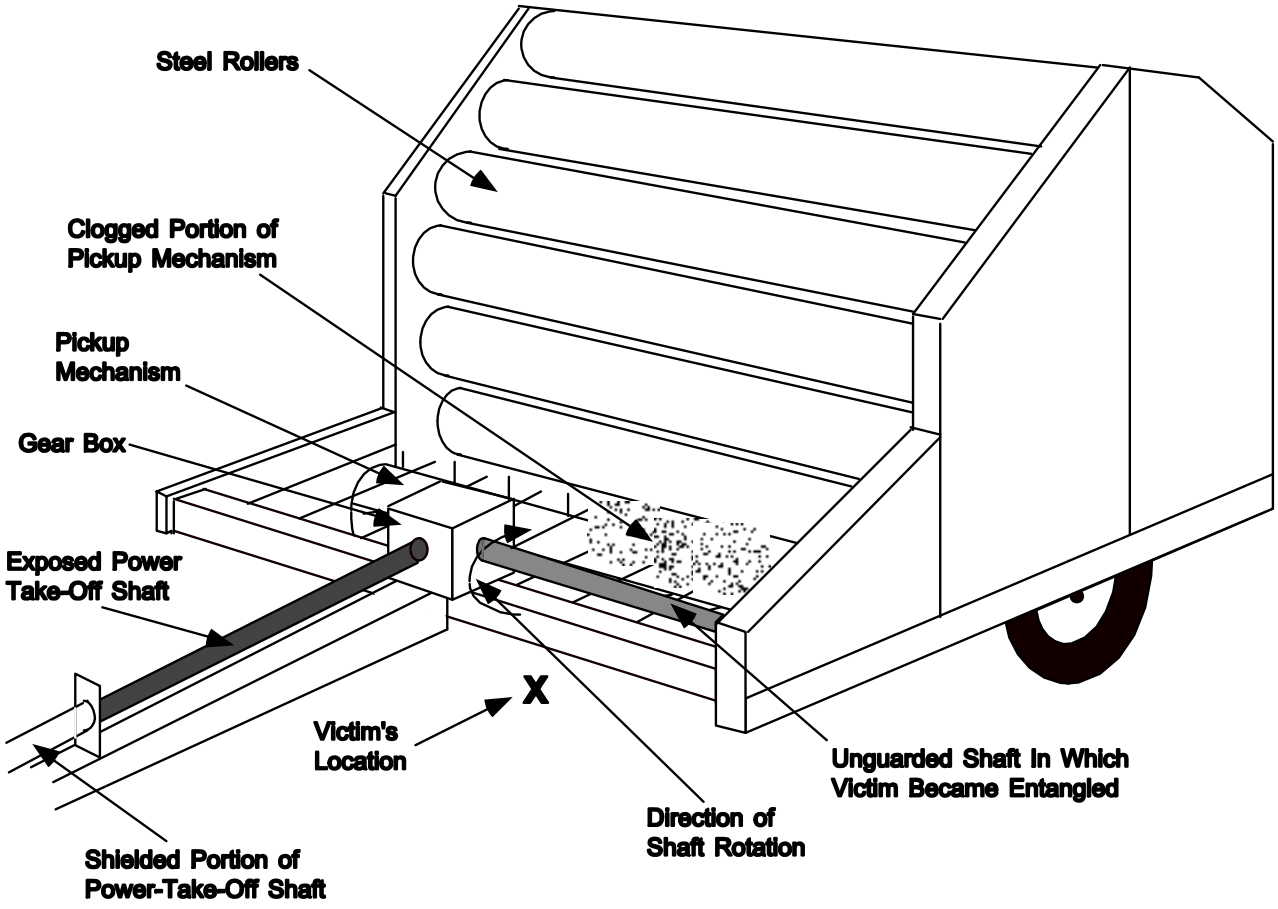

Figure 1. Baler - Not To Scale

from the gear box, his clothing became entangled in the rotating shaft. He was pulled against the front of the baler and the rotating shaft as his clothing wrapped around the shaft.

One of the victim's sons became concerned about his father's absence approximately ninety minutes after he arrived home from school. While he searched the farm place for his father, he noticed the tractor and baler in the corn field. He rode his bicycle into the field and discovered his father entangled in the baler. He climbed into the tractor cab and stopped the tractor's engine. After he got out of the tractor, he called to his father but did not receive a response. He rode his bicycle home and placed a call to emergency medical personnel. Rescue personnel arrived at the scene shortly after being notified. They pronounced the victim dead at the scene prior to freeing him from the baler.

CAUSE OF DEATH

The cause of death listed on the death certificate was neck trauma due to farm accident.

RECOMMENDATIONS/DISCUSSION

Recommendation #1: Operators should disengage the power-take-off before dismounting from a tractor.

Discussion: Entanglements in power-take-off shafts and machinery components can be prevented by disengaging the tractor's power-take-off before operators dismount from the tractor. Although this may not be possible in certain cases where a tractor is used to power a stationary machine, it should always be done when the operator is using portable machines such as the baler in this incident. If the power-take-off had been disengaged before the operator dismounted from the tractor, this fatality would have been prevented.

Recommendation #2: All equipment shields and guards should be kept in good condition and in place.

Discussion: Shields and guards protect workers from moving components that can cause serious injury or death. During this investigation, it was learned that the baler was originally equipped by the manufacturer with a shield that covered the horizontal shaft in which the victim became entangled. However, it could not be determined when the shield was removed or who removed it. In addition, it could not be determined whether the shield was on the baler when it was purchased by the victim. Whenever shields are removed from equipment to perform necessary maintenance or repairs, they should be properly reinstalled before the equipment is used. Also, damaged shields and guards should be immediately repaired to provide workers adequate protection from moving machine components.

Recommendation #3: Operators should turn off the engine and remove the key before dismounting a tractor.

Discussion: The potential for injury or death, due to entanglement, can be virtually eliminated by stopping the engine and whenever possible,removing the ignition key before operators dismount from tractors. Stopping the engine and removing the key provides protection: from power-take-off shaft

entanglement; entanglement in moving machine parts; and from unexpected engagement of power by another person while the operator is cleaning, lubricating, adjusting, or repairing a machine. In this case, if the tractor engine had been stopped and the ignition key removed before the operator dismounted from the tractor, this fatality would have been prevented.

Recommendation #4: Operators should not wear loose-fitting clothing near operating machines.

Discussion: The risk of entanglement in rotating shafts and machine components can be reduced if operators do not wear loose fitting clothing. Work clothing should be well-fitting and zippered or buttoned, not open. Frayed or loose fitting clothes, jackets and sweatshirts with drawstrings, and boots or shoes with long shoelaces should be avoided. Although it did not appear that the victim in this incident was wearing loose fitting clothing, this recommendation is a general safe work practice that should always be followed by operators of machines whenever the risk of entanglement exists.

REFERENCES

1. Agriculture Safety, Fundamentals of Machine Operation, 1987, Deere & Company, Moline, Illinois, Third Edition.

George Wahl, M.S.
Senior Safety Investigator
MN FACE

David L. Parker, M.D., M.P.H.
Principal Investigator
MN FACE