

Cotton Harvester Operator's Arm Mangled in Cotton Harvester Spindles¹

California NURSE Project²

SUMMARY: CASE 193-489-01

A cotton harvester operator was warming up his cotton harvester before going out to the field. While sitting in the cab, he heard a strange noise coming from the front of the machine. Leaving the cotton harvester on, he jumped down to investigate.

Standing in front of the machine, he saw a spindle hitting the head cover. Spindles are very sharp cone-shaped pieces of metal inside the head unit. They pull cotton off the plant by turning very fast. A head is covered except where the cotton enters the machine. Therefore, the spindles are partially exposed. It is at this spot where the cotton harvester operator stood and saw the spindles hitting the head cover.

Unsure how, his left hand or sleeve suddenly became caught in the turning spindles, and his arm was pulled into the machine. He screamed. Co-workers came running. Luckily, the cotton harvester operator pulled his arm out from the turning spindles. His fifth finger was dangling, while his arm was mangled and covered in blood.

How could this injury have been prevented?

- Workers should never place any part of their body in or near running equipment.
- Old cotton harvesters should be equipped with new safety devices that shut the power off when the operator leaves the cab.

BACKGROUND

On October 29, 1993, NURSE staff identified an agricultural injury while reviewing records at the California State Department of Industrial Relations, Occupational Safety and Health Administration (Cal/OSHA). On October 19, 1993, a cotton harvester operator's left hand and arm were severely damaged when he was investigating an unfamiliar sound near the turning spindles of a cotton harvester.

On November 11, 1993, a nurse from the NURSE Project interviewed the injured worker by telephone. A safety engineer from the NURSE Project conducted an on-site investigation, examined the cotton harvester, and discussed the incident with the farm owners on January 4, 1994. NURSE staff also reviewed the Cal/OSHA "Accident Report" and the hospital medical records.

The incident took place on a family owned and operated 825 acre farm. Two brothers own the farm, while a third brother assists in its operation. Cotton is planted on 457 acres, while corn and alfalfa are planted on the remaining acreage. The farm employees 1 full-time worker, 3 casual workers (working 1-12 weeks per year), 2 seasonal workers (working 13-37 weeks per year), and 3 family members.

During the on-site investigation, the safety engineer reviewed the employer's written injury and illness prevention program and noted it addressed all points as required by Title 8 California Code of Regulations 3203 -- Injury and Illness Prevention Program. (As of July 1, 1991 the State of California requires all employers to have a written seven point injury prevention program: 1. designated safety person responsible for implementing

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2. NURSE Project, California Occupational Health Program, 2151 Berkeley Way, Annex 11, Berkeley, CA 94704.

the program; 2. mode for ensuring employee compliance; 3. hazard communication; 4. hazard evaluation through periodic inspections; 5. injury investigation procedures; 6. intervention process for correcting hazards; and 7. provide safety training and instruction.)

The injured worker had been employed seasonally as a cotton harvester operator on other farms for the last 17 years, but was hired as a full-time worker on this farm 2 years ago. The incident occurred 11 days after beginning his second harvest season on this farm. At the start of the harvest season, the injured cotton harvester operator attended a safety seminar held by a local farm equipment dealer, and a safety meeting conducted by the supervisor.

INCIDENT

At approximately 11:00 a.m. on October 19, 1993, a 37 year-old Hispanic male cotton harvester operator started the engine of a cotton harvester in the farm shop area. Warming-up cotton harvesters for about 20 minutes before harvesting was a standard operating procedure on this farm. During the warm-up, the cotton harvester operator heard an unfamiliar sound coming from the front of the machine, so he jumped down from the cab to investigate.

On this cotton harvester there were four separate components called heads. Within each head are spindles. Spindles are very sharp cone-shaped pieces of metal that pull cotton off the plant by turning and wrapping cotton around themselves. A cover partially encloses each head, acting also as a guard. The section where the cotton is pulled into the machine is not covered. After the cotton is pulled into the machine, it is suctioned off the spindles into chutes that guide it to a large basket in the back of the harvester.

The cotton harvester operator walked to the number two head and saw a spindle hitting the head cover. Unsure how it happened, his hand or sleeve suddenly became caught in the turning spindles, and his arm was pulled into the machine. He screamed. A co-worker ran over and tried to turn the machine off but did not know how. Regardless, the cotton harvester operator pulled his arm out of the turning spindles. One farm owner, working approximately 20 feet away, ran over and turned the cotton harvester off. The injured cotton harvester operator's arm was bleeding heavily, and the fifth finger of his left hand was dangling. Immediately, a co-worker placed a tourniquet on the injured cotton harvester operator's arm at his elbow. One farm owner grabbed a towel and wrapped it around the bleeding

hand. Simultaneously, the other farm owner ran to the nearby house to call 911.

