Hispanic Construction Worker Dies While Operating Ride-On Roller/Compactor - South Carolina

NIOSH In-house FACE Report 2007-06

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Summary

On March 19, 2007, an 18-year-old male Hispanic construction worker (the victim) died from crushing injuries suffered when the roller/compactor he was operating on uneven soil overturned and fell onto him after he was ejected from the operators cab. The site the victim was compacting had previously failed a soil compaction inspection and the victim was hired to re-compact several areas for repeat soil compaction testing. It was the victims second day on the job with little training on operating the roller/compactor.

The victim had just finished compacting one plot and was moving to the next. The plots were side-by-side, consisting of compacted dirt bounded by un-compacted dirt. Flush with the side of one of the plots was a steep incline of un-compacted dirt. The rollover was not witnessed, but evidence suggests the victim was not wearing his seatbelt and was ejected from the operators cab. A coworker noticed the overturned roller/compactor and sought help from the foreman. Emergency Medical Service (EMS) was called. EMS personnel arrived within 15 minutes and pronounced the victim dead at the scene.

NIOSH investigators concluded that, in order to prevent future rollover fatalities, construction companies should:

- provide supervision for new employees doing unfamiliar tasks
- ensure proper assessment and training of the employees in safely performing job tasks

- develop a site-specific safety plan
- develop and implement a comprehensive safety program that addresses hazard recognition and the avoidance of unsafe conditions
- provide safety training in language(s) and literacy level(s) of all employees

Introduction

On March 19, 2007, an 18-year-old male Hispanic construction worker (the victim) died from being crushed when the roller/compactor he was operating overturned on uneven soil. On July 24, 2007, officials of the South Carolina Occupational Safety & Health Administration (SCOSHA) notified the Division of Safety Research (DSR) of the incident. On September 11, 2007, a DSR senior investigator and an Epidemic Intelligence Service (EIS) officer conducted an investigation of the incident. The incident was reviewed with the SCOSHA officials who conducted the investigation shortly after the incident occurred. A meeting with the South Carolina Wage and Hours Board and the police report provided further review of the incident. Details on the official cause of death were provided by the Coroners incident report. Representatives from the construction company declined to be interviewed. Photographs of the construction scene and the victim taken by the city police department were reviewed.

Employer

The employer is a company that has specialized in earth moving and excavations since 1971. It is an established contractor in the field of moving dirt and fine grading and employs more than 50 workers. The fleet of approximately 70 machines the company owns and operates includes scrapers, excavators, dozers, motor graders and articulated trucks. Applicants for work in this company are given the option of filling out forms in English or Spanish, however only documents in English are currently available at their website. Similarly, employee handbooks which discuss the companys safety policy are currently available only in English. The foreman and the two project managers (supervisors who interacted with the victim) spoke only English. Translating was done through a Hispanic co-worker whose fluency and literacy in English were not formally assessed.

Prior to the fatality, the small company had the basic elements of a safety program. There were monthly meetings conducted in English with employees and management to discuss safety practices, daily inspections at the worksites, a progressive disciplinary system, first aid supplies and safety and hazard training. There was no operating manual for the compactor/roller available to the victim.

Victim

The victim was originally from Chiapas, Mexico and had traveled to the U.S. within months before the fatality to meet his brother and find work. Previous to this job, he worked at a chicken processing plant for almost 2 months. He had heard from a friend working at a local construction company that there was a need for two individuals to be hired to finish a residential job constructing townhouses. He and another peer from Mexico were recruited, visited the site of their future employer for the first time on Friday, March 16, 2007, were hired and began work that same day. The victims literacy level in English or Spanish was not assessed; he was described by his employers as needing a translator to understand English. A Mexican birth certificate stated he was 18 years old. The police report listed his height as 56 and weighing 145 pounds.

Environment

The work environment was characterized by arriving at the worksite in the morning, punching a time clock, and having a 15-minute mid-morning break, an unpaid lunch break at the site, and a 15-minute mid-afternoon break. The machinery was at the worksite, and workers were given a job task and expected to function independently. Workers were encouraged (per the written employee handbook in English) to ask if they had any questions about a task or needed any additional equipment or instruction to complete a task.

Investigation

On Friday, March 16, 2007, the victim completed his paperwork, was officially hired and taken around the construction site by the project manager for a brief orientation. The victim was informed his job tasks were to shovel dirt and roll the edges of foundations in order to pass a compaction inspection conducted by a soil technician. A previous inspection had failed to meet industry standards for dirt compaction. A project manager who spoke only English, not the foreman, asked the victim to observe a coworker compacting the soil, and to then mimic that work on the roller as training. During the training process the victim was wearing his seatbelt in the cab while operating the roller. The friend/coworker who trained him reported the victim claimed he already knew how to sufficiently work the roller. He was not given any further training on the machine, no operating manuals were provided to him, and there was no direct communication with him in Spanish by anyone other than his friend/co-worker who translated. At the end of the work day, he was told to return on Monday morning and that he would be expected, with his coworker, to finish compacting the residential areas plots to get them ready for re-inspection.

