



**SUBJECT:** A forklift operator was killed when his forklift was struck from behind by a motor vehicle.

## **SUMMARY**

On September 17, 2004, a 20-year-old forklift operator was killed after being struck by a motor vehicle while driving a forklift on a state highway. The decedent's employer had rented the forklift from a nearby business and the decedent was returning it at the time of the incident. The employer had planned to follow the decedent in his truck with his emergency flashers on, but needed to get some gasoline first. He instructed the decedent to wait for him, but the decedent decided to leave without him once he was finished with his task. The forklift was only equipped with one flashing light on top; there were no slow-moving vehicle emblems. The decedent was not wearing the seat belt. After crossing to the inside lane of the highway to make a U-turn, the forklift was struck by a vehicle that had just come over a hill and did not have time to react. The decedent was ejected and pinned for 50 minutes under the forklift that landed on him. He was pronounced dead at the scene.

Oklahoma Fatality Assessment and Control Evaluation (OKFACE) investigators concluded that to help prevent similar occurrences, employers should:

- Consider using a trailer or other means for transporting mobile heavy equipment, such as forklifts, between worksites.
- Ensure that forklifts and other powered industrial trucks are not driven off work premises and particularly not on public highways.
- Ensure that employees wear a seat belt while operating forklifts or other powered industrial trucks.
- Develop, implement, and enforce a training and certification program for operators of forklifts and other powered industrial trucks.



Figure 1. Highway where incident occurred



---

## INTRODUCTION

On September 17, 2004, a 20-year-old forklift operator was killed when the forklift he was operating was struck from behind by a motor vehicle traveling at highway speed. OKFACE investigators were notified of the incident and an interview with a company official was conducted on December 3, 2004. OKFACE investigators also reviewed the death certificate and reports from the Medical Examiner, investigating law enforcement officer, local media, and the Occupational Safety and Health Administration (OSHA).

Employer: The victim was employed by a sheet metal fabrication company. The company had been in business for eight years and employed six full-time people at the time of the incident. The company's work was seasonal and the number of employees could double at other times of the year. On the day of the incident, the victim and the company owner were the only two people working at the site. The company did not have a comprehensive safety program. There were no written task-specific procedures; however, there were some machine-specific safe work procedures.

Victim: The 20-year-old male victim had 14 months of experience in metal fabrication and had been working for the same company the entire time. He had several months of on-the-job experience operating the company's forklift, but was driving rented equipment at the time of the incident. He had not received any formal forklift training.

Training: Monthly safety meetings were held, but the company maintained no documentation of any training that was completed by employees. Machine-specific training for the metal working tools was conducted by videos and on-the-job training. All forklift training was conducted informally on-the-job. The company owner and/or shop foreman selected a responsible employee and then showed him how to operate the equipment. Once the management observed the new operator and felt comfortable with his ability, the employee was allowed to use the forklift as needed. At the time of incident, only the owner, foreman, and decedent were authorized to operate the forklift.

Incident Scene: The incident occurred on a straight, downgrade section of four-lane divided state highway (Figure 1). The posted speed limit was 65 miles per hour. Road conditions were dry asphalt. The incident occurred just before 4:00 p.m.

Weather: On the day of the incident, the weather conditions were dry and sunny. The temperature was between 60 and 70 degrees Fahrenheit.

## INVESTIGATION

On the day of the incident, the decedent was assigned to unload equipment into a storage facility. All equipment that could be unloaded by hand was, but a forklift was needed to finish the job. The company's forklift was out of service at the time, so the owner arranged to rent a replacement from another nearby business. The decedent was sent to pick up the forklift, which was about three miles away, and drive it back to the site. The owner followed the decedent to the storage facility in his pickup truck with the emergency flashers on. When nearly all of the equipment had been unloaded, the owner instructed the decedent to finish and then wait for him before returning the forklift. The owner left to put gasoline in his pickup truck and planned to return and follow the decedent. The forklift, a standard size industrial

model with a maximum speed of 10 to 15 miles per hour, had only one flashing light on its top; there was not a slow-moving vehicle emblem or any other warning signs on it.

