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**TO:** Director, National Institute for Occupational Safety and Health

**FROM:** Iowa FACE      Case: 2005IA086      Report date: 22 July 2010

**SUBJECT:** Truck driver entangled in drive train while freeing seized brakes

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## SUMMARY

In December of 2005, a 64-year-old part-time truck operator died when his clothing became entangled in the drive train of a semi-truck tractor. Upon discovering that the brakes of the truck were frozen and would not release, the victim crawled under the truck to free the brakes using a hammer and metal rod. The truck had automatic transmission and was left running and in gear without the parking brake set. Once the brakes were released, the drive shaft began turning and the truck moved forward. The movement of the truck caused the victim's hooded sweatshirt to become entangled in the spinning drive shaft. The sweatshirt tightened around the victim's neck and chest leading to asphyxiation. First responders cut the victim free from the entanglement and began resuscitation, which was terminated on scene without transporting patient to ER. Upon completion of an autopsy, the Medical Examiner identified the cause of death as "traumatic asphyxia due to chest and neck compression."

## RECOMMENDATIONS

1. *Employees must not attempt tasks for which they are not authorized or have not received proper training.*
2. *The employer should revise the lockout/tagout program to include/revise the risks and procedures for working on energized equipment.*
3. *All employees should be trained in appropriate safety procedures associated with the equipment they are authorized to operate.*
4. *Equipment should be appropriately maintained in good operating condition.*

## INTRODUCTION

In December of 2005, a 64-year-old male part-time truck operator died when his clothing became entangled in the driveshaft of a truck. The Iowa FACE Program became aware of the incident through articles in local newspapers. Information for this report was gathered from local police and medical examiner reports as well information provided by Iowa Workforce Development.

The incident occurred on a hard-surfaced outdoor storage lot of a truck sales and service establishment. This business had recently performed service on the truck involved in the incident

(see photo 1), after which it was parked outside for approximately five days awaiting a driver to return it to an out-of-state owner. The victim was scheduled to make that delivery on the morning of the incident.

An individual employed to deliver commercial motor transport vehicles is required to pass a test on the safe operation of motor vehicles in order to obtain a commercial driver's license from the Iowa Department of Transportation. This individual's level of additional employee safety training was not documented in available records.

## INVESTIGATION

On the morning of the incident, the victim was scheduled to deliver the truck to the Kansas City area following vehicle service. The victim had been seen by coworkers just before 4:30 a.m. sitting in the cab of the running truck. It is believed that upon attempting to release the brakes to move the truck the victim found that they would not release perhaps in part due to the fact that the truck had been sitting outside in cold weather for five days prior to the incident. There was no trailer attached to the truck at the time of the incident.



Photo 1 - Driver's side of truck tractor

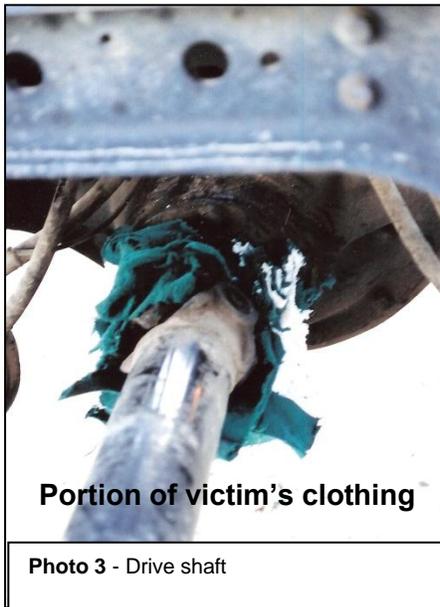
Based on written interview reports prepared by public safety, Iowa OSHA, and medical examiner personnel, the following scenario is believed to be how the un-witnessed death occurred. Upon realizing that the brakes were apparently frozen, the victim procured a hammer and

metal bar with which to manually release the brakes. The truck was left running at idle speed with the transmission in gear. This truck was equipped with an automatic transmission and torque converter that allows the truck to remain stationary while in gear. The truck's transmission control did not have a "park" position. The parking brake was not engaged. The operator then crawled under the truck with the tools to forcibly free the frozen brakes. He successfully released the brakes, which allowed the truck to move forward. As the truck moved, the victim's clothing became entangled in the universal joint (u-joint) on the revolving drive train. (See photos 2 and 3.) The victim was lifted off the ground and pinned against the frame of the truck causing the drive shaft to stop rotating. The compression of the victim against the frame led to his death by



Photo 2 - View underneath rear of truck

asphyxiation. It was estimated that the truck moved a total of eight feet from where it was originally parked.



At approximately 7:30 a.m., a co-worker arrived at the business and saw the victim under the truck. When he realized the victim was entrapped, he yelled at a co-worker to call 911. Two local police officers arrived at 7:38 a.m., followed shortly by paramedics. Upon arrival the responding officers found the victim entangled under the truck with no pulse and having an arm that was "very cold and stiff." The victim was cut free and resuscitation efforts commenced. He was transported to a nearby parking lot where an air flight ambulance had landed. Air flight medical personnel assessed the victim and directed that CPR be discontinued. The air transport was cancelled and the county medical examiner was called.

At the incident scene, the metal rod and hammer were observed by law enforcement between the truck tires. The victim's cell phone was also found on the ground, and it was apparent he had misdialed trying to call 911.

