



THE UNIVERSITY OF IOWA

Iowa City, Iowa 52242

TO: Director, National Institute for Occupational Safety and Health

FROM: Iowa FACE Program

Date: August 2000

SUBJECT: Farmer crushed to death under broken corn planter.

SUMMARY

During the spring of 1999 a farmer was killed while he was repairing a broken corn planter. The man and his father had just begun to plant corn on their 400-acre farm. The victim's father was driving a tractor pulling the 8-row planter, full of seed corn and fertilizer. The victim was driving another tractor and cultivator. After planting only five acres, the planter broke down at the end of a row. Several 19 mm ($\frac{3}{4}$



inch) diameter bolts attaching the tongue to the toolbar had broken, and the planter toolbar had dropped down slightly, yet was still holding together. The father drove the planter to the farmyard and his son followed, planning to repair the planter immediately if possible. The planter was parked in a driveway, and the victim crawled underneath to assess the damage. While lying on the ground he could see he needed a long bolt to pull the machine back together. Suddenly without warning, the planter buckled in the region of the broken bolts, and the toolbar and tongue folded upon each other. The entire weight of the planter fell with the toolbar, and the farmer was crushed and killed immediately underneath. The victim's father rushed to call 911, then used two jacks to raise the toolbar off his son. However, rescue efforts were ineffective, and the farmer was dead at the scene. No jacks or blocks were used under the planter before the farmer crawled underneath.

RECOMMENDATIONS based on our investigation are as follows:

#1 *Owners / operators of farm equipment should never work under machines without appropriate support or bracing.*

#2 *Manufacturers of farm equipment / implements should routinely review service calls for their machines and consider recalls or modifications as needed.*

INTRODUCTION

In May, 1999, a 47-year-old Iowa farmer was killed while trying to repair his corn planter. The Iowa FACE program became aware of the incident from a newspaper article, and began an investigation. Information was gathered from the County Sheriff and contact was made with the victim's father, who was an eyewitness of the event. A site visit was conducted during the summer of 1999 by two investigators from the Iowa FACE program. Photographs were taken of the repaired planter, and the local implement dealer was also interviewed.

The victim and his father worked together on a 400-acre farm producing corn and soybeans. The victim had been farming his entire life, yet also worked off the farm as a school bus driver. He was familiar with all aspects of the farm operation, including the planter and other equipment. There were no hired employees, and no official safety program at the farm.

INVESTIGATION

The victim and his father were working together on their first day of corn planting in the spring of 1999. The 8-row planter they were using was 10 years old and had been purchased four years earlier. The planter had a single axle and four wheels situated behind the toolbar (see Photo 1).

The planter was filled with corn seed and fertilizer, and the victim's father towed the planter to the first field for planting. The field was flat and planting was proceeding as normal. After the first five acres, while the planter was being turned around for another pass, the planter broke down. The father noticed that the area at the rear of the tongue had partially collapsed. He notified his son and they decided to tow the planter back to the farm to assess and repair the damage.

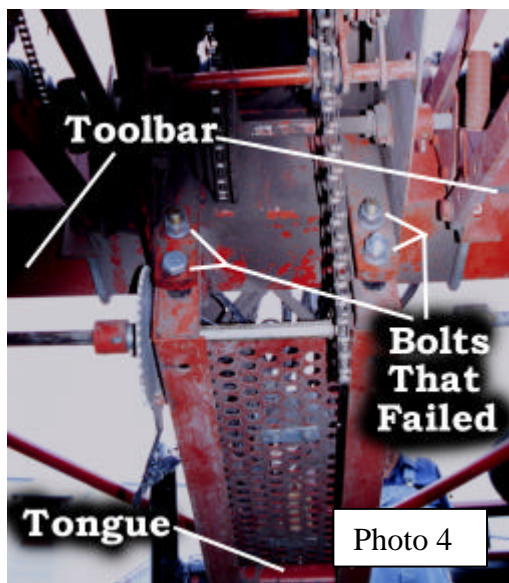
The planter held together and remained unchanged on the way back to the farm, and it was parked in the farm driveway, still attached to the tractor via the drawbar. The victim then crawled on his back under the planter to assess the nature of the damage. He told his father that he needed a long bolt to pull the machine together,



then suddenly without warning, the planter tongue folded in the region where it was attached to the toolbar (see Photo 2). What the victim was doing immediately prior to this is unknown. The toolbar with all its attachments, including the filled seed hoppers fell to the ground, crushing the farmer underneath. Rescue was called immediately, as the driveway was adjacent to the farmhouse, and the man was air-lifted to a regional hospital, however, his injuries were severe and he died shortly after arrival.

While waiting for rescue, the victim's father attempted to raise the planter off his son using two farm jacks. When the Sheriff arrived, it was assumed that these jacks had failed causing the planter to fall, yet the father asserts the jacks were used only afterward to raise the planter. No supports or bracing were used under the planter before the victim crawled underneath.

