A Construction Surveyor is Run Over by a Motor Grader That Was Backing Up

SUMMARY

A 32-year-old construction surveyor died when backed over by a motor grader. The victim was doing a grade check at the time of the incident. The grader operator was looking at the grade as he was backing. The back up warning device was working properly. The CA/FACE investigator determined that, in order to prevent future occurrences, employers, as part of their Injury and Illness Prevention Program (IIPP) should:

- **Ensure the present language in the company policy on working in close proximity to moving heavy equipment is adequate and applicable to all known situations and hazards.**
- **Ensure employees are adequately trained and that workers' achievement of skills is verified through a testing program.**
- **Consider using additional safety devices for heavy equipment to warn workers of a backing vehicle and to warn drivers when someone is in their blind spot.**
- **Consider installing equipment on graders that would incorporate the use of a laser, GPS, or sonic guided grading system.**

INTRODUCTION

On May 25, 2001, at approximately 9:00 a.m., a 32-year-old construction surveyor was run over by a grader that was backing up. The CA/FACE investigator learned of this incident on June 6, 2001, through the California Department of Industrial Relations, Division of Occupational Safety and Health (Cal/OSHA) Legal Unit. On October 29, 2001, the CA/FACE investigator traveled to the decedent's place of employment and interviewed the company's Safety Manager and reviewed the company's safety policies, procedures, and records. Pictures of the equipment involved were also obtained. Further interviews were later obtained from the equipment operator, laborer and other witnesses.

The employer of the victim was a general contractor and engineering corporation. The company had been in business for over 30 years and had approximately 1500 employees working at the time of the incident. There were 25 employees at the site when the incident occurred. The victim had been with the company for nine days and worked exclusively at the incident job site.

The company had a safety program and a written Injury and Illness Prevention Program (IIPP) with the required elements at the time of the incident. There were written task specific safe work procedures for what was considered critical tasks. Safety meetings were held weekly and documented.

The company provided initial training in the form of orientation to all employees. Task specific training was provided when required and the methods of training included on-the-job-training (OJT), classroom, video, and manual training. The company training provided a general overview of working safely around heavy equipment by instructing employees to make eye contact with the operator when in the vicinity of heavy equipment, but did not specifically address the hazards associated with the incident. The company did not require machine operator licensing, however the company did require equipment operators to be certified by the union. Training was evaluated through

performance testing. Records of employee training were documented.

INVESTIGATION

The site of the incident was a major construction site building a railroad corridor that extended many miles in a north south direction. The corridor was below ground with overpasses for vehicular traffic. The incident occurred at one of the many cross street restorations that was being graded in preparation for paving. The roadway alignment was straight and level. The weather conditions were clear, sunny and warm. The road was completely closed to all traffic.

On the day of the incident, the crew started work at 6:00 a.m. The crew consisted of the motor grader operator, two grade checkers and two laborers. The crew's assignment was to use the motor grader to cut the dirt to the sub-grade as specified by the project plans. The grade checkers would re-check the grade after the motor grader made a pass to determine what level they were at and advise the operator if they needed to add or remove dirt from the area. The pass made by the grader was usually the full length of the cross street restoration so it gave the grade checker plenty of time to check the grade before the grader returned. The laborers assisted the grade checkers as well as the equipment operator. The laborers and grade checkers were wearing the required high visibility safety vest and hard hats. The supervisor was at the site but at a different location at the time of the incident.

Just prior to the incident, the grader operator approached a manhole cover. Unable to go over the manhole cover without damaging it, one of the laborers assisted the grader operator by spotting it so the manhole cover could be circumnavigated. The motor grader operator stopped as he approached the manhole cover, then checked his side mirrors for any persons or any other machine that might be behind him, and then proceeded to back up. Seconds after placing the equipment in reverse and backing up, the operator noticed the other laborer running up along side the motor grader waving his hands and yelling for him to stop, which he did immediately.

The victim and the other laborer were approximately 20 feet behind the motor grader checking the grade and taking measurements. The laborer stated he heard the back-up alarm from the motor grader and knew it was moving in reverse so he got out of the way. When he spotted the victim he was bent down tying a ribbon on a stake with his back to the grader. He yelled for the victim to move but was too late. The laborer then ran around to the front of the motor grader waving his hands and yelling at the operator to stop.