On Monday, March 19, 2007, the victim began his workday shoveling dirt. He continued this task successfully until lunchtime when he took his 30 minute lunch break. After lunchtime he started work with the roller. The manufacturers operators manual states that the roller should not be operated on an incline of more than 17 degrees. There were 11 plots that needed further

compacting. The victim and his friend/coworker climbed onto their rollers and drove to plots 48-51. The victim successfully completed his task for plot 48. He then attempted to complete his task for plot 49. At plot 49 there was an area of non-compacted soil that was at a 45 degree incline from the compacted soil which made up the foundation for a future townhouse. At this time the victim was not observed by any supervisors as the foreman periodically left the site to retrieve parts and the project manager was elsewhere on the site. The friend/coworker was working on plots 50-51 and did not have a continuous, direct line of sight of the victim. The soil technician had arrived at 1:30pm to begin evaluating the soil.

The friend/coworker was concerned about the edge of the foundation (at a rise in elevation at 6 feet relative to the rest of the construction site that would have created a downward slope of around 45 degrees) at plot 49. The incident was not witnessed. Roller tracks showed that the victim must have approached the foundation pad by maneuvering the roller too far onto the non-compacted soil while still partly on the compacted soil. This caused the roller, which has a center of gravity that is not compatible with such positioning, to overturn in the direction of the non-compacted soil and land near the bottom of the slope. Evidence suggests that the victim was not wearing his seatbelt when this occurred: the seatbelt was equipped with an interlock that allowed the roller to run only when the seatbelt was buckled together. The seatbelt must have been fastened for the roller to be operational. Police photographs showed the seatbelts fastened after the roller overturned. The seatbelt buckles were likely clipped together around the operators seat and the victim was sitting on it while operating the machine. He was ejected from the roller, landed face down on the ground of the non-compacted soil further down the slope, and the roll bar of the roller/compactor landed across the victims back. The weight of the roller crushed the victim. At approximately 2:15pm, the friend/coworker noticed the overturned roller and rushed to the aid of the victim. It is not clear if the victim was already dead or somewhat conscious. The friend/coworker got help from the foreman, who got the attention of the project manager. An excavator was brought from somewhere else on the site and was used to lift the roller off the victim to remove the crushing weight.

Emergency medical services arrived within 15 minutes and the victim was pronounced dead at the scene. The victim had noticeable bruising consistent with the outline of the roof of the vibratory roller across his back. The police and coroner interviewed the friend/coworker, the foreman and a project manager. There was no indication of alcohol or drugs having played a role in the incident. Drug tests conducted on the victims blood were negative.

Upon interviewing the company foreman present the day of the fatality, the SCOSHA compliance officer learned that the foreman usually does the hiring. The foreman reported that he likes to personally interview each candidate and assess their skills and experience. The foreman, because he did not personally hire the victim, assumed one of the project managers had given him more

comprehensive safety training. Each of the 3 managers involved with the employee thought the other had trained him. The foreman reported checking the safety equipment on the roller, including the seatbelt, and that he found them all to be working properly. Daily worksite inspections were reported as part of the safety program.

A bilingual representative from the Wage and Hours Board for South Carolina interviewed the friend/coworker in Spanish, and the foreman and one of the project managers. The representatives findings regarding the events and actions leading to the fatality coincided with what was documented in the interviews conducted by the investigators from SCOSHA. Unfortunately, after repeated attempts, the NIOSH FACE team was not able to meet with the company who employed the victim.

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Cause of Death

The Coroner listed the cause of death as crushing which led to upper body trauma.

Recommendations/Discussion

Recommendation #1: Construction companies should provide supervision of new employees doing unfamiliar tasks.

Discussion: Whether or not there is documented experience the employee performed the same job tasks in previous work, it cannot be assumed that employees are familiar with job tasks. Employers should assess new employees competency to verify skills before assigning work. In this case, the two project managers and foreman each thought the other was supervising the victim. It is crucial that upon hire a competent person[a] evaluates a new employees proficiency in operating machinery used to complete job tasks (such as the roller/compactor) before the employee is allowed to work independently.

[a] Competent person is defined by OSHA as one who is capable of identifying existing and predictable hazards in the surroundings or working conditions which are unsanitary, hazardous, or dangerous to employees, and who has the authorization to take prompt corrective measures to eliminate them.

Recommendation #2: Construction companies should ensure training of employees in safely performing job tasks.

Discussion: Employers should provide training to employees in safely performing job tasks. The victim was on his 2nd day of the job with no documented experience supporting he knew how to safely operate roller/compactors. In this case, the two project managers and foreman supervising the victim each thought the other had assessed his skills and trained him to operate the machinery. The training provided to the victim consisted of observing another employee operating a roller/compactor. Training should involve a period of ongoing assessment by a pre-designated competent person, followed by a period of instruction in how to safely perform a job task, and then a probationary period to allow the employee to acquire the experience needed to safely perform the task. The training should be in accordance with the comprehensive safety program developed under Recommendation #4 (see below). Additionally, completion of the training should be documented and signed/dated by both the supervisor, safety officer (if available) and employee.

Recommendation #3: Construction companies should develop a site-specific safety plan.

