TO: Director, National Institute for Occupational Safety and Health

FROM: Iowa FACE Program

SUBJECT: Farmer crushed under corn planter while changing flat tire -- Iowa.

SUMMARY

A 55-year-old farmer died while changing a tire on a planter. The man had been planting corn earlier in the day without problems, however, when moving the planter to another field, he noticed that the second road tire on the right side of the planter was flat. He stopped in a pasture and began to change the tire. He did not brace up the planter, nor use the mechanical safety catch adjacent to the hydraulic cylinder, which is designed to keep the cylinder extended during maintenance.

He crawled under the planter and loosened the bolts on the wheel, but could not get it off. Then he tried to relieve ground pressure on the flat wheel by loosening the hydraulic fitting connected to the wheel hydraulic cylinder. He was obviously not aware that the hydraulic lines to both wheel cylinders were connected. He expected the outside wheel cylinder on that side of the planter to hold the machine up while he relieved ground pressure on the inside wheel. However when the hydraulic line fitting was off, hydraulic fluid immediately gushed out and the entire right side of the planter fell on the victim causing a fatal head injury. The man was killed instantly, but was not discovered until the next day by an employee of his farm.

RECOMMENDATIONS following our investigation are:

1. *Equipment parts supported by hydraulic systems must be mechanically blocked against motion during maintenance and service.*
2. *Hydraulic pressure must be relieved before working on any part of the hydraulic system.*

INTRODUCTION

In May 1996, a 55-year-old Iowa farmer was killed while changing a tire on a planter. The Iowa FACE program became aware of the incident in July from an OHNAC nurse, and began an investigation. An August site visit was made to the victim's farm and the planter was examined and photographed. Additional information was gathered from the County Sheriff, who also had several photographs to review.

The victim was the sole proprietor of his dairy farm and managed 750 acres of corn and soybean production. The man had farmed at this location since his youth and had one part-time employee who worked only in the springtime and fall. The farmer had been a widower for the past 3 years, and was working alone on the day of his death.

No safety program was in existence on this farm, nor was safety training a part of the employee's experience. The victim was very familiar with his equipment, doing all his own

mechanical repairs and maintenance.

INVESTIGATION

The victim had just finished planting a corn field with an 8-row planter, which was ~18 years old, and was transporting the equipment to another field to continue planting. For road transportation, the planter is lifted up by lowering the road wheels with hydraulic cylinders. In this process the man noticed the flat tire and stopped in a pasture area to change the tire. No jacks or blocks were placed under the planter, nor were the hydraulic safety stops secured at the time of the injury.

The planter was supported by a set of two tires on both sides of the machine. The inside tire on the right side of the planter was flat. The man crawled under the planter and loosened the bolts holding the wheel on, but could not remove it because of ground pressure on the tire. He then loosened the hydraulic fitting to the cylinder for that wheel. He was probably trying to relieve ground pressure on that wheel so the bolts could be removed. Apparently he thought the outside wheel would hold up the right side of the planter when the inside wheel was removed. However, the hydraulic lines for both these wheels were directly connected. When he completely loosened the coupling to the cylinder of the wheel, hydraulic fluid shot out under pressure, and the entire right side of the planter immediately fell on the victim causing a fatal head injury. Police photographs confirm the exact position of the victim's body and how he was working at the time of death. Also, hydraulic fluid was present on the man's clothing, hands, and the ground, consistent with this sequence of events.

The man received a fatal penetrating head injury when the heavy planter frame fell on him. An iron bracket with an exposed sharp corner fell on the man's head and was the immediate cause of his death. The next morning the victim's employee noticed that the dairy cows had not been milked, and he soon found the deceased farmer.

During our investigation we observed the generally poor condition of the planter. It was very rusty in many places, and in general need of repair. It was evident that the hydraulic cylinder safety stops had seldom, if ever, been used. It was reported that the man had a history of errant behavior for the last year since he fell off a wagon in the summer of 1995. Since then the employee had noticed the victim's increasing absentmindedness and unusual behavior, although he apparently maintained a normal social life. The type and severity of injuries acquired from this fall are not known, nor if these injuries contributed to this fatal injury.

CAUSE OF DEATH

The cause of death from the Medical Examiner's report was, "*penetrating wound to cranium*".

RECOMMENDATIONS / DISCUSSION

Recommendation #1 *Equipment parts supported by hydraulic systems must be mechanically*

blocked against motion during maintenance and service.

Discussion: When machines are turned off and everything is apparently at rest, hydraulic lines may still be under pressure. Failure of a hydraulic line, or in this case disconnecting a hydraulic fitting, can lead to loss of hydraulic fluid, loss of pressure, and rapid collapse of machine components, causing injury or death to anyone under a hydraulically supported part of the machine. Using the mechanical safety stop at the cylinder or otherwise blocking the machine from falling would have prevented this injury. When working under a hydraulically supported machine part, it should be mechanically blocked against motion even if the work does not involve repair or maintenance of the hydraulic components.

Recommendation #2 *Hydraulic pressure must be relieved before working on any part of the hydraulic system.*

Discussion: Before working on any hydraulic components, oil pressure must be relieved. This can usually be done by shutting off the engine which runs the hydraulic pump, lowering the implement to the ground or solid support (such as mechanical safety stop on the cylinder), and moving the hydraulic control lever back and forth several times. Once this is done, one must still be prepared for the high pressure spray of (hot) oil and movement of machine parts attached to the hydraulic system (see Recommendation #1). Hydraulic equipment that has been left idle for months, or even years, may still contain high pressure lines and be potentially dangerous.

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Fatality Assessment
&
Control Evaluation Program
(FACE)

The University of Iowa, in conjunction with the National Institute for Occupational Safety and Health (NIOSH), is investigating the causes of work-related fatalities in the State of Iowa. FACE is a surveillance program that identifies all occupational fatalities, conducts in-depth, on-site investigations on specific types of fatalities, and makes recommendations for employers and farmers to help prevent similar fatal accidents in the future.

Iowa is a major farming state, and therefore the Iowa FACE Program deals with many occupational deaths on the farm. It is a very hazardous profession that claims hundreds of lives nationally every year. We publish detailed reports that are disseminated to key agricultural leaders in Iowa who share our concern for the safety of farmers. To reach and effectively communicate with this independent and vulnerable group is a worthy challenge here in Iowa.

NIOSH funded state-based FACE Programs include: Alaska, California, Colorado, Indiana, Iowa, Kentucky, Maryland, Massachusetts, Minnesota, Missouri, Nebraska, New Jersey, Wisconsin, and Wyoming.

Additional information regarding this report or the Iowa Face Program is available from:

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