Construction Laborer Crushed by Asphalt Truck while Paving Interstate Highway

Investigation: # 95-MA-039-01
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SUMMARY

On October 24, a 34 year old male construction laborer was fatally injured when he was crushed beneath an asphalt-carrying tractor trailer while paving an interstate highway. The victim, facing away from the tractor-trailer, was shoveling old asphalt from around a catch basin adjacent to the high-speed lane. Working approximately 12 feet behind the trailer, the victim could not be seen by the truck driver. The vehicle had no backup alarm. Co-workers, seeing the truck begin to move yelled to the driver and the victim, but it was too late. The victim was run over by the left rear dual axle and was killed instantly. State police on the scene for highway traffic control called the local medical examiner who removed the body to a county hospital. The MA FACE Director concluded that to prevent similar occurrences in the future:

- ***Construction company employers should ensure that one person be designated as a signalman to direct trucks backing up within highway construction sites***
- ***Trucking company employers should design, develop and implement a comprehensive safety program that includes, but is not limited to, training for truck drivers in hazard recognition on construction sites and providing back-up alarms on trucks***
- ***Highway paving contractors should design, develop and implement a comprehensive safety program that includes, but is not limited to, training for highway workers in controlling traffic hazards on highway construction sites***

In addition, tractor-trailer manufacturers should:

- ***consider providing back-up alarms and back-up lights as standard equipment on new vehicles.***

INTRODUCTION

On October 25, 1995, the MA FACE Program was notified by a Massachusetts medical examiner through the 24 hour Occupational Fatality Hotline, that on October 24, 1995, a 34 year old male construction laborer was fatally injured when he was crushed beneath a tractor-trailer at a paving job on an interstate highway. An investigation was immediately initiated. Since the crew at the incident site had been moved to another job, the MA FACE Program Director traveled to their current jobsite where the victim's co-workers were interviewed on October 31, 1995. An interview with the employer was held on November 1, 1995 by telephone. An interview with the company that owned and operated the tractor-trailer was held on November 2, 1995 by telephone. The police report, death certificate, corporate information, OSHA information and witness interviews were obtained during the course of the investigation.

The employer was a paving contractor and was in business approximately 13 years at the time of the incident. Company-wide, they employed approximately 55 persons as needed, 11 of whom were working at the construction site at the time of the incident. Of these, 4 held the same job title as that of the victim. The company had designated the foreman in charge of safety on the site, and had written safety procedures, although it did not have regularly scheduled safety meetings.

The victim was one of five union construction laborers at the incident site and was employed by the company for approximately eight years at the time of his death. His training was primarily on the job.

INVESTIGATION

On October 24, 1995, a construction crew was working on a paving job on the northbound side of a six-lane interstate highway. The high speed lane and the middle lane had been closed to traffic. The crew consisted of two paver operators, two roller operators, five laborers, and two supervisors. Between four and five truckers were at the site at any given time. The truck drivers on the site were not employed by the same company as the construction crew.

The process of asphalt highway paving includes the following steps. Tractor-trailers containing the hot mixed asphalt arrive on the site and form a queue. In turn, the trucks back up to a paver. After reaching the paver, the tailgate is opened by the laborer and the driver lifts the trailer bed to pour the mix into a hopper on the paver. The paver and the truck then proceed forward together until either the truck is empty or the section of paving is completed. The truck will then pull forward away from the paver while laborers scrape with shovels any asphalt which remains at the edge of the truck bed. When this is completed, the laborers hold the tailgate closed while the driver lowers the truck bed. Then the truck pulls away, and another truck begins backing up. The distance that a truck must operate in reverse is determined by how much room is needed by the trucks to maneuver. This is determined by how long the trucks are and whether the truck which has just emptied can pull into the adjacent lane to leave.
The paver (or spreader as it is sometimes called) receives the asphalt from the trucks and

spreads it at the proper thickness and width on the highway. The paver operator is assisted by laborers who may rake piles of asphalt, shovel asphalt from the paver or the end of the truck bed, clean out the truck, clean out the paver, cover catch basins and manhole covers, and other related tasks. When the paver has spread the asphalt, the rollers take over and compress the asphalt.

On this particular job, there were two pavers operating simultaneously in staggered positions in adjacent lanes on the highway. Paver #1 was working in the far left (high-speed lane). Paver #2 was in the middle lane staggered some distance behind paver #1. Therefore, trucks leaving paver #1 were able to pull into the middle lane to leave. Trucks were queued on the shoulder and partially in the high-speed lane. Most of the time, trucks waited to be signaled to approach the paver, but sometimes drivers backed up on their own as soon as they had seen the previous truck leave the paver. Trucking companies are paid by the number of loads of asphalt which their company delivers to the site. This arrangement can sometimes put pressure on the drivers to make deliveries at construction sites quickly and return to the plant for more asphalt.

