

TO: Director, National Institute for Occupational Safety and Health

FROM: Iowa FACE

Case No. 2004IA014

Report Date: 28 August 2006

SUBJECT: Farmer Crushed Under Falling Dump Trailer Box While Repairing Lift Cylinder

SUMMARY

A 64-year-old, part-time farmer was working in the machinery shed on his farm late in the spring of 2004. He was repairing the hydraulic cylinder lift system for the box on a tandem wheel dump trailer. He used a skid steer equipped with a pallet fork attachment to lift and hold the front of the trailer box in a raised position. This provided clearance for the farmer to access the hydraulic cylinder and lift linkage area under the middle of the dump trailer box (Photo 1).

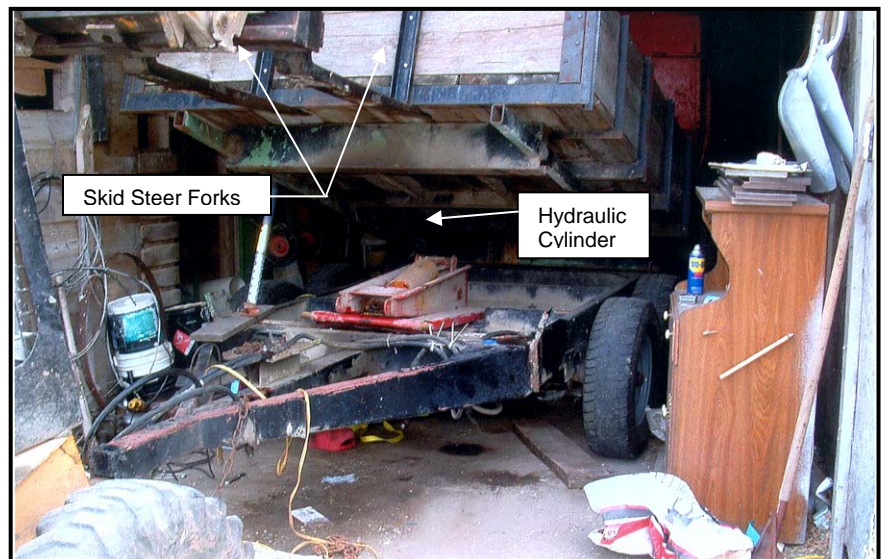


Photo 1 – Front of trailer box supported by pallet fork tines of skid steer and location of the hydraulic cylinder within the lift mechanism (disconnected from under side of box).

The man was working alone in his machine shed at the time of the incident. He had disconnected the hydraulic cylinder from the underside of the trailer box. The skid steer forks reaching in from outside the doorway held the front of the box in an elevated position similar to when a load is being dumped from the wagon box. As he leaned across the trailer frame under the box to remove the hydraulic cylinder, the trailer moved rearward. The front edge of the wagon slipped off the forks of the skid steer and the trailer box fell suddenly. The man was crushed over the lift linkage and frame by the underside of the trailer box.

A few moments after the incident a relative discovered the farmer trapped under the wagon's box. Emergency crews were summoned. They used jacks and struts to secure both the wagon and the raised lift arms of the skid steer. Resuscitative efforts were not successful and the farmer was pronounced dead at the scene.

RECOMMENDATIONS:

- *Dump trailers should be equipped with rigid mechanical means to secure the trailer box in a raised position and they must be put into place without entering the area under the raised wagon box before making inspections, adjustments, or repairs under a raised box.*
- *Persons planning repairs underneath a dump trailer should securely block (chock) the rear axle wheels to prevent unexpected, inadvertent movement of the trailer.*
- *Persons inspecting or working on dump trailer lift systems should, when possible, choose to perform the task with the trailer box in its lowest position.*
- *Dump trailers should be designed to accommodate, when practicable, service and replacement of the lift system while the trailer box is in its lowest position.*

INTRODUCTION

During late spring 2004, a 64-year-old farmer was killed while doing equipment repair work on his farm. He was crushed under a dump trailer box that fell while he was working on its hydraulic lift system. Iowa FACE personnel became aware of this incident a few days after it occurred through an article in a local newspaper and began an investigation. Additional information was gathered from the County Sheriff and the Medical Examiner's office.

