The National Institute for Occupational Safety and Health (NIOSH)

Farmer Dies After Large Round Hay Bale Falls on Him

DATE: May 24, 1994
MN FACE Investigation 94MN01401

SUMMARY

A 38-year-old male hay farmer (victim), died from injuries sustained when a large round hay bale being loaded on a flatbed trailer fell on him. The victim used a tractor and loader to load hay bales onto the trailer. The tractor was not equipped with a cab or an enclosed rollover protective structure. The loader bucket was modified to lift hay bales by the attachment of two removable tines which cradled the bale as it was lifted. It was not equipped with a large round bale clamp or bale fork specifically designed to securely lift the bale. He was loading the second layer of bales which required raising the bucket nearly to its maximum height above the tractor. The unsecured raised bale tumbled down the loader beams when he apparently tilted the bucket back. The bale struck him and resulted in his head hitting part of the tractor. He died 30 days later from severe injuries to the right side of his head. MN FACE investigators concluded that, in order to reduce the likelihood of similar occurrences, the following guidelines should be followed:

- operators should use attachments on loaders which are specifically designed for the task being performed; and
- operators should use tractors with an enclosed rollover protective structure to prevent material from directly striking the operator if it falls.

INTRODUCTION

On March 5, 1994, MN FACE investigators were notified of a farm work-related incident which occurred on January 23, 1994. The victim sustained severe head injuries during the incident and died 30 days later on February 22, 1994. A site investigation was conducted, in conjunction with the county sheriff's department, by MN FACE investigators on March 22, 1994. During the site investigation, information concerning the incident was provided by the victim's father.

The victim owned a hay farming business which he operated from his father's farm (incident site). He farmed with his father from 1977 until 1985 when his father retired. He discontinued grain and dairy farming in 1985 and subsequently engaged primarily in hay farming. He leased approximately 375 acres of farm land, 160 acres from his retired father and the remainder from other landowners. He harvested and baled hay during the summer months, producing both large round and small square bales for sale. During the winter months he sold and delivered hay with a semi-truck and flatbed trailer. He was alone at the time of the incident.

INVESTIGATION

The victim used a farm tractor and loader to lift large round hay bales onto a 47-foot long flatbed trailer. When filled, the trailer held 30 large round bales arranged in two rows with each row containing two layers. The bales were approximately 5.75 feet in diameter and 4 feet long. The victim's father estimated that each bale weighed approximately 1,000 pounds. The tractor and loader were approximately 14 years old and were purchased new by the victim's father. The two-wheel-drive tractor had a wide frontend. It had a large rear-mounted counterweight attached to the three-point hydraulic lift. The counterweight consisted of a 30 gallon steel drum, top removed, filled with concrete.

The loader bucket was a general purpose bucket and was not designed for handling large round bales. Attached to the bucket were two removable bale tines which were designed and built by the victim. Each tine was approximately 4 feet long, 4 inches wide, and 1.5 inches thick. The removable tines were temporarily attached to the loader bucket when the victim loaded large round bales. The tines were not pushed "into" the bale but were used to cradle the bale (see Figure 1) as it was lifted. The loader and bucket did not have any mechanism to securely hold the bale while it was being lifted. The tines were removed from the bucket prior to the MN FACE investigation.

The victim parked the semi-truck and flatbed trailer near one end of a large open-sided pole building (see Figure 2) which was partially filled with small square bales. The large round bales were stored outside about 300 yards away near the opposite end of the pole building. The victim used the tractor and loader to pick up and load one bale at a time. After picking up a bale, he drove along the side of the pole building towards the side of the flatbed trailer. Since the front portion of the trailer was not obstructed by the pole building, he was able to load the front portion of the trailer without maneuvering the tractor back and forth.

