# Police Officer Fatally Injured When Struck By A Backing Dump Truck At A Public Roadway Construction Work Zone - Massachusetts

**Investigation: # 00-MA-61-01**
**Release Date: November 7, 2002**

## SUMMARY

On December 1, 2000, a 60-year-old male police officer (the victim) was fatally injured when he was crushed beneath an asphalt loaded dump truck at a public roadway construction site. The dump truck involved in the incident was backing inside the work zone while the victim was walking away from the dump truck preparing to help the truck back. Two truck drivers parked within the construction site noticed the dump truck was backing in line with the walking officer. They attempted to warn the officer and the backing truck operator. The dump truck struck and knocked the victim to the ground and then backed over him with the left rear wheels. On site police officers placed emergency assistance calls and responded to the victim who was transported to a local hospital where he was pronounced dead a few hours later. The Massachusetts FACE Program concluded that to prevent similar occurrences in the future, employers/roadway construction contractors should:

- **carefully evaluate project scheduling by considering the type of work zone set up, the time of day and the time of year the work will be performed**
- **develop, implement and enforce an internal traffic control plan (ITCP) specific to each construction site to reduce backing of construction vehicles**
- **ensure backing procedures are in place and that designated individuals are assigned as signalers to direct backing construction vehicles on construction sites**
- **immediately repair equipment when problems, such as broken back-up alarms, arise**

In addition, **local and state government agencies** should:

- **consider offering work zone safety training for all municipal officers who perform traffic details on roadway construction site**
- **consider applicants' past work practices and safety record for all submitted bids to perform roadway construction work**

In addition, **manufacturers of heavy construction equipment, such as dump trucks**, should:

- **explore the possibility of incorporating new monitoring technology on their equipment that will assist the operator while backing.**

# INTRODUCTION

On December 2, 2000, the Massachusetts FACE Program was alerted, by the local media, that on December 1, 2000, a police officer was fatally injured when he was struck by a dump truck while working a traffic detail at a public roadway construction site. On December 19, 2000, the Massachusetts FACE Director traveled to the police department of the town in which the incident occurred and interviewed a sergeant and an officer from the department's traffic division. In addition, the incident site was visited although the construction project had been shut down until the following spring. The police report, death certificate, and incident site photographs were obtained during the course of the investigation.

The victim had been employed with a municipal police department as a full-time police officer for approximately 28 years. Both the incident town and the town where the victim was employed had a mutual agreement that the town in need of traffic detail coverage could call on officers from the other town involved in the agreement to cover these details.

The incident town had been incorporated since the middle of the 1600s' and employed approximately 100 patrolmen. The roadway construction project had a total of 15 detail officers and troopers working on site at the time of the incident. Four of these detail officers were from the same town as the victim; four were from the incident town and the remaining seven officers were from the Massachusetts State Police. Municipal police officers, unlike Massachusetts State Police troopers, do not receive specific training on roadway construction work zone safety.

# INVESTIGATION

The day of the incident, the repaving project consisted of a large work zone approximately one-mile long and comprised three lanes of a four lane undivided asphalt state highway. The closed traffic lanes included the two westbound lanes and the left-hand eastbound lane. The right-hand eastbound lane, the lane furthest from the repaving, was still in use by motorists traveling east. Motorists traveling west were detoured around the construction site using adjacent roads. Several parking lot entrances/exit ways for retail stores and strip malls were included in the work zone. The work zone design had motorists driving into the construction site and across closed travel lanes for access to the stores. The victim had been assigned to direct traffic at one of the entrance/exit ways for a strip mall located at the west end of the work zone (Figure #1).

The actual repaving process was being performed approximately $3/10^{th}$ of a mile to the east of the incident location. When asphalt loaded dump trucks arrived on site, they would wait inside the work zone for their turn to unload. While waiting, the dump trucks were located at the west end of the work zone, approximately $3/10^{th}$ of a mile west of the actual paving process (Figure #2). When it was time to unload, the trucks would back, in an easterly direction, to the paving activity. Prior to the incident, five dump trucks were waiting inside

the work zone to unload. Of these trucks, four had been running and one, which had a trailer attached to it, was broken down. Two of the running trucks were located on the west side of the mall entrance, including the truck involved in the incident (truck A) and another truck (truck B). The three trucks located on the east side of the mall entrance, included the broken-down truck (truck C) (Figure #3).