The victim was one of five laborers on the crew assisting at both pavers. Tasks were not normally assigned person-by-person because the crew had worked together for a long time and knew what needed to be done. One of the usual tasks was removing old asphalt from around the catch basins which, in this case, were located in the left-lane shoulder. The catch basins were then covered before paving over them, so that they would not become clogged with asphalt.

At the time of the incident, the driver of the truck next-in-line for paver #1 had just re-entered the cab of his truck. About a minute later, the victim went over to shovel out around the catch basin located approximately 12 feet behind the waiting 18-wheel tractor-trailer filled with asphalt. Just one minute later, the driver saw a truck pull away from paver #1 into the adjacent middle lane. The driver started backing up and then heard people yelling and the truck driver working at paver #2 blowing his air horn. The driver then stopped and exited the vehicle to find the victim under the body of the truck. The four left rear wheels had completely passed over him and he had died instantly. The truck had driven approximately 20 feet before stopping.

A state police officer on site for off-site traffic control called the county medical examiner who pronounced the victim dead at the scene.

CAUSE OF DEATH

The medical examiner listed the cause of death as crushing injuries of head and torso.

RECOMMENDATIONS/DISCUSSION

Recommendation #1: Construction company employers should ensure that one person be designated as a signalman to direct trucks backing up within highway construction sites

Discussion: OSHA regulations, 29 CFR 1926.601 (4) states that "No employer shall use any motor vehicle equipment having an obstructed view to the rear unless: (i) The vehicle has a reverse signal alarm audible above the surrounding noise level or; (ii) The vehicle is backed up only when an observer signals that it is safe to do so." In this case the victim was working close enough to the rear of the tractor-trailer that the driver was not able to see him in the side mirrors. The truck was not equipped with a back-up alarm.

A back-up alarm serves to warn workers in the area that a truck is backing up. However, discussions with the road crew after the incident and a visit to another road paving site indicated that most back-up alarms are barely audible above the ambient noise. Also, construction workers may have become almost immune to the warning since alarms are beeping almost continuously on a busy site. A more cautious approach would be to always assign one person, a signalman, to organize and direct all traffic within the construction area. Employers should be sure that truck drivers, upon entering the site, are aware of who the signalman is and the meaning of signals used on the site. In this case, a signalman either would not have allowed the victim to work behind the waiting truck, or would not have allowed the truck to back up until the victim had cleared the area.

Recommendation #2: Trucking company employers should design, develop and implement a comprehensive safety program that includes, but is not limited to, training for truck drivers in hazard recognition on construction sites and providing back-up alarms on trucks

Discussion: As part of a comprehensive health and safety program, trucking company employers should train drivers on hazards particular to the construction sites they will encounter. Truck drivers should be trained to be aware of pedestrians working in the construction zone. On multi-employer sites, which are frequent in the construction industry, drivers should be instructed by their employers to be sure they are clear about who is authorized to direct traffic and follow those directions. Drivers should understand the signaling code used on the particular site. If nobody is assigned to direct traffic, drivers should check with workers on the site before backing up or otherwise driving without a clear view.

Trucking companies should also be sure that all tractors, and longer trailers, are provided with sufficiently audible back-up alarms. Though somewhat limited in effectiveness, these alarms provide some warning for pedestrians on the construction site.

Recommendation #3: Highway paving contractors should design, develop and implement a comprehensive safety program that includes, but is not limited to, training for highway workers in controlling traffic hazards on highway construction sites

Discussion: Employers, with the participation of employees, should develop, implement, and enforce a comprehensive safety program. The program should begin with an analysis of hazards associated with highway construction and the implementation of controls of those hazards. It should also include training for all employees in hazard recognition and use of controls. Specifically, safety programs for highway construction workers should include methods for controlling the ever-present traffic hazards, both from within the work zone and from passing traffic. For example, one method of controlling the hazard of vehicles backing-up on the site could be to establish a "hazard zone" of approximately 20 feet behind a vehicle. Laborers working within that "zone" would inform the driver of the vehicle before beginning work and when he has finished. Other methods could be developed based on specific site conditions and input from those working on the site. Training of signalmen and flagmen for highway work should also be part of this program.

Recommendation #4: Tractor and trailer manufacturers should consider providing back-up alarms and back-up lights as standard equipment on new vehicles.

Discussion: The tractor involved in this incident was brand new. Although the owners probably intended to purchase and install a back-up alarm, this had not been done. Considering that most tractors are used in situations that would require a back-up alarm, by OSHA standards, it is reasonable to offer this equipment as standard on new vehicles. Trailer manufacturers should also consider installing back-up alarms on trailers. The popularity of longer trailers means that the alarm on the tractor is barely audible to those behind the trailer. The installation of back-up lights on trailers, though not required by OSHA, would assist workers in construction areas and loading docks with heavy traffic in identifying which vehicle is backing-up.

REFERENCES

Code of Federal Regulations, 29 CFR 1926.601 (b)(4) Motor vehicles, Government Printing Office

ILO, Safety and Health in Construction: An ILO code of practice, Geneva, International Labor Office, 1992