Another equipment operator working in the vicinity saw the reverse direction of the motor grader putting it on a direct collision course with the victim. He stated he yelled and screamed but with all the construction noise he doubted anyone could hear him. He stated the ripper on the back of the motor grader hit the victim on the shoulder knocking him down, then the rear tire ran over him. After stopping the motor grader, the operator looked in the direction the laborer was pointing and saw the victim beneath the right rear wheel. The operator immediately moved the grader off the victim. 911 was called and the paramedics responded. They performed CPR on the victim, however he did not respond and was pronounced dead by the paramedics.

CAUSE OF DEATH

The cause of death, according to the death certificate, was multiple blunt traumatic injuries.

RECOMMENDATIONS / DISCUSSION

Recommendation #1: Ensure the present language in the company policy on working in close proximity to moving heavy equipment is adequate and applicable to all known situations and hazards.

Discussion: The employer of the victim had a policy regarding working in close proximity to moving heavy equipment. The policy was to always make eye contact with the operator whenever entering the immediate work zone of the equipment so the operator is aware of your presence. The policy made no mention on proper protocol to follow when the equipment entered someone else's work area. On the day of the incident, the operator was initially aware of his crew's location and the crew was aware of the operator's direction of travel, however, when conditions changed, everyone failed to re-establish themselves with one another. The operator assumed the laborer and grade checker were further in back of him than 20 feet when he changed his direction of travel because of the manhole. The laborer and grade checker moved from one location to another assuming they were still in a safe work area. On an active construction work site conditions constantly change and company policy needs to reflect foreseeable changes in order to protect their employees.

Recommendation #2: Ensure employees are adequately trained and that workers' achievement of skills is verified through a testing program.

Discussion: Everyone involved in this incident was familiar with each other's work habits. Having worked as a crew together for the past nine days, they formulated assumptions as to what each other's move would be. The type of work being performed was routine for this profession and usually followed a repetitive pattern. When that routine changed because of the manhole cover, then everyone involved should been made aware of that change and adjusted their work accordingly. This did not happen. A formalized training and testing program would ensure employers that safety would precede routine work assignments. Employers can ensure worker compliance with safe work practices through programs of training, supervision, safe work recognition, and progressive disciplinary measures.

Recommendation #3: Consider using additional safety devices for heavy equipment to warn workers of a backing vehicle and to warn drivers when someone is in their blind spot.

Discussion: Workers on construction sites often work in close proximity to moving heavy equipment. Being exposed on a daily basis to the noise and warning devices of backing equipment can desensitize individuals to the presence of such vehicles. Other devices such as a strobe light or different noises should be considered as additions to the standard back-up alarm to warn workers of a backing vehicle. There are also devices available that can detect the presence of persons in the blind spots of vehicles and provide a warning to the driver. Two-way radios issued to all equipment operators might also help warning each other of impending danger. These additions should be considered especially when the standard practice has failed.

Recommendation #4: Consider installing equipment on graders that would incorporate the use of a laser, GPS, or sonic guided grading system.

Discussion: There are companies today that manufacture devices, utilizing the latest advances in laser, GPS, and sonic technology, which can be retrofitted to just about any piece of heavy equipment, regardless of the age. By using some of this technology, companies can increase their capacity, and perform grading tasks without the use of grade checkers. This not only is a cost savings, but also enhances the safety on the job site by reducing employee exposure. Had this type of technology been used on this jobsite, this incident might have been prevented.

RESOURCES

1. California Code of Regulations, Vol. 9, Title 8, Subchapter 4, Article 10, Sections 1511(a), 1592(a), 1593(d).

2. http://www.forester.net/gx_0105_laser.html

FATALITY ASSESSMENT AND CONTROL EVALUATION PROGRAM

The California Department of Health Services, in cooperation with the California Public Health Institute, and the National Institute for Occupational Safety and Health (NIOSH), conducts investigations on work-related fatalities. The goal of this program, known as the California Fatality Assessment and Control Evaluation (CA/FACE), is to prevent fatal work injuries in the future. CA/FACE aims to achieve this goal by studying the work 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.

NIOSH funded state-based FACE programs include: Alaska, California, Iowa, Kentucky, Maryland, Massachusetts, Maryland, Minnesota, Nebraska, New Jersey, New York, Ohio, Oklahoma, Texas, Washington, West Virginia, and Wisconsin.

To contact California State FACE program personnel regarding State-based FACE reports, please use information listed on the Contact Sheet on the NIOSH FACE website. Please contact In-house FACE program personnel regarding In-house FACE reports and to gain assistance when State-FACE program personnel cannot be reached.