

## **A driller working at a west Texas oil field died when he fell from a derrick board he was standing on as it was being lifted into place by a forklift.**

**Investigation # 98TX07301**

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### **SUMMARY:**

A 42 year-old, male driller died when he fell from the derrick board he was standing on as it was being lifted into place by a forklift. The victim and a co-worker were "rigging up," assembling an oil rig at the drilling location. The workers were attempting to attach the derrick board to the mast with the mast head (crown) resting on a 25 foot stand. The victim and another employee stood on the derrick board as it was lifted into position. They were going to pin the derrick board to the mast. As they were being lifted up the derrick board was pulled off the forklift's forks by a crane's whip line and the two workers fell to the ground. The victim struck his head on a rock and died from a blunt force trauma to the head and multiple skull fractures.

The TX FACE Investigator concluded that to reduce the likelihood of similar occurrences, employers should:

- \* instruct employees that standing on a load being moved, lifted, etc., by a crane or a forklift (in this case a front-end loader equipped with forks) is an unacceptable work practice and should never be done.*
- \* perform a job safety analysis (JSA) and instruct supervisors to use the JSA as guidelines for completing a task.*
- \* establish procedures that ensure personnel and equipment are properly employed during the "rigging up" process.*
- \* ensure that safety is built into and practiced in all phases of all operations and holding those in the line of authority accountable for deviations from accepted work practices.*
- \* develop a system of successively heavier penalties for violation of safe work practices.*

## **INTRODUCTION**

On January 30, 1998, a 42 year-old, driller (the victim) died when he fell from a derrick board on which he was standing. The TX FACE program officer was notified by the area OSHA office about the incident on February 5, 1998. On February 17, 1998, the TX FACE program officer visited the job site. The safety director was interviewed. No other employees were available for interviews. The OSHA representative who conducted the investigation was contacted. No photographs or measurements were allowed to be taken at the site. The Sheriff's report and EMS report were also obtained.

The employer is an oil and gas drilling contractor, employing approximately 300 employees. Approximately 40 of those employees were of the same occupation as the victim. Fifteen employees were at the job site at the time of the incident. The company has been in business for one year. The business operates continuously throughout the year.

The employer has a safety program run by a full-time safety director. There is a written safety program in place which includes safety policies but the particular task that resulted in the fatality was not addressed in the safety program. Prior to letting a new employee start work, a mandatory eight-hour orientation program is conducted. Upon completion of the orientation, a test is administered. Safety meetings at job sites are conducted on a daily basis. Training is conducted on an annual or semiannual basis. Refresher training is also accomplished depending on the job. The methods used to conduct task specific training are classroom and on the job (OJT).

This was the first fatality experienced by the company. The victim had been working for the company for two months. The victim was recognized as a very experienced worker. Although his exact amount of experience could not be determined, a company official stated that it was at least ten years.

## **INVESTIGATION**

The oil rig was being assembled (a process commonly referred to as "rigging up") by the drilling company with the assistance of the trucking company who transported the rig to the drilling site. The drilling company has the responsibility for managing/controlling the work being performed at the site to include the rigging up process. In this incident, the tool pusher was supervising the activities which included the personnel and equipment from the trucking company. The tool pusher was on the stand used to support the mast and had his back to the operation when the incident occurred.

The type of rig being assembled had a static hook load of 1 million lbs., and a 142 foot mast. The height of the substructure (girder-like framework that rests on the ground right over the hole) was 25 feet. The substructure was assembled first. Next, the mast was attached to a special cradle on the substructure. Normally two truck-mounted cranes were used to maneuver the bottom part of the mast into position on the cradle. The crown (top) was placed on a separate 25 foot high stand.

The next procedure in the process involved attaching the derrick board to the mast. According to a company official, the accepted method for accomplishing this task, although not described in written procedures, involved attaching the derrick board to the mast when the crown is off the stand and the mast is lowered to the ground by two cranes. Normally two cranes are used to lower the mast down so that a forklift only has to raise the derrick board up less than a foot to attach the derrick board. In this case, however, two cranes were not available. Worker's used a front-end loader equipped with forks to lift the derrick. (Note: The forks on the front-end loader are not original equipment. The manufacturer of the front-end loader does not recommend their use).

The crew was going to attempt to attach the derrick board to the mast while the crown was resting on a stand. The reason for deviating from the accepted method was that a crane with sufficient lifting capacity was not available. An official from the trucking company ordered one of the two cranes on the site be relocated to another job site. The crane that was left behind had a malfunction which shut the crane down when a lift greater than 42,000 pounds was attempted. In order to support the mast off the stand and then be able to raise the mast with the derrick board attached, the crane must be able to lift more than 42,000 lbs.