Both truck A and truck B were 10-wheel dump trucks and were next inline to unload. The driver of truck B had asked the victim for help backing across the strip mall entranceway. The victim, wearing an orange jacket and orange mittens, started to walk in an easterly direction, away from the dump trucks, to position himself to direct motorists and assist the dump trucks in backing. When truck A started backing, a motorist who was driving by the work zone and the driver of truck B noticed that truck A was backing in line with the victim, who was still walking in an easterly direction away from the dump trucks. Both the motorist and the driver of truck B sounded their horns in an attempt to get the attention of the driver of truck A and the victim. The sound of the horns only got the attention of the driver of the broken down dump truck (truck C) that was waiting at the east side of the mall entrance.

The drivers of truck C and truck B realized that truck A was not going to stop, and they got out of their trucks and started running toward the victim and truck A. The driver of truck A had not noticed the victim behind his truck or the two truck drivers running towards him yelling and waving their arms. Truck A then struck the officer who fell to the ground. The officer tried to get out from underneath truck A when the rear left side wheels rolled onto him. According to the police report, the driver of truck A realized he had hit something, exited his truck and saw that his truck was on top of the victim. He then moved the truck forward to get the truck off of him.

After the incident, the driver of truck C went to assist the officer along with many of the other officers and troopers who were on site. A call was placed for emergency assistance, and the victim was transported to a local hospital where he was pronounced dead a few hours later.

Truck A, which was owned by the driver's employer, was examined by the police after the incident. This examination revealed that the backup alarm was missing from the truck but the bracket and wires for the alarm were still present. It had been reported to the police that the truck operator had informed the company about the broken backup alarm months prior to the incident. Also, during the police examination it was noted that the truck cab windows were tinted. The police department tested the window tint, and the results were reported as 15 percent luminous, which exceeds the Massachusetts legal limit (General Laws of Massachusetts Title XIV Chapter 90 Section 9D). The police department also noted that the drivers' side window was rolled approximately 2/3$^{rds}$ of the way down and that the passenger side window was in the full up position.

During the investigation, it was revealed that the police department had made unsuccessful attempts to have the construction work switched to times the stores would not be open. In addition, the construction company involved in the incident had performed work for the commonwealth in the past. Approximately five years prior to this incident, while working for the commonwealth, this company had another fatal incident very similar to the one investigated in this report involving a laborer.

## CAUSE OF DEATH

The medical examiner listed the cause of death as multiple traumatic injuries.

## RECOMMENDATIONS/DISCUSSION

**Discussion:** When scheduling a project, consideration of the construction site surroundings should include, but not be limited to, type of work zone set up and time of day and year the work will be performed.[1] In this case, the work zone contained entranceways to several strip malls and retail stores. These stores were open during construction requiring their patrons drive across the work zone to get to the parking lots creating a potentially hazard situation for themselves and the construction workers. In addition, the incident occurred on December 1st, during the holiday season when stores tend to be the busiest.

At the time of scheduling this construction project, serious consideration could have focused on the importance of the time of day and year the work was going to be performed and the fact that motorists would have to cut across the work zone to gain access to stores. Performing the work outside of the holiday season and around the stores hours could have minimized the amount of traffic driving through the work zone and subsequently the hazard. During the FACE investigation, the police department had stated that they made an unsuccessful attempt to have the construction work switched to times the stores would not be open.

**Recommendation #2: Employers/roadway construction contractors should develop, implement and enforce an internal traffic control plan (ITCP) specific to each construction site to reduce backing of construction vehicles.**

**Discussion:** An internal traffic control plan (ITCP) is a tool that project managers can use to coordinate the flow of construction vehicles, equipment, and workers on foot moving in close proximity to each other within the work zone.[1]

To reduce the hazard associated with backing construction vehicles and equipment, an ITCP can be developed to minimize the backing of all construction vehicles and equipment on site. This can be accomplished by taking into consideration tasks to be performed and how the vehicles can safely navigate through the construction site to complete these tasks while backing as little as possible. The ITCP should also consider workers on foot and set up walkways for these workers that are clear of backing construction vehicles and equipment.[1] In addition, some areas within a construction work zone might have to be defined as areas that are prohibited for workers on foot.

An internal traffic control design for repaving projects could eliminate or decrease backing by having dump trucks pull into the construction site and letting the operation catch up to them. If this type of system had been incorporated into the repaving project that led to this incident, there would have been no need for the dump trucks to back across the parking lot entrance and exit ways.

**Recommendation #3: Employers/roadway construction contractors should ensure backing procedures are in place and that designated individuals are assigned as signalers to direct backing construction vehicles on construction sites.**

**Discussion:** Backing procedures should be developed and implemented for each roadway construction project for when backing on a construction site becomes necessary. Backing protocols should include but not be limited to an assigned backing signaler, and policies that backing will not begin without an understandable signal from the signaler that it is safe to start backing.[2] In addition, operators of construction vehicles and equipment must come to a complete stop if contact with signaler is lost and not to resume backing until contact re-established. All equipment operators and truck drivers, upon entering the construction site, should be aware of who the signalers are and the established backing protocol.