An ambulance and the sheriff responded to the scene; however, the injured cotton harvester operator was already enroute to a hospital in a private vehicle. He had insisted that one of the farm owners drive him to the local hospital, which was about 15 minutes away. At the hospital, his arm was x-rayed, splinted and dressed, and he was given antibiotics and pain medication. At approximately 4:25 p.m., the injured cotton harvester operator was transferred, via helicopter, to a microsurgery center specializing in repairing amputations.

Upon arrival, the injured cotton harvester operator was immediately admitted and taken to surgery. After assessment, he was found to have a partially amputated left fifth finger with severe lacerations to tendons and nerves in his left hand, wrist, and arm. His wrist was also dislocated. During surgery, the dislocation was repaired by placing a pin between the two bones at the wrist, the large open wounds were cleaned, and damaged tissue was removed. An antibiotic-soaked bandage was applied over the open wounds.

The next day, the injured cotton harvester operator underwent a ten-hour operation for further repair of his injuries. Due to extensive damage, his left fifth finger was surgically amputated. Repair to his tendons was done to restore function to his arm and hand. Nerve repair was also accomplished. Muscles from his back were transplanted into his forearm to replace the damaged muscles. Skin was transplanted from his thigh to cover his hand, wrist, and arm where the skin had tore off. The injured cotton harvester operator started physical therapy that afternoon to help him regain function of his arm and hand. He was discharged ten days later.

Four months later, the NURSE Project nurse was told by the injured cotton harvester operator that he had not returned to work, and his doctor put his earliest return as April 1995. He was still going to a rehabilitation center to regain full function of his arm and hand. He also reported no feeling had returned to his fingers.

PREVENTION STRATEGIES

1. Standard operating procedures should ensure that workers never place themselves in hazardous situations to accomplish work tasks. For this farm, the standard operating procedure was for a worker to

alert a supervisor if a machine was not running properly. In this incident, the standard operating procedure was bypassed. If training had completely implemented the standard operating procedure, this incident may have been prevented.

2. Manufacturers should design equipment with safety in mind. Cotton harvesters should have a safety interlock device that shuts the power off and disengages the spindles when the operator leaves the cab. Employers should assess old equipment before the harvest season begins, and retrofit it with new safety features. If the cotton harvester had this safety device, the spindles would have stopped turning when the cotton harvester operator left the cab, and this injury could have been prevented. Some cotton harvesters currently manufactured are equipped with this device.
3. Employers should have an appropriate emergency response plan. This should include persons trained in first aid and cardiopulmonary resuscitation (CPR).^{*} Although the farm owner and co-worker attempted to control the bleeding and called 911, they used a tourniquet instead of a pressure dressing to control the bleeding, and the injured worker was still driven to the hospital in a private vehicle. If someone had been trained in first aid and CPR, they would have known the importance of using Emergency Medical Services (EMS). Moreover, if the injured worker's condition had worsened on the way to the hospital, the farm owner may not have been able to provide adequate emergency medical care to him. *** Title 8 California Code of Regulations 3400(b): "In the absence of an infirmary, clinic, or hospital, in near proximity to the workplace...a person or persons shall be adequately trained to render first aid." Title 8 California Code of Regulations 3439(b): "There shall be at least 1 employee for every 2 employees at any remote locations with training for the administering of emergency first aid."**

FURTHER INFORMATION

For further information concerning this incident or other agriculture-related injuries, please contact:

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The NURSE (Nurses Using Rural Sentinel Events) project is conducted by the California Occupational Health Program of the California Department of Health Services, in conjunction with the National Institute for Occupational Safety and Health. The program's goal is to prevent occupational injuries associated with agriculture. Injuries are reported by hospitals, emergency medical services, clinics, medical examiners, and coroners. Selected cases are followed up by conducting interviews of injured workers, co-workers, employers, and others involved in the incident. An on-site safety investigation is also conducted. These investigations provide detailed information on the worker, the work environment, and the potential risk factors resulting in the injury. Each investigation concludes with specific recommendations designed to prevent injuries, for the use of employers, workers, and others concerned about health and safety in agriculture.