

Oilfield Service Machine Tip Over in Wyoming

SUMMARY

A 26 year old Oilfield Service roustabout died from injuries received when a trenching machine tipped over onto him, crushing his chest and pushing him into an embankment where his head struck a large rock. A work crew was transporting a trenching machine up a 14% to 20% grade on a newly cut, ungravelled roadway, to place a pit liner in a new well pit. The loaded truck couldn't pull the steep grade, so they unloaded the trencher ½ mile from the pit, and began driving it up on its own power. A worker who was thought to have potential as a future driver was at the controls and the victim, who was an experienced driver, was riding beside him while the new driver learned the operation. The driver shifted gears, unintentionally placing the machine in neutral, and it started to roll backwards. The victim touched the gearshift lever to instruct the driver to correct the error when he lost his balance and fell from the machine, which rolled over him. As the machine rolled backwards, the front blade pushed him against an embankment where his head struck a rock. Emergency services were called, but by the time they arrived, the victim had died.

Employers may be able to minimize the potential for occurrence of this type of incident through the following precautions:

- **Inexperienced drivers should receive on-the-job training in non-hazardous situations and not be exposed to life-threatening experiences while training.**
- **Workers should avoid riding on moving machinery where they can communicate with the driver.**
- **Employees working around machinery in hazardous areas should be positioned in such a way as to assure an escape route in case of unexpected movement.**

INTRODUCTION

On a Thursday morning, July 17, 1992, an oilfield services crew was transporting a trenching machine over a newly cut mountain roadway for use at a new pit site. The crew would use the machine to dig a trench around the pit, lay a plastic liner in the pit with the edges lying in the trench, and then use the machine to refill the trench to hold the liner in place. They were transporting the trencher on a flatbed truck, which couldn't make the steep grade. They then determined to unload the trencher and drive it to the pit (about a half mile away) on its own power.

The victim was an experienced driver, and had been training a new driver who showed potential for becoming an expert driver. He was allowing the inexperienced driver to operate the machine on the half mile to the hill top, and was riding beside the driver to be available in case of trouble. By riding on the immediate left of the vehicle, it was believed that he could instruct the new driver on operation.

The road was roughly cut with loose dirt still evident. The upward slope was from a 14% to a 20% grade, with a rock embankment to the driver's left and a steep dropoff to the drivers right. The roadway width was sufficient for two vehicles abreast with only a few inches clearance.

While driving up the slope, the driver got the vehicle out of gear and it began rolling backwards. The victim fell off, but then attempted to run alongside to give instruction and either fell or lost his footing and was pulled down under the tire and run over. As the vehicle rolled backwards, either the front stabilizer or the front blade pushed him to the left where his head hit a rock.

INVESTIGATION

Through a reciprocal notification agreement with the OSHA Administrator of the Wyoming Department of Employment, the WY-FACE Project was notified of the incident at 4:00 pm on July 16. A meeting was subsequently conducted with the employer and the site was photographed. Conversations were held with county officials and reports were requested and received from the county sheriff and the county coroner.

The company had been in the oilfield servicing business for approximately nine years, servicing statewide oil fields with such activities as pipeline installation, tank hookup, repair of broken pipe, and providing fencing and maintenance as needed. The company employs an average of 12 employees (varying on the basis of work to be done), with all hired employees serving in a variety of tasks as general roustabouts.

The victim had worked for the company for 6 years as a roustabout. He had been involved in approximately 50 pit liner installations, and was an experienced trencher operator. He was highly regarded for his abilities and concern for safety. He was steady and dependable, with no alcohol, drug, or attitude problems, and appeared "wide awake and alert" at the morning safety meeting.

There is no designated safety officer or formal procedures for conducting activities. As safety rules become available and appear pertinent, they are gathered in a file and/or posted on bulletin boards where they are accessible to employees. Standard procedure for the oilfield service company, which was practiced earlier that morning, was to conduct "tailgate safety meetings" where workers are reminded by the supervisor of the job ahead and the hazards involved.

During that morning's safety meeting, the supervisor discussed the hazards of trencher operation as it applied to truck transport and use in pit liner installation procedures. The trencher was equipped with a "Gates Cab" for rollover protection, but was not equipped with seat belts. Both the victim and the driver wore hard-toed shoes, but were not wearing hard hats at the time of the incident.

A rough road had been cut through a rocky mountain pass to allow heavy equipment to travel to and from a reserve pit at the top of the mountain. The road was of native rock, wide enough for two vehicles to meet and pass, with loose rocks on the surface. On the left (travelling uphill), was a steep embankment and to the right was a steep drop off. The point where the incident occurred was ½ mile from the reserve pit at the top.

The oilfield service operation was to place a pit liner in a reserve pit at the top of the mountain. They were transporting a ditching machine to the location by flatbed truck. Due to the grade and road surface,

the loaded truck couldn't pull the hill, so they decided to unload the ditching machine from the truck, and drive it up under its own power.

After having unloaded the machinery from the truck, the victim was instructing a fellow worker on the operation of the vehicle. The victim was on the left side of the machine, next to a steep bank, so that he could instruct the driver on what to do. The inexperienced driver had lifted the front blade of the ditching machine, and asked the victim whether to switch the transmission from hydraulics to chain drive since the Hydro-drive was slower. The victim touched the gear lever, which the driver presumed to be an indication that he should change gears. As he pulled back on the lever, the gear disengaged and the machine rolled backwards. The victim was jolted from the machine, but held on with his feet on the ground. As the driver tried to stop the machine with the brakes, the victim called to him to "bank it", or turn inward toward the bank to keep it from going over the edge of the mountain. The driver tried to regain control, the victim lost his footing, fell, and was run over by the tire and then struck on the head or shoulder by the blade which pushed him into the embankment.

