The National Institute for Occupational Safety and Health (NIOSH)

Farm Worker Electrocuted While Repairing Bale Conveyor Electrical Cord

MN FACE Investigation 99MN03901
DATE: November 29, 1999

SUMMARY

A 45-year-old farmer (victim) was electrocuted at his brother's farm. The victim was working alone at the time of the incident. He had just had lunch with his brothers and was repairing an electrical cord on a bale conveyor. The conveyor was going to be used to unload a rack of bales into the barn loft. It appeared that the victim had tried to replace the plug on the bale elevator cord, possibly earlier on the day of the incident. The victim may have sprayed a commercial lubricant on the plug prior to loosening three screws on it. The plug also had the ground prong broken off. It is unclear why he did not finish changing the plug prior to unloading the rack, but it appears that he may have had some difficulty removing one of the three screws. When one of the brothers left the house a short time later he found the victim lying on the ground and immediately called rescue personnel. Rescue personnel arrived shortly after being called and pronounced the victim dead at the scene.

MN FACE investigators concluded that, in order to reduce the likelihood of similar occurrences, the following guidelines should be followed:

- electrical cord plugs should be dry before being inserted into energized electrical outlets or extension cords;
- all electrical equipment and circuits should be de-energized and tested before any repair or maintenance services are performed; and
- electrical equipment and components should be routinely inspected and repaired.

INTRODUCTION

On October 25, 1999 MN FACE investigators were notified of a farm work-related fatality that occurred on August 12, 1999. The county sheriff's department was contacted and a releasable copy of their report of the incident was obtained. A site investigation was not 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 and his brothers used a bale conveyor to unload bales from a hayrack parked near a barn. The conveyor was used to move traditional small bales from ground level up into the loft of the barn. The conveyor was powered by an electric motor that was mounted on a metal frame at the end of the conveyor near the ground. Electrical power was provided for the electric motor via several extension cords from an electrical outlet inside the barn. Based on photos taken at the incident site, the victim apparently tried to replace the plug on the bale elevator cord, possibly earlier on the day of the incident. Near the bale elevator was a small toolbox and a bag containing several new electrical cord plugs and a commercial spray lubricant. The ground prong of the original bale elevator cord plug was broken off and two of the three screws that hold a safety disk in the face of the plug were removed. The third screw for the plug's safety disk was loose and it appeared that the entire plug had been sprayed with the lubricant.

The victim apparently was unable to remove the old plug from the motor cord, possibly because he was unable to remove the third screw from the plug's safety cover. Since the incident was unwitnessed, it appeared that he decided to wait to change the plug and to proceed with unloading the bales from the rack. He apparently inserted the old plug that had been sprayed with lubricant into the extension cord and was electrocuted.

A short time later, one of the victim's brothers left the farm house to help unload the bales. He discovered the victim lying on the ground near the bottom of the bale elevator. He immediately placed a call to emergency personnel who arrived at the scene shortly after being notified. They performed resuscitation efforts, but were unsuccessful and the victim was pronounced dead.

RECOMMENDATIONS/DISCUSSION

Recommendation #1: Electrical cord plugs should be dry before being inserted in energized electrical outlets or extension cords.

Discussion: The risk of electrocution exists whenever workers are using any type of electrical equipment or working on electrical circuits or components. This risk increases if equipment or electrical components are wet or damp since liquids and moisture are typically excellent conductors of electricity. Shortly before this incident occurred an attempt had been made to remove and replace the bale elevator's electrical cord plug. A commercial lubricant had apparently been sprayed onto the plug's screws to make removal of the screws easier. However, excess lubricant may have covered a portion, if not most of the exterior of the plug. When the victim was unable to remove the original plug and replace it with a new plug, he apparently inserted the damp plug into the energized extension cord and was electrocuted. Whenever, an electrical plug becomes wet or damp, it must be thoroughly dried both internally and externally before it is inserted into an electrical outlet or extension cord to reduce the risk of electrocution.

Recommendation #2: All electrical equipment and circuits should be de-energized and tested before any repair or maintenance services are performed.

Discussion: The hazard of electrocution can be reduced by de-energizing electrical equipment and circuits prior to performing any repair or maintenance activities. Whenever electrically powered equipment is serviced or repaired, it should always be de-energized to reduce the hazards of electrocution. In addition, electrical circuits should be de-energized by the removal of circuit breakers and fuses and, whenever possible, the circuit should be locked out and tagged out. Proper lockout and tag out of circuits can significantly reduce the potential of circuits being inadvertently re-energized by other workers who may not be aware that repair and maintenance work are being performed. After electrical circuits are de-energized, they should be tested before repair and maintenance work is begun to insure that they were successfully de-energized.

Recommendation #3: Electrical equipment and components should be routinely inspected and repaired.

Discussion: Routine inspections, similar to those required in general industry by OSHA Standard 29 CFR 1910.303(b), should be performed on all electrical equipment and components to identify unsafe conditions. Unsafe conditions such as frayed and broken insulation, improperly grounded equipment and broken or unsafe equipment should be identified and the unsafe condition should be immediately eliminated to reduce the risk of electrocution. Unsafe equipment should be taken out of service until the unsafe condition is corrected and eliminated. The plug involved in this incident was in need of repair and although the victim had apparently tried to repair it earlier in the day, the repair was not completed before it was used.

REFERENCES

1. Office of the Federal Register: code of Federal Regulations, Labor, 29 CFR Part 1910.303(b), U.S. Department of Labor, Occupational Safety and Health Administration, Washington, D.C., July 1, 1994.

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