**Recommendation #4: Employers/roadway construction contractors should immediately repair equipment when problems, such as broken back-up alarms, arise.**

**Discussion:** Regular preventive maintenance for construction equipment is an important way to ensure that the equipment is in safe working condition. When a problem is identified that jeopardizes the safety to the operator or any other person, the vehicle or equipment should be taken out of service and repaired before being placed back in service. In this case, the company that employed the truck operator involved in the incident owned the truck he was operating (truck A). It had been reported to the police that the truck operator had informed the company about the broken backup alarm months prior to the incident.

If the truck involved in the incident had a functional back up alarm, the victim might have had an advanced warning that the truck was backing in close proximity to him and giving him time to react and get out of the way. In addition, regular preventive maintenance could have identified the illegal window tint hazard and possibly led to its removal, giving the operator a better view out of the truck cab windows.

**Recommendation #5: Local and state government agencies should consider offering work zone safety training for all municipal officers who perform traffic details on roadway construction site.**

**Discussion:** Training municipal officers in roadway work zone safety, including work zone setup and design, would provide them the knowledge to better protect not only themselves, but also construction workers, pedestrians, and motorists. This training should be updated annually and based, at a minimum, on the Manual on Uniform Traffic Control Devices (MUTCD), Part 6, which governs work zone designs.[3] The possibility of extending training to include other hazards common on construction sites, such as trenching and electrical hazards, should also be considered.

The Massachusetts State Police train their troopers in roadway work zone safety. This existing training course could be used as an outline to develop training for local city and town officers.

**Recommendation #6: Local and state government agencies should consider applicants' past work practices and safety record for all submitted bids to perform roadway construction work.**

**Discussion:** Local and state government agencies should review at a minimum the bidding companies' work practices and safety record on both their own past jobs and other private and public jobs. In this case, the state agency, which the roadway work was being performed for, has an application to prequalify contractors for bid submission. This application for the prequalification, which is valid for one year, asks about the applicant's entire past work history and safety record for the past three years. The safety record question includes; any civil, criminal or administrative proceedings involving public contracts, safety, environmental laws, or regulations including those of OSHA, EPA, DEP or any similar agency of any state. Other safety related questions were; any deaths of employees or others occurring in connection with any project and any injuries suffered by employees or others in connection with any project and resulting in complete disability in excess of thirty working days.

**Recommendation #7: Manufacturers of heavy construction equipment, such as dump trucks, should explore the possibility of incorporating new monitoring technology on their equipment that will assist the operator while backing.**

**Discussion:** As in this case and many other cases, the police reported that the truck operator stated he did not see the victim behind the truck. New immerging technology, such as video cameras, fiber optic systems and radio frequency identification (RFID) tags and tag readers are becoming available and could be installed on construction equipment.[4,5]

Video cameras and fiber optic systems would be mounted at the rear of the equipment, or at the blind spot, and a monitor would be placed inside the operator's area giving the operator an unobstructed view of the area around the rear of the vehicle. The RFID system has each worker on foot wearing a small RFID tag and a tag reader mounted in the equipment. When a tag is sensed within the tag reader's sensing range, the equipment operator receives a warning.

## REFERENCES


1. NIOSH 2001. Building Safer Highway Work Zones: Measures to Prevent Worker Injuries from Vehicles and Equipment, Department of Health and Human Services, Center for Disease Control and Prevention, National Institute for Occupational Safety and Health, DHHS (NIOSH) Publication No. 2001-128.
2. Code of Federal Regulations, 29 CFR 1926.601 Safety and Health Regulations for Construction, Motor vehicles, Government Printing Office.
3. Manual on Uniform Traffic Control Devices (MUTCD), 1988 Edition, Revision 3, September 3, 1993, Revision No. 4, issued January 4, 1995 and Errata No. 1, issued April 11,1995, (15M-11-96), Part VI. Standards and Guides for Traffic Controls for Street and Highway Construction, Maintenance, Utility, and Incident Management Operations, U.S. Department of Transportation Federal Highway Administration, printed by American Traffic Safety Services.
4. NIOSH 1998. Program for mining research, navigation and warning aides for mobile equipment, U.S. Department of Health and Human Services, Public Health Services, Centers for Disease Control and Prevention, National Institute for Occupational Safety and Health, DHHS (NIOSH) Publication No. 98-114.
5. NIOSH website: https://www.cdc.gov/niosh/mining/works/coversheet296.html. NIOSH 2000. Test results of collision warning systems for surface mining dump trucks. U.S. Department of Health and Human Services, Public Health Services, Centers for Disease Control and Prevention, National Institute for Occupational Safety and Health, DHHS (NIOSH) RI 9652. (Link updated 3/20/2013)