The victim was experienced with machinery and had been a long-time farmer. He had recently started renting his land to relatives and became a part-time welder for a local shop.

INVESTIGATION

The day of the incident the victim had worked at the welding shop in the morning but left work early because he wasn't feeling well. Later in the afternoon he decided to do some repair work on a tandem axle dump trailer, which had a malfunctioning hydraulic lift cylinder. The man was last seen minutes before his death. He was operating a skid steer equipped with pallet or forklift forks where a bucket or other attachment is typically installed.

The trailer had been backed into the machine shed. The victim used the skid steer with forklift attachment to reach into the shed across the hitch to lift and hold the front edge of the trailer's box. This provided access to the hydraulic cylinder and lift linkage under the middle of the trailer box (Photo 2). No braces or struts were used to support the feed wagon box and no wheel chocks were used to secure the wagon so that it would not move inadvertently.

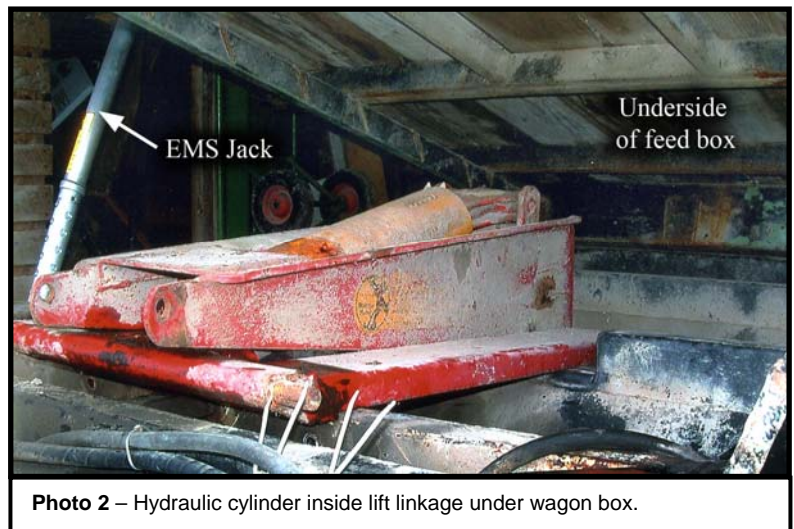


Photo 2 – Hydraulic cylinder inside lift linkage under wagon box.

The victim moved into position under the box and began the process of removing and replacing the hydraulic cylinder. He leaned over the trailer's frame. The front edge of the trailer box slipped off the forks of the skid steer, allowing the wagon box to fall. The victim was crushed between the underside of the dump trailer box and the top of the lift mechanism and frame of the trailer. The victim was discovered a few minutes later by a relative, who immediately tried to extricate him. The relative crawled into the skid steer loader (under its raised lift arms) (Photo 3), started its engine, and used the front forks to lift the trailer box off the victim. He then yelled for the victim's wife to call 9-1-1. Emergency medical services (EMS) arrived in approximately 10 minutes.



Photo 3 – Skid steer with front forks holding up the front edge of the trailer box. Also shown are the telescoping supports used by the EMS crew to secure the skid steer lift arms and trailer box.

The victim was found kneeling on the concrete floor with his head and neck resting on top of the hydraulic cylinder. He was not breathing and had pressure markings on his body from being pinned under the wagon box. Before working on the victim, EMS personnel put bracing under the raised wagon box and the raised arms of the skid steer. They also chocked the dump trailer's wheels.

CAUSE OF DEATH

The official cause of death was reported as blunt force trauma to the head, neck, and chest resulting in massive bleeding.

