

FACE AK-92-61

TO: CDR Louis Smith, NIOSH, Division of Safety Research

FROM: Gary Bledsoe, AKFACE

SUBJECT: Truck Driver Dies From Asphyxiation After Entanglement in Dump Truck Power Take-off (PTO) - Alaska

SUMMARY

On December 22, 1992, a 36-year-old, male dump truck driver (the victim) was asphyxiated as a result of becoming entangled in the vehicle's power take-off driveline. The victim was attempting to clear a jam in the transmission linkage, which had become stuck in one gear. He climbed beneath the truck (on the driver's side) while the dump bed was rising and the power take-off engaged. His hair and clothing were caught by the PTO, and his body was wrapped around the driveline. Subsequently, chest compression prevented proper breathing, and the victim was asphyxiated. When the driver failed to return within a reasonable time, his supervisor drove to the last known work site, where he discovered the victim in the truck's driveline. The victim was pronounced dead on the scene.

Based on the findings of the epidemiologic investigation, to prevent similar occurrences, employers should:

ensure that all employees are aware of the potential dangers associated with power take-offs and that prior to engaging in any work process that exposes them to PTO's, workers should ensure that the PTO is disengaged and the engine is shut off.

ensure that all workers avoid wearing loose clothing or long hair (without proper precautions) that could become caught in machinery.

ensure that a written hazard communication program is developed which clearly outlines potential work hazards and processes, as well as recommended preventive measures.

ensure that an employee safety training program is developed and conducted on an ongoing basis, using relevant safety information for the work processes carried out; and

consideration should be given to engineering machine guards for truck power take-offs.

INTRODUCTION

On December 22, 1992, a 36-year-old male dump truck driver died from asphyxiation after becoming entangled in the power take-off driveline, while attempting to clear snow from the jammed transmission linkage with a tire iron. The Alaska Division of Public Health, Section of Epidemiology was notified by a Nurse Consultant from the Section on December 23, 1992. An investigation involving an Injury Prevention Specialist from the Alaska Department of Health

and Social Services, Division of Public Health, Section of Epidemiology and an Environmental Health Specialist from the NIOSH, Alaska Activity ensued on December 24, 1992. The incident was reviewed with the Alaska Department of Labor officials (AKDOL), witnesses, and company officials. The incident site was visited, measurements were made, and photographs of the fatality site were obtained. The company was visited to discuss the mechanics and normal operation of the type of truck and power take-off involved in the fatality. Appropriate documents (AKDOL reports, etc.) were obtained during the investigation.

The employer was a local paving and snow removal company which had been in business for 8 years. The company did not have a written safety policy which addresses rules and procedures specific to prevent the type of fatality that occurred. However, the owner's stated policy was that only mechanics should ever be under a truck. Safety meetings were not regularly scheduled, nor did the company have a written hazard communication program.

The vehicle was a 1974 Ford 8000 end dump truck with a standard 13-speed transmission. The transmission has four forward gears with a four-gear Browning split shift equipped with a power take-off. The PTO transfers power from the engine to the dump bed hydraulic system, and is used to raise and lower the dump bed.

INVESTIGATION

A local paving and snow removal company performed contract snow removal for private businesses. On the night of the incident the worker had picked up a load of snow from a local business park at approximately 10:40 PM. He drove to a private dumping area to dump the load. When he failed to return within a reasonable amount of time, his supervisor drove to the private dumping site. At approximately 11:15 PM the supervisor observed the victim's truck at the site. The lights of the truck were on, but the motor was not running. The dump bed was raised at about a 15-20 degree angle. The supervisor could not initially locate the driver, but noticed an area of disturbed snow on the right side of the vehicle. The supervisor looked under the vehicle and found the driver entangled in the power take-off. He called 911, and emergency medical services personnel immediately responded. They determined that the victim was dead at the scene.

Investigators believe the victim was attempting to "speed shift" because the transmission was stuck in overdrive. This practice sometimes will cause the transmission linkage to stick in one gear.