A review of the operation manual for this truck recommends that the brakes be set. However, in this case, that would not have allowed the victim to release the frozen brakes. No attempt to chock the tires or otherwise immobilize the truck was observed at the worksite.

## CAUSE OF DEATH

The county medical examiner's autopsy report lists traumatic asphyxia due to chest and neck compression as the cause of death.

## RECOMMENDATIONS AND DISCUSSION

**Recommendation 1:** *All employees should be trained in appropriate safety procedures associated with the equipment they are hired to operate.*

**Discussion:** Employees should receive appropriate training on the operating hazards and safe maintenance of equipment. In this incident, the victim failed to follow several safety rules found in the equipment operator manual in the company's safety program. The operator manual states when performing maintenance the engine should be turned off and the wheels chocked. The manual also states not to wear loose clothing. OSHA's lockout/tagout standards are also intended to prevent the unexpected release of stored energy during servicing of motor vehicles.

**Recommendation 2:** *The employer should revise the lockout/tagout program to include/revise the risks and procedures for working on energized equipment.*

**Discussion:** OSHA's lockout/tagout standard (29 CFR 1910.147) is intended to prevent the unexpected release of stored energy during servicing of equipment, including motor vehicles. Currently, 120 fatalities and 50,000 injuries per year are associated with failure to release or block energized sources prior to accessing hazards. An effective lockout/tagout would have provided for

notification of working on energized machinery. This procedure might have involved another person to engage the brakes and/or resulted in a more timely rescue of the victim through immediate dialing of 911. Alternative methods for locking out the truck when the brakes cannot be set should include chocking the wheels and other means to prevent the truck from moving.

**Recommendation 3:** *Workers must not attempt tasks for which they have not received proper training.*

**Discussion:** Employees should never undertake jobs for which they have not been properly trained. The victim in this incident was a part-time truck driver, and there was no indication that he had been trained as a mechanic qualified to release frozen brakes. Upon discovering that the brakes had seized, he should have notified appropriate maintenance personnel rather than attempting the repair alone. The host facility should institute a driver policy to remind and enforce such rules when drivers arrive to transport trucks to customers.

**Recommendation 4:** *Equipment should be appropriately maintained in good operating condition.*

**Discussion:** All indications in this incident are that the victim was attempting to free frozen brakes on the truck when the injury occurred. This situation could have been caused by improper maintenance of the truck's air drying system. This system is intended to remove moisture from the brake system air lines in order to avoid situations such as frozen brakes. Air drying systems utilize filters which must be replaced on a periodic schedule.

## REFERENCES

“Commercial Driver's License Program (CDL/CDLIS)”, Federal Motor Carrier Safety Administration, U.S. Department of Transportation, Federal Motor Carrier Safety Administration 1200 New Jersey Avenue SE, Washington, DC 20590; as viewed at <http://www.fmcsa.dot.gov/registration-licensing/cdl/cdl.htm>

Directive STD 01-05-019 - STD 1-7.3 - 29 CFR 1910.147, the Control of Hazardous Energy (Lockout/Tagout) - Inspection Procedures and Interpretive Guidance, Occupational Safety & Health Administration, US Department of Labor, 200 Constitution Avenue, NW, Washington, DC 20210

“Trucking Industry, OSHA Standards”, Occupational Safety & Health Administration, US Department of Labor, 200 Constitution Avenue, NW, Washington, DC 20210  
[http://www.osha.gov/SLTC/trucking\\_industry/index.html](http://www.osha.gov/SLTC/trucking_industry/index.html)

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## **Fatality Assessment and Control Evaluation FACE**

Fatality Assessment and Control Evaluation, FACE, is a program of the *National Institute for Occupational Safety and Health* (NIOSH), which is part of the *Centers for Disease Control and Prevention* of the *U.S. Department of Health and Human Services*. Nationally, the FACE program identifies traumatic deaths at work, conducts in-depth studies of select work deaths, makes recommendations for prevention, and publishes reports and alerts. The goal is to prevent occupational fatalities across the nation.

The NIOSH head office in Morgantown, West Virginia, carries out an intramural FACE case surveillance and evaluation program and also funds state-based programs in several cooperating states. In Iowa, *The University of Iowa* through its *Injury Prevention Research Center* works in conjunction with the *Iowa Department of Public Health* and its *Office of the State Medical Examiner* to conduct the Iowa FACE program.

Nationally, NIOSH combines its internal information with that from cooperating states to provide information in a variety of forms which is disseminated widely among the industries involved. NIOSH publications are available on the web at <http://www.cdc.gov/NIOSH/FACE/> and from the NIOSH Distribution Center (1-800-35NIOSH).

Iowa FACE also publishes its case studies, issues precautionary messages, and prepares articles for trade and professional publication. In addition to postings on the national NIOSH website, this information is posted on the Iowa FACE site, <http://www.public-health.uiowa.edu/FACE/>. Copies of FACE case studies and other publications are available by contacting Iowa FACE, too.

The Iowa FACE team includes the following specialists from the University of Iowa: Marizen Ramirez, PhD, Principal Investigator; Corinne Peek-Asa, PhD, MPH, Co-Principal Investigator; John Lundell, MA, Co-Investigator; Renee Anthony, PhD, Co-Investigator; Murray Madsen, MBA, Chief Trauma Investigator; and Adele Bonney, editor. Additional expertise is provided from the Iowa Department of Public Health, including Rita Gergely, Principal Investigator; Kathy Leinenkugel, Surveillance Specialist; and John Kraemer from the Office of the State Medical Examiner.

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