RECOMMENDATIONS AND DISCUSSION

Recommendation #1 – *Dump trailers should be equipped with rigid mechanical means to secure the trailer box in a raised position and they must be put into place without entering the area under the raised wagon box before making inspections, adjustments, or repairs under a raised box.*

Discussion: It may be necessary for a person to perform special tasks in the hazardous zone under a raised trailer box. The risk of the trailer box falling unexpectedly due to failure, disassembly, shifting loads, or movement of the trailer may not be addressed by mechanical locks in the linkage or on the hydraulic lift cylinder. In situations requiring a person in the hazardous zone, a sufficiently strong, rigid, metal strut or prop secured at both ends and able to hold the raised trailer box must be installed. This installation should be performed without entering the hazardous zone beneath a raised box to minimize the risk of the box falling during installation of the prop.

Recommendation #2 – *Persons planning repairs underneath a dump trailer should securely block (chock) the rear axle wheels to prevent unexpected, inadvertent movement of the trailer.*

Discussion: Repair personnel should anticipate the need to chock or otherwise prevent a trailer from moving. It is important that such chocks be properly designed and selected to fit the wheel rather than be a randomly selected object. Chocks are typically positioned on rear axle wheels. When properly selected and positioned, chocks keep the trailer from moving. Before performing repairs under the trailer, its parking brake should be set (if it has parking brakes) or chocks should be placed behind the rear wheels. Similarly, the parking brake for the skid steer needs to be engaged to keep it from moving. Also before exiting the skid steer, the lift arms must be restrained so they cannot fall on the operator. This same concept applies to the raised box where a rigid mechanical means can keep it from falling.

Recommendation #3 – *Persons inspecting or working on dump trailer lift systems should, when possible, choose to perform the task with the trailer box in its lowest position.*

Discussion: Persons working on dump trailer lift systems should evaluate the ability to perform the desired task(s) and determine if and how they can be performed without raising the trailer box. Again, the ability to do the desired procedures with the trailer box resting in its lowest position eliminates the hazard of it falling.

Recommendation #4 – *Dump trailers should be designed to accommodate, when practicable, service and replacement of the lift system while the trailer box is in its lowest position.*

Discussion: This fatal incident occurred while the victim was underneath the raised trailer box. Designs that do not require users to be under the raised trailer box, especially to perform routine inspection, servicing, or repair work, should be preferred. The ability to do the desired procedures with the trailer box resting in its lowest position eliminates the hazard of it falling.

REFERENCES

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Fatality Assessment and Control Evaluation

FACE

Fatality Assessment and Control Evaluation, FACE, is a program of the *National Institute for Occupational Safety and Health* (NIOSH), which is part of the *Centers for Disease Control and Prevention* of the *U.S. Department of Health and Human Services*. Nationally, the FACE program identifies traumatic deaths at work, conducts in-depth studies of select work deaths, makes recommendations for prevention, and publishes reports and alerts. The goal is to prevent occupational fatalities across the nation.

The NIOSH head office in Morgantown, West Virginia, carries out an intramural FACE case surveillance and evaluation program and also funds state-based programs in several cooperating states. In Iowa, *The University of Iowa* through its *Injury Prevention Research Center* works in conjunction with the *Iowa Department of Public Health* and its *Office of the State Medical Examiner* to conduct the Iowa FACE program.

Nationally, NIOSH combines its internal information with that from cooperating states to provide information in a variety of forms which is disseminated widely among the industries involved. NIOSH publications are available on the web at <http://www.cdc.gov/NIOSH/FACE/> and from the NIOSH (1-800-CDC-INFO (1-800-232-4636) or email cdcinfo@cdc.gov).

Iowa FACE also publishes its case studies, issues precautionary messages, and prepares articles for trade and professional publications. In addition to postings on the national NIOSH website, this information is often posted on the Iowa FACE website at <http://www.public-health.uiowa.edu/FACE/>. Copies of FACE case studies and other publications are also available by contacting Iowa FACE directly.

The Iowa FACE team includes the following specialists from the University of Iowa: Craig Zwerling, MD, PhD, MPH, Principal Investigator; John Lundell, MA, Co-Investigator; Murray Madsen, MBA, Chief Trauma Investigator; and Co-Investigator/specialists Risto Rautiainen, PhD, and Wayne Sanderson, PhD, CIH. Additional expertise is provided from the Iowa Department of Public Health, including Rita Gergely, Principal Investigator, and John Kraemer, PA, from the Office of the State Medical Examiner.

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