While the owner was gone, the decedent finished the job and decided to start driving back on the highway. After traveling only a short distance to the west, he needed to U-turn at an intersection to return to the east and head back into town. The decedent, traveling downhill, moved into the inside lane in preparation of where the highway widened with a left turn only lane. He was almost to the point where he could move into the turn lane and turn around the center median when a two-door motor vehicle crested the hill at 65 miles per hour. Without sufficient time to react to the slow-moving vehicle, the driver struck the back end of the forklift approximately 528 feet and 5½ seconds from the top of the hill and traveling 60 miles per hour. The driver tried to swerve right just before the collision. The motor vehicle went end-over-end twice and came to rest 130 feet west of the point of impact. The driver was pinned between the dashboard and the driver's seat for approximately 80 minutes before being extricated and airlifted to the hospital. The forklift overturned on its side 43 feet west of the point of impact. The decedent, who was not wearing a seat belt, was thrown from the operator's compartment and pinned by the forklift, which rolled on top of him.

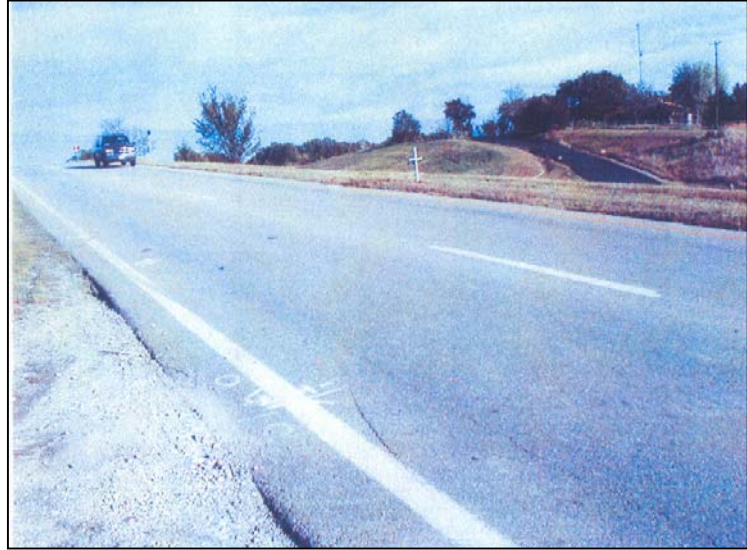


Figure 2. Incident scene

As the owner returned from getting gasoline, he came upon the incident and noticed the forklift on its side. The fire department had already arrived and was trying to extricate the decedent from under the forklift. It took approximately 50 minutes and a small crane to free the victim. Emergency medical services personnel pronounced him dead at the scene.

## CAUSE OF DEATH

The Medical Examiner's report listed the cause of death as internal injuries due to blunt force trauma.

## RECOMMENDATIONS

**Recommendation #1: Employers should consider using a trailer or other means for transporting mobile heavy equipment, such as forklifts, between worksites.**

Discussion: In instances where it becomes necessary to move mobile heavy equipment between worksites, employers should consider using a trailer or other means of transport, rather than driving the machinery itself. This consideration should be made particularly when the machinery is slow-moving and cannot meet minimum speed requirements or is not equipped with proper lights and turn signals.

---

**Recommendation #2: Employers should ensure that forklifts and other powered industrial trucks are not driven off work premises and particularly not on public highways.**

Discussion: Forklifts and other powered industrial trucks should be operated within the confines of the work environment and should not be driven on public highways. Employers should discuss with employees the laws involving the use of specialized machinery on a roadway. In Oklahoma, specialized industrial equipment is not included in the exemptions made for farm equipment use on roadways. In this incident, the fact that the forklift's maximum speed was 10 to 15 miles per hour, that the planned trip route included obstructed views caused by hills, and that the forklift was not permitted or equipped with the proper visibility devices made operation of this type of equipment unsafe and unlawful on this public highway.