Discussion: Employers should develop and implement a site-specific safety plan detailing safe operating procedures and identifying safety hazards for all job tasks on the basis of training workers. Equipment-specific operating procedures should be incorporated into the safety plan. Specifically, manufacturers typically specify a grade limit (steepness) beyond which the equipment should not be operated; this limit should be incorporated into the safety program for every piece of operated machinery. The safety plan should be continually evaluated for changing conditions at the worksite and modified as needed. Appropriate personal protective equipment (PPE) should be provided to all workers. Only machinery equipped with fully-functioning Rollover Protective Structures, seatbelts, and other operational safety features should be used. Faulty or removed machinery safety equipment should be fixed or replaced. [1]

Recommendation #4: Construction companies should develop and implement a comprehensive safety program that addresses hazard recognition and the avoidance of unsafe conditions.

Discussion: At the time of the incident, the SCOSHA representatives noted that there was no formal training to perform the job task the victim was hired to do, nor was there a comprehensive safety program. The training the victim received involved watching and then mimicking another roller/compactor operator. The established company safety program consisted of: monthly safety meetings, daily worksite inspections, a progressive disciplinary system, and availability of first aid supplies. At the time of the investigation by NIOSH, the office manager of the company wrote a memo outlining the future comprehensive safety program. A comprehensive safety program should include hazard recognition and the avoidance of unsafe conditions with respect to site set-up, equipment operation, and the role of other site workers. At the time of the fatality, such a safety program was neither developed nor implemented.

The safety program should include provisions for the equipment operators to be trained in site-specific safety procedures, the proper use of equipment (including conducting routine operational checks), being aware of the hazards presented by the equipment and being aware of their work environment (especially when operating machinery) [1]. Specifically, equipment operators should be aware of and trained on the hazards associated with operating machinery on non-level surfaces. Furthermore, they should be trained on the importance of fastening the seatbelt and not jumping from the equipment in the event of a rollover, and in letting the seatbelt and roll bar play the role for which they were intended. It should be emphasized in such an event that knees and elbows should be kept close to the body, to hold on firmly, and lean away from the impact to avoid being crushed by the ROPS.

As important as designing and implementing a comprehensive safety program is the enforcement of knowledge gained and behaviors learned by employees as a result of such training. Just as the role of the company is to provide a comprehensive safety program, the role of the employee is to be fully compliant with safety policies. The company involved in this incident has a progressive disciplinary system where employees noncompliant with safety policies are first given a verbal warning, followed by a written warning if noncompliant a second time, and finally suspension if noncompliance persists. This is a useful way to enforce safety policies. Established (written and discussed) safety policies are needed for ensuring both employee and employer compliance with safety-promoting behaviors. Equipment operators should be required to attend safety training sessions in addition to mandatory regular use of safety equipment such as seatbelts and other personal protective equipment.

Specific to this incident, the employee was not wearing his seatbelt and operated the roller/compactor on a 45 degree incline, exceeding the 17 degree incline limit recommended by the manufacturer. Strict enforcement of the seatbelt policy could have created a safety climate at the company that fostered the correct use of safety controls, such as always fastening the seatbelt while operating the roller/compactor. Furthermore, strict enforcement of following manufacturers guidelines in the safe operation of machinery would have likely led to more extensive training and reiteration of manufacturers recommendations by supervisors and senior co-workers.

Recommendation #5: Construction companies should provide safety training in language(s) and literacy level(s) of all workers.

Discussion: In 2005, almost 25% of the construction workforce had less than a high school diploma. Among Hispanic workers, almost 55% had a high school diploma or less [2]. Since 1980 the percentage of Hispanic workers in the construction industry quadrupled to 23% in 2005. It is crucial to not only provide safety training at an appropriate literacy level but in an appropriate language. The victim spoke Spanish exclusively and his translators English-comprehension skills were not evaluated. The OSHA Hazard Communication Standard, 29 CFR 1910.1200 (h) where employers are required to

inform and train employees about hazardous chemicals in their work area also states if the same employees do not comprehend verbal English, the employer must inform and train these employees in a language which is comprehensible in order to meet the Hazard Communication Standard requirements [3]. Although this particular incident did not involve hazardous chemicals, but, rather, hazardous machinery, the concept is still applicable to this situation as safety training in the language comprehensible to the victim was needed. Furthermore, innovative and novel training methods that address the literacy issue by eliminating written tests in favor of classroom laboratories where workers can practice safety skills have been used to train workers, in addition to other nontraditional educational approaches that do not assume a certain literacy level [4].

To assist employers with this task, the Occupational Safety and Health Administration has developed the Compliance Assistance: Hispanic Employers and Workers webpage. (https://www.osha.gov/dcsp/compliance_assistance/index_hispanic.html#x93;Compliance Assistance: Hispanic Employers and Workers" webpage.) This page includes Spanish-language materials on workplace rights and responsibilities and Spanish-language outreach and training resources. The webpage also includes a list of OSHAs Hispanic/English-as-a-second-language coordinators. The Website can be accessed at https://www.osha.gov/dcsp/compliance_assistance/index_hispanic.html.

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Investigator Information

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