The tongue of this planter was bolted around the toolbar with six bolts, two ~ 250mm (10-inch) long bolts on top, and four 125 mm (5-inch) long bolts on the bottom, all of them being 19 mm (¾ inch) in diameter. It was the 125 mm (5-inch) bolts underneath the toolbar, which were broken. Portions of two of these bolts were retrieved from the field where the planter broke down, and we photographed these bolts during our investigation (see Photo 3). It appeared the bolts had been sheared off due to extreme forces acting on them during planting. One bolt had an obvious tear near its head, which was partially torn off.



We visited the local implement dealer who sold the used planter to the victim. Workers were aware of this fatality and stated that four similar planters had failed in the same manner that spring. They mentioned that it had been an unusually wet spring, and therefore the soil was hard and difficult to plant. They had repaired four similar planters, three with a missing or broken bolt, and another which had folded / collapsed in an identical fashion and hit the ground. We were told that the original specifications for the machine calls for 16 mm (5/8-inch) diameter bolts, but that they were recently upgraded to 19 mm (¾-inch) diameter, and that newer planters have a different design.

Mechanics at this implement dealership could see no reason why the planter needed to be bolted, rather than welded together at this stressful area under the toolbar. The section behind the toolbar rarely needed maintenance or repair and the components would be easily accessible even if the unit had been welded together.

CAUSE OF DEATH

The official cause of death from the medical examiner's office was listed as "acute traumatic chest injuries due to pinned under corn planter".

RECOMMENDATIONS / DISCUSSION

Recommendation #1 *Owners / operators of farm equipment should never work under machines without appropriate support or bracing.*

Discussion: Many times workers are in a hurry and do not take necessary precautions to sufficiently support machinery, often times relying on jacks which can tip or slide out of place.

In this case, since the planter held together while being towed back to the farm, it was assumed it would stay in one piece while being repaired. Perhaps the victim was unaware of the extreme stress at the point where the tongue bolts on to the toolbar. The victim crawled underneath to take a look. He then obviously started pulling the tongue parts closer to their original position with longer bolts, when the bolts failed causing the planter to fold. Jacks were readily available and could have been used to support the machine. Solid supports are necessary when working under machinery.

Recommendation #2 *Manufacturers of farm equipment / implements should routinely review service calls for their machines and consider recalls or modifications as needed.*

Discussion: Several identical planters from this manufacturer failed in the same fashion as this one, at the critical union of the tongue and toolbar. This design put too much stress on the bolts leading to bolt failure and breakage. Newer planters from this manufacturer have re-designed the union of tongue and toolbar, with welded seams that virtually eliminate a similar type of accident. If companies are aware of weaknesses in machinery design, they should warn current customers of potential problems while they are making design improvements.

Wayne Johnson, M.D.
Chief Trauma Investigator (FACE)
Institute for Rural & Environmental Health
University of Iowa -- Iowa City, Iowa

Risto Rautiainen, M.Sc.Agr.
Coordinator
Great Plains Center for Agricultural Health
Institute for Rural & Environmental Health
University of Iowa -- Iowa City, Iowa

Fatality Assessment and Control Evaluation

FACE

FACE is an occupational fatality investigation and surveillance program of the *National Institute for Occupational Safety and Health* (NIOSH). In the state of Iowa, *The University of Iowa*, in conjunction with the *Iowa Department of Public Health* carries out the FACE program. The NIOSH head office in Morgantown, West Virginia, carries out an intramural FACE program and funds state based programs in Alaska, California, Iowa, Kentucky, Maryland, Massachusetts, Minnesota, Missouri, Nebraska, New Jersey, Ohio, Oklahoma, Texas, Wisconsin, Washington, and Wyoming.

The purpose of FACE is to identify all occupational fatalities in the participating states, conduct in-depth investigations on specific types of fatalities, and make recommendations regarding prevention. NIOSH collects this information nationally and publishes reports and Alerts, which are disseminated widely to the involved industries. NIOSH FACE publications are available from the NIOSH Distribution Center (1-800-35NIOSH).

Iowa FACE publishes case reports, one page Warnings, and articles in trade journals. Most of this information is posted on our web site listed below. Copies of the reports and Warnings are available by contacting our offices in Iowa City, IA.

The Iowa FACE team consists of the following: Craig Zwerling, MD, PhD, MPH, Principal Investigator; Wayne Johnson, MD, Chief Investigator; John Lundell, MA, Coordinator; Lois Etre, Co-Investigator; Risto Rautiainen, MS, Co-Investigator.



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

Iowa FACE Program
105 IREH, Oakdale Campus
The University of Iowa
Iowa City, IA. 52242-5000

Iowa Toll Free 1-800-513-0998
Phone: (319)-335-4351 Fax: (319) 335-4225
Internet: <http://www.public-health.uiowa.edu/face>
E-mail: wayne-johnson@uiowa.edu