November 30, 1999

Nebraska FACE Investigation 99NE021

SUBJECT:

Member of Road Striping Crew Stuck by Semi

SUMMARY:

A 56-year-old senior highway maintenance worker, was killed when the vehicle he was operating was struck from the rear by a semi on an interstate highway. The victim was driving the trail vehicle of a three vehicle highway striping crew. The striping operation was traveling down the interstate at 18 miles per hour. A semi was traveling in the same lane as the trail vehicle and came up on it at an estimated 75-80 mph. The driver of the semi hit his brakes and skidded for approximately 1.7 seconds before impacting the victim's vehicle. The trail vehicle was thrown into the median and rolled once. The driver was killed instantly.

The Nebraska Department of Labor Investigator concluded that to prevent future similar occurrences employers should:

* ensure for mobile striping operations, on a multilane road, that the rear vehicle be equipped with a truck-mounted attenuator (TMA) and that it travels on the shoulder if possible.

* ensure vehicle operators and occupants always use vehicle restraint systems

* consider using a combination of white, orange, or blue strobe lights mounted on all vehicles in the striping operation.

* consider using a more durable method of striping than painting, such as heat inlaid tape, thermo plastic striping, or tape laid in grooves in the pavement, that would decrease worker exposure to hazards.

* include in training for mobile operations the need to constantly scan rear view mirrors for fast approaching traffic and procedures to avoid collision.

PROGRAM OBJECTIVE:

The goal of the Fatality Assessment and Control Evaluation (FACE) workplace investigation is to prevent work-related deaths or injuries in the future by a study of the working environment, the worker, the task the worker was performing, the tools the worker was using, and the role of management in controlling how these factors interact.

This report is generated and distributed **solely** for the purpose of providing current, relevant education to employers, their employees and the community on methods to prevent occupational fatalities and injuries.

INTRODUCTION:

On July 13, 1999, at approximately 3:30 p.m., a 56-year-old senior highway maintenance worker was killed when his vehicle was struck from behind by a semi on an interstate highway. The Nebraska Department of Labor was notified of the fatality on the morning of July 14, 1999, by the company experiencing the fatality. The Nebraska FACE Investigator conducted a site visit on July 20, 1999. Interviews were conducted with management and workers who were part of the striping crew at the incident site. The FACE Investigator also visited with the Highway Patrolman who responded to the accident and obtained a copy of the accident report.

The employer is a government agency that employs 2,250 people. It has been in operation for 104 years. Previous fatalities have occurred with this employer. A full-time safety manager is employed on staff. The employer has a comprehensive written safety program, and an active safety committee.

The victim had been employed by the company full-time for 5 years and for 2 years prior to that he worked part-time. He had been trained for the task he was performing at the time of the incident.

INVESTIGATION:

On the day of the incident the victim started his shift at 7:00 a.m. He worked in the maintenance yard in the morning. The incident happened in the afternoon at approximately 3:30 p.m., only 6 or 7

minutes after the striping operation had begun. Approximately 1½ miles of striping had been painted when the incident occurred.

The striping operation consisted of three vehicles. The lead vehicle was the striping machine and it was followed by a trailing vehicle with beacons and a "WET PAINT" sign. The incident vehicle was in the rear and was equipped with beacons, a "WET PAINT" sign and a roof-mounted flashing arrow board with the arrow flashing to the right. Separation distance between each of the vehicles was approximately 1/4 mile to allow for the paint to dry. All three vehicles were in the left lane of the two East-bound lanes of the interstate.

All three vehicles in the striping operation were moving East at approximately 18 miles per hour. A semi and trailer was passing two other semis going East. Weather conditions were optimal and the semi driver had a clear, unobstructed view of the road for approximately 15 seconds prior to the crash. The driver of the front semi that was passed also stated the driver of the incident semi appeared to have sufficient room to pull back into the right lane before impact. From the skid marks at the incident site it appears the driver of the incident semi applied the brakes approximately 1.7 seconds prior to impact. His estimated speed prior to applying the brakes was 75-80 mph. He struck the rear vehicle, which was a 1989 Chevrolet suburban, and it flipped over one time and came to rest upright in the median 195 feet from the point of impact. The driver of the vehicle that was struck was not wearing a seat belt. The impact caused him to slide up and back and he struck his head, and broke his neck. He was killed instantly.

CAUSE OF DEATH:

The cause of death, as stated on the death certificate, was fracture/dislocation at C-1 and C-2 vertebrate.

RECOMMENDATIONS/DISCUSSION:

Recommendation #1: **Employers should ensure for mobile striping operations, on a multilane road, that the rear vehicle be equipped with a truck-mounted attenuator (TMA) and that it travels on the shoulder if possible.**

Discussion: The Manual on Uniform Traffic Control Devices (MUTCD), Part VI, recommends that the trail vehicle (referred to in the MUTCD as protection vehicle #1) travel on the shoulder if possible and that it be equipped with a truck-mounted attenuator and highly visible signs. In this case all vehicles were in the left lane of the two lane interstate highway because the left shoulder was not wide enough for protection vehicle #1 to travel on. A truck-mounted attenuator, although an optional safety device, could have absorbed much of the impact in this incident. Figure TA-35 in Part VI, MUTCD, shows the recommended configuration for mobile operations on a multilane road. (See Figure 1)

Recommendation #2: Employers should ensure vehicle operators and occupants always use vehicle restraint systems.

Discussion: Seat belts and shoulder harnesses should always be worn when in a moving vehicle equipped with such. This is in compliance with Nebraska State Law as well as the safety procedures for this employer.

Recommendation #3: Employers should consider using a combination of white, orange, or blue strobe lights mounted on all vehicles in the striping operation.

Discussion: Tests have shown that a combination of lights, such as a white strobe mixed in with orange, is more visible than a single color. Also tests have shown that drivers will respond quicker to a blue light than orange or white. NOTE: Current laws in Nebraska only permit orange warning lights on maintenance vehicles (other than blue lights on snow plows), but this is an issue that may need to be addressed through legislation.

Recommendation #4: Employers should consider using a more durable method of striping than painting, such as heat inlaid tape, thermo plastic striping, or tape laid in grooves in the pavement, that would decrease worker exposure to hazards.

Discussion: Using the painting method for striping roads requires that they be painted twice a year. Other methods are much more durable, such as thermo plastic striping (which could last between 5 and 7 years) and tape laid in grooves cut in the pavement (this method stands up well to

snow plows). Granted, these other methods are more expensive but they could decrease worker exposure to hazards.

Recommendation #5: Employers should include in training for mobile operations the need to constantly scan rear view mirrors for fast approaching traffic and procedures to avoid collision.

Discussion: It appeared that the victim may have made an attempt to turn to the left just prior to impact. (See Figure 2) The impact on the Suburban was greater to the left rear, indicating the victim may have noticed the semi approaching him at a high rate of speed or heard the screeching tires and instinctively attempted to pull left, off the road. Also the vehicle was thrown to the left. All vehicle operators should be trained to constantly scan rear view and side view mirrors for potential hazards and determine what action to take to avoid them.

References: Part VI, Manual on Uniform Traffic Control Devices, February 19, 1998.

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