OSHA requires any vehicle, which by design moves slowly (i.e., 25 miles per hour or less) on public roads, to display the slow-moving vehicle emblem on the center rear of the vehicle. The emblem consists of a fluorescent yellow-orange triangle with a dark red border. The yellow-orange fluorescent triangle is a highly visible color for daylight exposure. The reflective border defines the shape of the fluorescent color in daylight and creates a hollow red triangle in the path of motor vehicle headlights at night. This emblem is required in addition to any lighting devices or other equipment required by law. Local and state statutes may also require particular registration and permitting of eligible specialized machinery to be operated on a public roadway (e.g., Oklahoma State Title 47, Sections 427 and 1129). Applicable permits and registration should be in possession of the operator and carried with the equipment at all times. Employers should also consider using other highly visible vehicles as escorts when driving lawful slow-moving machinery on roadways and should ensure that minimum speed requirements can be met.

**Recommendation #3: Employers should ensure that employees wear a seat belt while operating forklifts or other powered industrial trucks.**

Discussion: According to Section 5(a)(1) of the Occupational Safety and Health Act, "Each employer shall furnish to each of his employees employment and a place of employment which are free from recognized hazards that are causing or are likely to cause death or serious physical harm to his employees." Employers should ensure that all new forklifts have seat belts installed and older models have retrofitted operator restraint systems, if available. Manufacturers of sit-down type forklifts have been required to install operator restraint systems since 1992. Employees should be trained on the importance of using a seat belt, and employers should monitor employees for compliance. Although it likely would not have helped in this incident, the risk of being crushed greatly decreases if the operator can remain inside the operator's compartment during a tipover or collision. Operators of powered industrial trucks that have operator restraint systems installed are required by OSHA to utilize them (National consensus standard ASME B56.1-1993).

**Recommendation #4: Employers should develop, implement, and enforce a training and certification program for operators of forklifts and other powered industrial trucks.**



Discussion: According to OSHA standards, companies that operate powered industrial trucks should have competent operators who have successfully completed a training and evaluation program. In developing training programs, employers should include truck-related topics (e.g., operating instructions, differences between the truck and an automobile, vehicle capacity and stability, controls and instrumentation, visibility, operating limitations, and inspection and maintenance) and workplace-related topics (e.g., surface conditions, pedestrian traffic, closed environments, and load manipulation, stacking, and stability). Training should be conducted by someone with knowledge and experience in training and evaluating operators and should involve a combination of formal instruction, practical training, and performance evaluation. Refresher training and evaluation should be conducted at least once every three years or sooner if new equipment is to be used or the operator is observed performing unsafely. The employer should certify that each operator has been trained and evaluated. Documentation of the operator's name, date of training, date of evaluation, and entities conducting the training and evaluation should be kept on record by the employer. Simply having a history of operating the equipment does not necessarily qualify an individual as trained and certified.

## REFERENCES

- National Institute for Occupational Safety and Health, NIOSH ALERT – *Preventing Injuries and Deaths of Workers Who Operate or Work Near Forklifts*, Publication No. 2001-109
- Occupational Safety and Health Administration, 29 CFR 1910.178 *Powered Industrial Trucks*.
- Occupational Safety and Health Administration, 29 CFR 1910.145(d)(10), *Specification for accidental prevention signs and tags: Slow-moving vehicle emblem*.
- American Society of Mechanical Engineers, *National Consensus Standard*, B56.1-1993
- Occupational Safety and Health Administration, *General Duty Clause*, Section 5(a)(1).
- Occupational Safety and Health Administration, *Standard Interpretations*, 03/07/96 – *Use of seat belts on powered industrial trucks*.

The Oklahoma Fatality Assessment and Control Evaluation (OKFACE) is an occupational fatality surveillance project to determine the epidemiology of all fatal work-related injuries and identify and recommend prevention strategies. FACE is a research program of the National Institute for Occupational Safety and Health (NIOSH), Division of Safety Research.

These fatality investigations serve to prevent fatal work-related injuries in the future by studying the work environment, the worker, the task the worker was performing, the tools the worker was using, the energy exchange resulting in injury, and the role of management in controlling how these factors interact.

For more information on fatal work-related injuries, please contact:

Oklahoma State Department of Health  
Injury Prevention Service  
1000 NE 10<sup>th</sup> Street  
Oklahoma City, OK 73117-1299  
nancyk@health.ok.gov  
1-800-522-0204 or 405-271-3430  
[www.health.ok.gov/program/injury](http://www.health.ok.gov/program/injury)