

## Overturning of a Forklift

### INTRODUCTION

The National Institute for Occupational Safety and Health (NIOSH), Division of Safety Research (DSR), is currently conducting The Fatal Accident Circumstances and Epidemiology (FACE) Study. By scientifically collecting data from a sample of similar fatal incidents, this study will identify and rank factors which increase the risk of fatal injury for selected employees.

On the morning of July 19, 1983 a mechanic was fatally injured while load testing a forklift truck. The truck overturned with the raised mast striking the employee. The employee was pronounced dead at the scene.

### CONTACTS/ACTIVITIES

After notifying the employer and arranging a site visit, two DSR staff members, an epidemiologist and a safety engineer interviewed the employers, inspected and photographed the workplace (site of the mishap) and equipment involved, and obtained comparison interview data from co-workers. This visit occurred on August 4, 1983.

### SYNOPSIS OF EVENTS

This company services, modifies, and refurbishes industrial materials handling equipment. It employs 20 people, who were primarily trained as mechanics, specializing in industrial truck servicing and modification for specific purposes required by their customers.

The forklift involved in the incident was being modified to handle large rolls of paper. However, testing procedures had not been performed on this equipment. The victim apparently took the vehicle to perform the load test while the supervisor had gone off the premises to pick up parts. The supervisor was unaware of the victim's intentions. The company's normal Standard Operating Procedure (SOP) was to test forklifts on a hard surface leaning the mast up against a permanent structure, while the supervisor was present. None of these procedures were followed in this case. To the best of their knowledge, the two owners did not know of any other similar incident in the past, during which an employee deviated so radically from the SOP. There was some discussion of the victim's state of mind; e.g., the effects of his recent divorce.

Site inspection revealed the following details: The forklift was carrying a paper roll, approximately 72 inches in diameter and 71 inches long, and weighing 5430 lbs. on a machine that was rated to carry 5500 lbs. with the mast vertically raised to its highest point. The driver had parked the forklift with the rear wheels on the asphalt pavement and the front wheels on the berm. He raised the load up over the canopy of another forklift and tilted the mast forward to test the truck's counter weight stability. This caused his truck to tilt forward and rotate counter-clockwise about the front wheel axles. He lowered the load onto the canopy of the other truck. However, as his truck continued to rotate, he jumped off and crouched down among some equipment about 12 ft from the forklift. The mast fell in the victim's direction, fatally injuring him.

## **GENERAL CONCLUSIONS AND RECOMMENDATIONS**

The occurrence of this occupational fatality represents the combination of the violation of several precautions for forklift operation and the misfortune of the victim being in the wrong place when he sought safety. First, the load of paper on the forklift nearly equaled the load rated capacity of 5500 lbs. of the lifting device. Second, the operator did not follow usual SOP for testing the forklift, such as leaning the vehicle against a solid structure or tying it down in the rear by chains or ropes. Third, the forklift was driven off a hard surface onto a softer surface (berm) where the front of the vehicle could lean forward further compounding the tilt angle and thus increasing the load. Fourth, the mast of the forklift was raised to its highest point and then lowered onto the unstable support of another vehicle. And, fifth, given the relatively long period of time (several seconds at least) during which the forklift started to fall, the victim had sufficient time to seek a safe distance, but, unfortunately, he moved with the direction of the fall. From discussions with the owners, the victim had had sufficient experience and training to be aware of the safe and correct SOP for testing forklifts. Thus the employee's decision to proceed with a test outside of the SOP is open to conjecture.

According to an in-depth study of incidents associated with materials handling equipment (Coleman et al, 1978), tipping of sit-down forklifts is ranked fifth among forklift accident types, among which are:

- 1) struck by material from forklift
- 2) caught between forklift and stationary object
- 3) struck by moving part of forklift
- 4) pedestrian accidents

Also, incidents involving forklifts accounted for over 1% of worker compensation claims in Wisconsin. Thus, forklifts are a major source of injury, and forklift tipping is a common occurrence. It is recommended that when forklifts are tested, special attention be paid to the instability of forklifts that result from near capacity load in combination with uneven surfaces.

The owners of the company were very cooperative in providing sufficient opportunity for obtaining information about the procedures and sequence of events associated with this incident.

### **Reference**

Coleman, PJ, Gottlieb, MS, Kaplan, MC, Knutson, SJ, McPeek, JS, Human factors analysis of materials handling equipment., report to NIOSH, Madison, Wisconsin, 1978.