The victim had attempted to clear the jammed linkage by accessing the bottom of the transmission on the drivers side. This enabled his winter clothing and long hair to become caught in the PTO. If the victim had used the right side of the vehicle, he would have been less likely to come into contact with the PTO. The victim's employment records indicated that he had over ten years of truck driving experience on a variety of models. However, he was not a trained truck mechanic, nor was he employed by the company as a mechanic.

CAUSE OF DEATH

The autopsy report attributed the victim's death to "asphyxiation by chest compression"

RECOMMENDATIONS/DISCUSSION

Recommendation #1: Employers should ensure that all employees are aware of the potential dangers associated with power take-offs and that prior to engaging in any work process that exposes them to PTO's, workers should ensure that the PTO is disengaged and the engine is shut off.

Discussion: Although the company had a policy that did not permit drivers to go underneath trucks (only mechanics were permitted to do so), no task specific training was provided that emphasized the dangers of power take-offs. A training program should be developed that includes 1) recognition of PTO hazards, 2) training workers to always disengage PTO's and shut off engines prior to any work process that could potentially expose them to an unprotected PTO, and 3) training regarding safe and correct methods of clearing jammed transmission linkages. The linkage in a Browning transmission can be reached by tipping the hood to expose the engine compartment and transmission (including linkages). This would be a comparatively safe procedure that would prevent workers from accessing machinery from the bottom of the transmission. However, this training would require that workers be aware of other moving parts in the engine and transmission that should be carefully avoided. A preferable alternative is that drivers should be prohibited from performing mechanical repairs or adjustments, especially in field settings. Workers should also be discouraged from using "speed shifting" techniques; they increase the likelihood of transmission linkage jams. The seconds saved in this process are often lost in clearing jams and, more important, "speed shifting" can lead to potentially hazardous situations as described above.

Recommendation #2: Employers should ensure that all workers avoid wearing loose clothing or long hair (without proper precautions) that could become caught in machinery.

Discussion: The victim's loose winter clothing and long hair were caught in the PTO. This led to his body being wrapped around the transmission line. All workers should be made aware of these hazards and take appropriate precautions. Unrestrained long hair places employees at increased risk to PTO hazards. Long hair should be contained (caps, nets, etc.) so that capture by rotating machinery or nip points is prevented. Clothing should be free of flaps and other potential grab points for machinery. Most important, workers should avoid exposure to rotating machinery or nip points, and have qualified mechanics repair trucks, including transmissions and PTO's.

Recommendation #3: Employers should ensure that a written hazard communication program is developed which clearly outlines potential work hazards and processes, as well as preventive recommendations.

Discussion: Although a stated policy existed that would have prevented this fatality, no formalized written hazard communication program existed. Such a program should be developed that highlights the dangers of PTO's, as well as other hazardous machinery and parts. This policy should clearly differentiate the duties of drivers and mechanics. Drivers should be prohibited from repairing jammed transmission linkages, "speed shifting", and other hazardous practices. This policy should be coordinated with a hazard-specific training program for all existing and new drivers.

Recommendation #4: Employers should ensure that an employee safety training program is developed and conducted on an ongoing basis, using relevant safety information for the work processes carried out.

Discussion: A hazard-specific training program (as described in Recommendation 1) should be developed. In addition, ongoing hazard recognition and evaluation should be conducted. When new hazards are recognized, effective preventive measures should be included in a formalized safety training plan. This training should be ongoing, and should be a requirement for journeyman workers as well as for new workers and trainees. The safety training program should be supplemented with regular safety meetings, in which current project safety issues and long-term safety topics are discussed. One individual should be given primary responsibility for conducting safety activities, and should receive full support for these activities from company officials.

Recommendation #5: Consideration should be given to engineering machine guards for truck power take-offs.

Discussion: Currently, the model of truck involved in the incident does not have any machine guarding for the PTO. Consideration should be given to developing a machine guard that would prevent inadvertent contact with moving parts of the PTO. Although the primary prevention strategy for this fatality should be separating drivers from the hazard by eliminating unnecessary exposures, machine guarding would provide an added level of protection for mechanics, who cannot entirely avoid exposure to PTO's. A simple metal covering could act as an effective shield for exposed parts of the PTO, thereby reducing the potential for PTO-related injuries to truck mechanics.

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