

## Tractor Driver Killed by Flying Metal Object<sup>1</sup>

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California NURSE Project<sup>2</sup>

### SUMMARY : CASE 192-040-01

A tractor driver was pulling a mulcher (which cuts wood into smaller pieces) over cut branches in an orange grove. He owned an orange grove and knew how to use a mulcher. When rounding a row of orange trees, a small metal object was thrown by the blades, exiting through the back of the mulcher. This metal object bounced off the back of the mulcher and struck the tractor driver in the forehead.

A relative found him several hours later, slumped over in the seat on the tractor which had run up against an orange tree. He was unconscious. He was taken, by ambulance, to a hospital. He stayed in a coma and was pronounced brain dead two days later.

How could this death have been prevented?

- The mulcher should have had a guard over the back.
- Tractor drivers can wear helmets to prevent flying objects from hitting them in the head.
- Employers should have injury prevention programs. These programs can help workers and employers identify and fix hazards (such as an unguarded mulcher).

### BACKGROUND

On April 15, 1992, the nurse from the NURSE project was reviewing the county coroner's log. She noted a 52 year-old male Caucasian died on March 31, 1992. He had been struck in the head by a metal object while driving a tractor on March 29, 1992. The incident occurred on an orange grove where he was mulching cut

branches lying between rows of orange trees. He was driving a tractor which was pulling a reel-type mulcher (which is similar to a lawn mower with blades rotating around a horizontal axis) over cut branches. A small unidentified metal object, propelled through the air by the blades of the mulcher, struck him in the forehead and penetrated through his skull into his brain. He remained in a coma until he was pronounced brain dead in the hospital two days later.

An on-site visit was made by the Senior safety engineer of the NURSE Project on July 7, 1992. The Senior safety engineer discussed the incident with the newly hired, full-time manager of the orange grove and photographed the mulcher. NURSE staff also reviewed the medical examiner/coroner records related to this fatality.

The California Occupational Safety and Health Administration (Cal/OSHA) was not notified, and did not investigate the fatality.

This incident occurred on a family owned and operated 90-acre orange farm. The fatally injured tractor driver was helping the part-time manager of the farm (the only employee of the farm owner) at the time of the incident. Most of the farm work, consisting of pruning orange trees, applying pesticides, and picking oranges, is done by contractors. Casual farm laborers (working 1-12 weeks per year) are hired to help with pruning and irrigation. At the time of the incident, the farm owner did not have a written injury prevention program. (As of July 1, 1991 the State of California requires all employers to have a written seven point injury prevention program: designated safety person responsible for implementing the program; mode for ensuring employee compliance; hazard communication; hazard

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1. This document, CDHS(COHP)-FI-92-005-15, was extracted from a series of the Nurses Using Rural Sentinel Events (NURSE) project, 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. Publication date: May 1992.

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

evaluation through periodic inspections; injury investigation procedures; intervention process for correcting hazards; and a health and safety program.)

After this fatal incident the farm owner hired a new full-time manager for the farm. The new manager was developing a written injury and illness prevention program at the time of the on-site investigation by the Senior safety engineer.

## INCIDENT

On March 29, 1992, at approximately 12:00 p.m., a 52 year-old Caucasian male tractor driver was struck in the forehead by a small piece of metal. This object had been propelled by the blades of a mulcher, which was being pulled behind and powered by the tractor he was driving. He was mulching branches cut from orange trees using a large reel-type brush mulcher. This reel-type mulcher is similar to a lawn mower, with blades rotating around a horizontal axis. The cutting blades on the reel are driven by a power take-off unit (an extension of the tractor transmission shaft used to power implements with the tractor engine). After being cut into smaller pieces (mulching) the branches are mixed into the soil. The fatally injured tractor driver had his own 20-acre orange grove and was familiar with mulching. As he was rounding a row of orange trees, a small piece of metal was picked up by the mulcher blades and propelled out the back through the air. It might have changed direction by bouncing off a rear support of the mulcher. The metal struck him in the mid-forehead, presumably as he was looking backwards over his shoulder. It penetrated the front of his skull and lodged in his brain.

There were guards at the front of the blades, but the rear of the mulcher was not covered. In the past, this mulcher was known by the farm employees to sometimes throw branches and other material out the rear of the machine at high speed. This mulcher had two 1-inch square stabilizing metal braces at the rear. When an object is thrown out the rear of the mulcher, it may hit these braces and bounce off in another direction. Although this incident was unwitnessed, the metal object may have struck the metal brace and been deflected up and toward the tractor driver.

A relative on the farm at the time of the incident found the injured worker several hours later slumped over in the seat on the tractor that had run up against an orange tree. He was unconscious. He was transported by ambulance to a small local hospital. Later he was transferred to an acute care hospital, arriving at 5:30

p.m. He remained comatose and was pronounced brain dead at 1:50 p.m. on March 31, 1992. There is no information available on the discovery of the injured tractor driver by the relative, or on the Emergency Medical Services or hospital treatment.

The cause of death reported by the coroner was severe cranio-cerebral trauma due to a penetrating projectile. Although no autopsy was performed, an x-ray revealed a small metal piece in the brain.

## PREVENTION STRATEGIES

1. Employers and manufacturers of agricultural equipment should consider safety engineering when designing equipment. Although this mulcher had guards in the front of the blades, all blade areas should have been guarded\*. Rotating blades generate enough force to cause pieces of metal to penetrate tree trunks, and in this incident, even the human skull. It is not uncommon for mulchers to create flying objects. A fatality in another separate incident, which also involved a penetrating head wound from a metal object propelled by a mulcher, was recently reviewed by NURSE staff. Similarities existed in the two incidents, however, this other mulcher was a rotary type, with blades rotating around a vertical axis. These two deaths demonstrate that mulchers should be guarded on all sides of the blades. If guards had been installed to prevent material from being propelled from the rear of the mulcher, this incident may not have occurred. After this incident, the new manager and the farm owner installed a protective screen behind the tractor seat. This screen (made of heavy mesh) is attached to the Roll-over Protective Structure. This may help prevent the tractor driver from being struck by flying objects. However, a small metal object may be propelled by such high force that it may still pass through a mesh screen. **\*Title 8 California Code of Regulations 3440 (c) requires that all P.T.O. units and drivelines be guarded.**
2. Employers should require workers to use personal protective equipment and provide this equipment, along with instruction on proper use, to employees. If the tractor driver had been wearing a helmet at the time of this incident, this might have prevented the metal object from penetrating into his brain. The farm manager now requires any employee driving a tractor to wear a helmet and safety goggles.
3. There was no written safety program\*\* at the time of this incident although after the fatality occurred, the

farm manager was developing a program. One component that should be included in such a program is the identification and correction of hazards. If there was an enforced written program, the hazard created by unguarded blades on the mulcher might have been noted and corrected. \*\*  
**Title 8 California Code of Regulations 3203 - Injury and Illness Prevention Program.**

### **FURTHER INFORMATION**

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

NURSE Project  
California Occupational Health Program

Berkeley office:  
2151 Berkeley Way, Annex 11  
Berkeley, California 94704  
(510) 849-5150

Fresno office:  
1111 Fulton Mall, Suite 212  
Fresno, California 93721  
(209) 233-1267

Salinas office:  
1000 South Main St., Suite 306  
Salinas, California 93901  
(408) 757-2892

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.