**Figure 2 – West side of the retail store entranceway. Photograph taken after the project was shut down.**

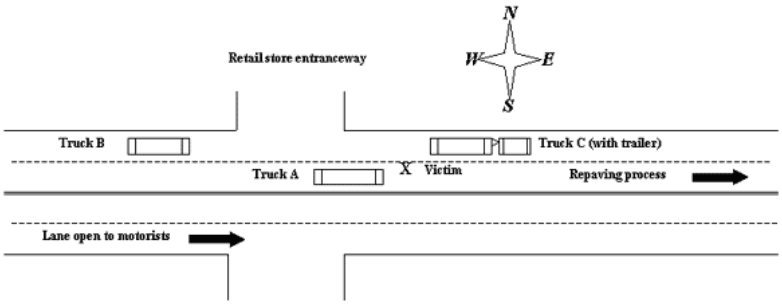


**Figure 3 – Diagram of the incident site.**

**SUMMARY OF OSHA'S DRAFT PROPOSED**
**SAFETY AND HEALTH PROGRAM RULE FOR EMPLOYERS**
**(29 CFR 1900.1 Docket No. S&H-0027)**

**Core elements**

- Management leadership and employee participation
- Hazard identification, assessment, prevention and control
- Access to information and training
- Evaluation of program effectiveness

**Basic obligations**

- Set up a safety and health program, with employee input, to manage workplace safety and health to reduce injuries, illnesses and fatalities.
- Ensure that the safety and health program is appropriate to workplace conditions taking into account factors such as hazards employees are exposed to and number of employees.
- Establish and assign safety and health responsibilities to an employee. The assigned person must have access to relevant information and training to carryout their safety and health responsibilities and receive safety and health concerns, questions and ideas from other employees.

**Employee participation**

- Regularly communicate with employees about workplace safety and health matters and involve employees in hazard identification, assessment, prioritization, training, and program evaluation.
- Establish a way and encourage employees to report job-related fatalities, injuries, illnesses, incidents, and hazards promptly and to make recommendations about appropriate ways to control those hazards.

**Identify and assess hazards to which employees are exposed**

**Safety and health program record keeping**

- Keep records of identified hazards, their assessment and actions taken or the plan to control these hazards.

**Hazard prevention and control**

- Comply with the hazard prevention and control requirements of the OSHA standards by developing a plan for coming into compliance as promptly as possible, which includes setting priorities and deadlines for controlling hazards and tracking the progress.

**Information and training**

- Ensure each employee is provided with safety and health information and training.
- If an employee is exposed to hazards, training must be provided on the nature of the hazards to which they are exposed to and how to recognize these hazards. Training must include what is being done to control these hazards and protective measures employees must follow to prevent or minimize their exposures.
- Safety and health training must be provided to current and new employees and before assigning a job involving exposure to a hazard. The training should be provided routinely, when safety and health information is modified or a change in workplace conditions indicates a new or increased hazard exists.

**Program evaluation and maintenance**

- Evaluate the safety and health program at least once every two years or as often as necessary to ensure program effectiveness.
- Revise the safety and health program in a timely manner once deficiencies have been identified.

**Multi-employer workplaces**

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| • Conduct inspections of the workplace at least every two years and when safety and health information change or when a change in workplace conditions indicates that a new or increased hazard may be present.<br>• Evaluate new equipment, materials, and processes for hazards before introducing them into the workplace and assess the severity of identified hazards and rank those hazards that cannot be corrected immediately according to their severity.<br><br>**Investigate safety and health events in the workplace**<br><br>• Thoroughly investigate each work-related death, serious injury, illness, or incident (near miss). | • The host employer's responsibility is to provide information about hazards and their controls, safety and health rules, and emergency procedures to all employers at the workplace. In addition, the host employer must ensure that assigned safety and health responsibilities are appropriate to other employers at the workplace.<br>• The contract employer responsibility is to ensure that the host employer is aware of hazards associated with the contract employer's work and how the contract employer is addressing them. In addition, the contract employer must advise the host employer of any previously unidentified hazards at the workplace. |

Date issued November 23, 1998. Full text available on https://www.osha.gov/dsg/topics/safetyhealth/nshp.html (https://www.osha.gov/dsg/topics/safetyhealth/nshp.html). (Link updated 3/20/2013)

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