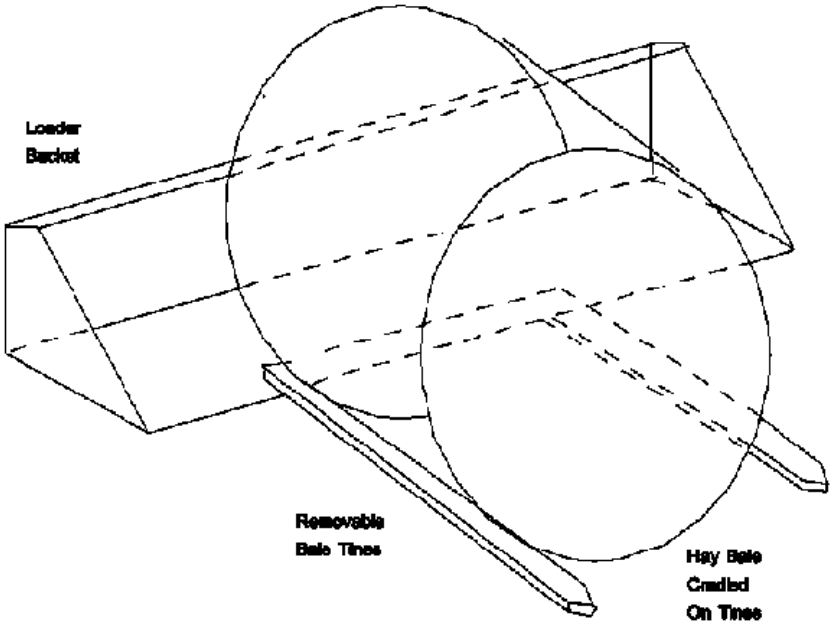

Figure 1. Loader bucket and bale. Not to scale.

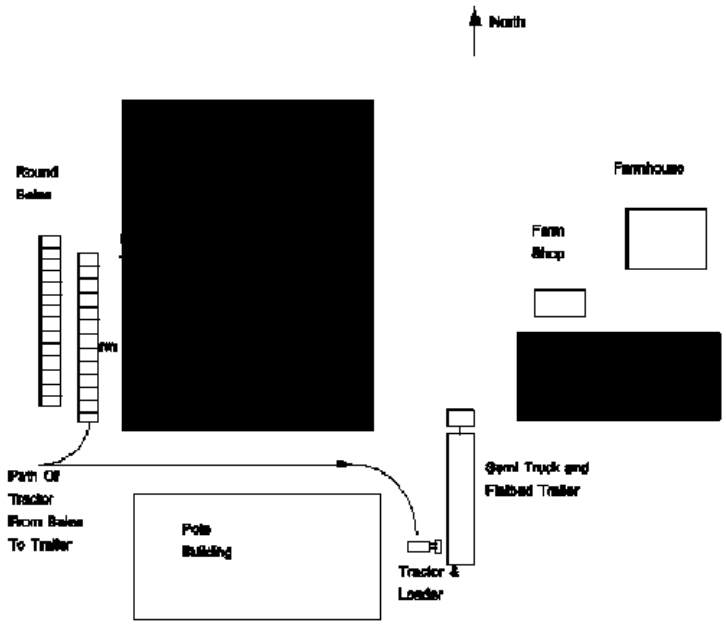

Figure 2. Incident site. Not to scale.

He was loading one of the last few bales of the second layer when the incident occurred. The back of the parked trailer extended to a position in front of the large pole building. The victim's father believed it may have been necessary for his son to maneuver the tractor back and forth between the trailer and the pole building to properly position bales onto the back portion of the trailer. During the maneuvering, he believed his son may have grabbed the wrong control lever and inadvertently tilted the bucket back after raising the bale high enough to clear the first layer on the trailer.

Apparently, when he tilted the bucket back, the bale became unstable, tumbled down the loader, and struck the victim. He sustained severe injuries to the right side of his head. These injuries may have occurred as the result of his head striking either the right fender, the hydraulic control levers located to the right of the steering wheel, or the steering wheel. The only part of the tractor and loader which was damaged was the steering wheel. It was bent downward as a result of being struck by either the victim or the bale.

The victim walked unassisted about 150 yards to his father's farmhouse. He told his father a bale fell off the loader and struck him as he was seated on the tractor. The victim's father transported him to a local hospital for medical treatment. The victim remained conscious while being transported to the hospital and for a short period of time after arrival. After loosing consciousness, the victim remained unconscious and died 30 days later as a result of the injuries sustained during the incident.

CAUSE OF DEATH

The cause of death listed on the death certificate was severe closed head trauma.

RECOMMENDATIONS/DISCUSSION

Recommendation #1: Operators should use attachments on loaders which are specifically designed for the task being performed.

Discussion: The bucket used during this incident was a general purpose bucket and was not designed for lifting large round bales. Loader manufacturers build attachments such as bale clamps and bale forks which are specifically designed for lifting large round bales. These attachments hold the bale in a secure, stable position as it is raised or lowered. A warning sign on the loader frame had the following specific warning:

> **Do not handle round bales with loader unless special "manufacturer's name" round bale clamp is installed. Without clamp, bale can fall on operator when bale is raised.**

If a large round bale lifting attachment had been used, this fatality might have been prevented.

Recommendation 2: Operators should use tractors with an enclosed rollover protective structure to prevent material from directly striking the operator if it falls.

Discussion: The tractor used during this incident was not equipped with any type of enclosed rollover protective structure. If the tractor had been equipped with an enclosed rollover protective structure, the bale might have been deflected as it tumbled toward the victim. If the bale had not directly struck the victim, he may not have been injured or may have been less severely injured, and this fatality might have been prevented.

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