The victim was lying facedown against the embankment, where his head had struck a sharp rock. The driver rode the machine to a point where it ran up onto the embankment and tipped over onto its stabilizer, stopping the movement. Then he ran toward the victim at the same time a fellow worker ran down the hill to the victim. The other worker covered the victim with his shirt while the driver ran up the hill to alert the supervisor (a search and rescue volunteer) who used the communication facilities available to alert 911 responders.

The oil field lies on a two county border, and the employer is in a third county. Access to the field is by dirt road through three separate ranches, approximately 15 miles from the nearest paved highway. The emergency responders for the county where the incident occurred were approximately 50 miles from the highway exit to the ranch roads. Ambulance and police agencies in 3 counties responded to the call, and an air flight was initiated, but there was confusion as to the location of the incident. First responders were to meet crew members at a ranch closer to the incident site, and those crew members were late because they had engine trouble on the way to the ranch. The ranch owners didn't know where to send them as there are several oil fields in the area. Apparently, the best information had been given to the primary responder who was 31 miles further from the scene than the first responders. Emergency responders reached the victim over an hour after the occurrence. Coroners records indicate that the victim died within minutes of receiving his injuries.

Mobile communications equipment is maintained whenever crews are at a remote location, both for safety and business needs, so that the crew can stay in contact with its home base and emergency response personnel. In this instance, the mobil radio was on the flatbed that was being used to transport the trenching machine, and was at the top of the hill, less than a half-mile from the trencher when the incident occurred.

No other vehicles or pedestrians were behind or beside the trenching machine as it prepared to move uphill. When it rolled downhill, the options were to bank slightly to the left to stay on the roadway, bank sharply to the left into the bank, or go over the edge by banking to the right or not banking at all. There were no safety barriers on the outside edge of the roadway.

Having rolled into an embankment and tipped over, the machine was turned off to prevent sparking a potential fuel spill. The job of installing the pit liner could not be conducted without the machine so the work was stopped until after incident cleanup was completed. Since the incident occurred in a remote

area, there was no need for evacuation or traffic control. The scene was left untouched until the investigation was completed and the victim's body was removed.

CAUSE OF DEATH

The Medical Examiner listed the cause of death as Flailed Chest.

RECOMMENDATIONS/DISCUSSION

While much credit must be given to the oilfield service personnel for conducting pre-task safety discussions, more concern should have been shown for the practical considerations of allowing an inexperienced driver to operate trenching equipment under such hazardous conditions. It appears that the victim thought the operator had left the blade down (which would have prohibited the downhill roll) before attempting to change gears, and therefore indicated that the gear should be changed from the "croud" position into chain drive to allow for faster movement up the hill. The backward roll either jolted the more experienced victim from the machine, or he tried to step down to the ground as the machine rolled backwards. The driver attempted to stop the machine by using the brakes, but was unable to stop the downhill force. Under the circumstances, the potential for rolling the machine over the edge of the precipice and experiencing multiple deaths is frightening.

Oilfield service supervisory personnel should always assess the added potential for unsafe actions when unexpected developments occur. While there had been a "tailgate safety meeting" in regard to the potential hazards of the trenching procedure anticipated at the well pit where the liner was being installed, no one realized that the trenching machine would have to be unloaded and driven to the location. The decision to unload was an unexpected development with a potential for unanticipated hazards which, in this instance, actually occurred. Such a decision should have been an opportunity for reanalyzing safety factors, including the possibility that the vehicle might look like a training opportunity for a new worker with a potential for future skills in operating machinery. Common sense would dictate that this was not the time nor the place to train a new driver.

The victim added to the potential for his own injuries by placing himself in a position where he had no escape in the event of unexpected developments. From his position to the left of the driver, he had no control over the gearshift on the driver's right. He also was unable to avoid the wheels of the rolling vehicle due to their proximity to the side of the mountain, and the loose rock at the edge of the road.

There would be an advantage to the company to establish, write and disseminate a safety policy in regard to equipment operation as well as safety procedures to follow for other oilfield service activities. Included in that policy should be a policy to prevent inexperienced workers from receiving on-the-job training in areas that are more hazardous than the workers experience level dictates.

FATAL ACCIDENT CIRCUMSTANCES AND EPIDEMIOLOGY (FACE) PROJECT

The National Institute for Occupational Safety and Health (NIOSH), Division of Safety Research (DSR), performs Fatal Accident Circumstances and Epidemiology (FACE) investigations when a participating state reports an occupational fatality and requests technical assistance. The goal of these evaluations is to prevent fatal work injuries in the future by studying the working environment, the worker, the task the worker was performing, the tools the worker was using, the energy exchange resulting in fatal injury, and the role of management in controlling how these factors interact.

States participating in this study include: Georgia, Indiana, Kentucky, Maryland, North Carolina, Ohio, Pennsylvania, South Carolina, Tennessee, Virginia, and West Virginia.

NIOSH Funded/State-based FACE Projects providing surveillance and intervention capabilities to show a measurable reduction in workplace fatalities include: Alaska, California, Colorado, Massachusetts, New Jersey, Minnesota, Missouri, Wisconsin and Wyoming.

Additional information regarding this report is available from:

Wyoming Occupational Fatality Analysis Program
522 Hathaway Building - 2300 Capitol Avenue
Cheyenne, WY 82002
(307) 777-5439

Please use information listed on the Contact Sheet on the NIOSH FACE web site to contact [In-house FACE program personnel](#) regarding In-house FACE reports and to gain assistance when State-FACE program personnel cannot be reached.