DATE: October 7, 1992

FROM: Fatality Assessment & Control Evaluation (FACE) Project
Minnesota Department of Health (MN FACE)

SUBJECT: MN FACE Investigation MN9207
Highway Paving Crew Member Dies After Being Run Over By a Rear End Dump Truck

SUMMARY

A 45-year-old member of a highway paving crew (victim) died as a result of being run over by a rear end dump truck that was backing up during truck repositioning maneuvers on a section of highway under construction. The victim was asked to instruct a line of seven truck drivers to back up to a new location. He proceeded to the rear truck (Truck 1) and gave instructions to do so. At the same time, another truck (Truck 2) was coming forward towards the line from the rear. While the victim signaled Truck 2 to stop, Truck 1's driver began turning and backing up to make way for Truck 2. The victim was in the path of Truck 1 and in the driver's blind spot. Although Truck 1's back-up alarm was functioning properly and despite attempts by Truck 2's driver to signal the danger to the victim, he was hit and pushed approximately 14 feet on blacktop. He died later that day in surgery from exsanguinations. MN FACE investigators concluded that, in order to prevent similar occurrences, the following guidelines should be followed:

> workers should direct only traffic moving in one direction at busy, noisy construction sites;

> include information in employee safety training about human inaccuracy in estimating the arrival time of a moving vehicle; and

> equip trucks used on construction sites with rearview sonar which alarms drivers of close proximity to objects behind them.

INTRODUCTION

MN FACE personnel were notified on July 2, 1992, by MN OSHA of a June 30, 1992, highway construction fatality. On July 6, 1992, MN OSHA personnel and the company's safety officer were interviewed. A Minnesota State Patrol report was requested. A site investigation was not conducted due to completion of the job and the highway crew's moving to a new location.

The victim worked as a boom-truck driver for a company of 500 employees. The major categories of work contracted by the company were bridge work, sewer work, parking ramp repair, highway paving, and paving repair. The company employs a full-time safety officer. Weekly toolbox meetings regarding safety issues are conducted.

INVESTIGATION

The incident occurred on a blacktop mat, which was the underlayment for concrete paving the crew was laying that day. The victim and two helpers were setting reinforcing rods on the mat, over which concrete would be spread.

Rear end dump trucks hauled concrete to the paver for spreading. They drove towards the paver down the center area of the mat, turned around at a blacktopped area of the median, and preceded backwards to the paver where they dumped their concrete load. They drove away on the left side of the mat, opposite to normal traffic patterns, in order to better see the re-bar and avoid running onto it. See Figure 1.

The victim had completed his work and was watching the paving operation. He was asked to instruct the drivers of a line of 7 or 8 batch trucks waiting to drive towards the paver to back up approximately 1000 feet. The paver had advanced to a position where using the blacktopped area in the median as a turn-a-round was not possible, and this maneuver was necessary in order to use another section of the highway.

The victim walked to the rear truck (Truck 1; Figure 2) and gave the driver instructions to back up. At the same time, another truck (Truck 2) was coming

forward towards the rear of the truck line. As the victim was signaling Truck 2 to stop, he managed to position himself in the path of Truck 1, which was backing up, and he was in that driver's blind spot. Truck 1's driver was backing and turning into the opposite lane, the lane used to drive away from the paver, to make right-of-way for Truck 2. Despite Truck 1's having an operational back-up alarm and attempts by Truck 2's driver to warn him of the danger, the victim was hit by the right rear duals of Truck 1 and pushed approximately 14 feet on the blacktop. He stated to rescue personnel before transport that he "thought (he) could make it." He died later in surgery from exsanguinations.

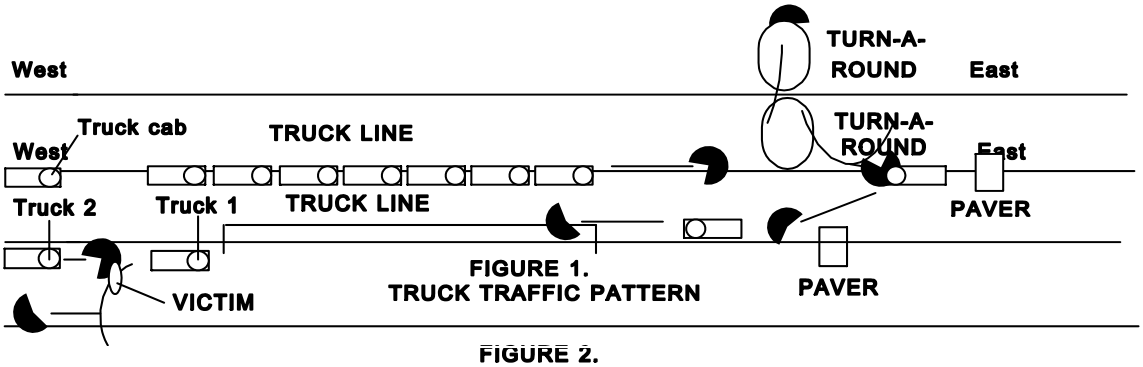

FIGURE 1.
TRUCK TRAFFIC PATTERN

FIGURE 2.
INTENDED ROUTE OF BACKING TRUCK AT TIME OF INCIDENT

CAUSE OF DEATH

The county coroner reported the cause of death to be exsanguinations.

RECOMMENDATIONS/DISCUSSION

Recommendation #1: Workers should direct only traffic moving in one direction on busy, noisy construction sites.

Discussion: Construction worksites can be noisy and hectic. There can be many operations occurring at any single moment and that can be distracting. In addition, it is possible that workers habituate to frequent audible alarms (i.e., truck back-up alarms) on construction sites. For these reasons, it may be prudent to have multiple traffic directors on construction worksites if traffic is moving in more than one direction.

Recommendation #2: In employee safety training, include information about human inaccuracy in estimating the arrival time of a moving vehicle.

Discussion: In general, the ability to comprehend hazards are related to age, with increased accuracy of judgment associated with increasing age. Studies in which approaching cars were viewed on film have shown, however, that adults, in addition to children, tend to overestimate the time of arrival. The victim's statement that he thought he could make it indicates that this may be what happened in this incident. Having this information, workers could allow themselves necessary "extra" time to protect themselves from the associated hazards of moving vehicles.

Recommendation #3: Equip trucks used on construction sites with rearview sonar, which alarms drivers of close proximity to objects behind them.

Discussion: There are existing sonar systems that notify drivers of their proximity to objects behind them while backing up. These sonars are able to detect very small objects and operate much like radar detectors sounding more frequently with closer proximity to the object. Often, these sonars are used on personal recreational motor homes and trailers, but they have also been used on fire trucks and delivery trucks. These sonar systems could be considered as an additional protective measure to construction truck back-up alarms.

REFERENCES

1. Robertson, Leon S. Injuries: Causes, Control Strategies, and Public Policy. D.C. Heath & Company. Lexington, MA. 1983, p. 54.

2. Personal interview. Xanadu Engineering, 176 N. Raymond Avenue, Suite 127, Fullerton, CA 92631.