The operator of the front-end loader positioned the forks underneath the derrick board. Chains were used to secure the derrick board to the forks and to the forklift. When they attempted to raise the derrick board, the board would rock forward because the bulk of the weight was on the front portion of the forks. A decision was then made to use the smaller whip line from the crane to aid in the lift and also help balance the derrick board.

The victim and another worker climbed up onto the derrick board. The forklift operator lifted them up approximately 20 feet and stopped when two workers shouted the derrick board was moving. The crane operator was also observed pointing at something. At some point a cross beam, which was chained to the forklift came apart. The derrick board was pulled forward off the forks by the whip line. The victim and another worker fell/jumped approximately 20 feet. The victim struck the back of his head on a large rock.

The volunteer EMS squad responded . They were notified at 2:14 p.m. and responded at 2:17 p.m. They arrived at the scene at 2:44 p.m. First aid was administered by EMS. The Justice of the Peace, upon arriving at the scene pronounced the victim dead at 2:50 p.m.

## **CAUSE OF DEATH**

The autopsy report listed the cause of death as a blunt force trauma to the head and multiple skull fracture. The victim had a four and a half inch long gash on the back of his head. Laying about two feet away was a large blood-stained rock.

## RECOMMENDATIONS/DISCUSSION

***Recommendation #1*** - Employers should instruct employees that standing on a load being moved, lifted, etc., by a crane or a forklift (in this case a front-end loader equipped with forks) is an unacceptable work practice and should never be done.

Discussion: OSHA standard CFR 1910.180(h)(3)(v), prohibits the practice of hoisting, lowering, swinging, or traveling while anyone is on the load or hook. The crane in this incident was assisting in the lift of the derrick board while two workers were standing on it. It is likely that the whip line from the crane exerted the force which caused the derrick board to slide off the forks.

A rough terrain forklift truck, or in this case a front-end loader that was modified by removing the front bucket and attaching forks, should not be used to lift people unless there is no other practical option. If workers are going to be lifted by a rough terrain forklift, then employers should refer to ANSI standard B56.6-1992, Safety Standard for Rough Terrain Forklift Trucks. Paragraph 5.15, Elevating Personnel. Some of the precautions mentioned include: providing a personnel platform securely attached to the lifting carriage or forks; keep the platform horizontal and never tip it forward; restraining means such as railings, chains, cable, body belts with lanyards are in place and properly used; lower platform when moving the forklift for adjustments in position; and have a trained operator in position to control the forklift.

Also, OSHA standard CFR 29, 1910.178(m)(12)(i)-(iii) may also be referred to for an acceptable practice for carrying/lifting workers with a forklift. The standard describes using an approved platform securely seated on the forks, fastened to the vertical face, and provided with handrails and toeboards.

A forklift, therefore, should only be used to move material and workers separately, but not both at the same time. Also, a front-end loader should not be modified to a forklift configuration unless authorized by the manufacture.

***Recommendation #2:*** Employers should perform a job safety analysis (JSA) and instruct supervisors to use the JSA as guidelines for completing a task.

Discussion: A JSA forces those conducting the analysis to view each operation as part of a system. In so doing, each step in the operation is assessed while consideration is paid to the relationship between steps and the interaction between workers and equipment, materials, the environment, and other workers. Other benefits include identifying hazardous conditions and potential accidents, providing information with which effective control measures can be established, determining the level of knowledge and skill as well as the physical requirements that workers need to execute specific tasks, and discovering and eliminating unsafe procedures, techniques, motions, positions and actions. A JSA can help shape decisions correctly and lead to fulfillment of the desired objectives.

**Recommendation #3: Employers should establish procedures that ensure personnel and equipment are properly employed during the “rigging up” process.**

Discussion: When two separate organizations combine their efforts in performing a task, everyone should be clear on what is required. It is no different then if all the resources belonged to one organization. The basic idea is to employ personnel and equipment in a manner which ensures the safety of the worker and the equipment involved. In other words using the right tool for the job. In this particular task, the procedure for raising the mast was known. The parties involved knew a crane was required to lower the mast, attach the derrick board, then raise the mast. The deviation occurred when one of the tools needed for the job, the crane, was no longer available. Employees in this particular case were motivated to get the job done with what was available.

**Recommendation #4 - The employer should ensure that safety is built into and practiced in all phases of all operations and holding those in the line of authority accountable for deviations from accepted work practices.**

Discussion: Safety is an acknowledged management responsibility. Admittedly, everyone has a responsibility for their own safety, as well as for the safety of others for whom their actions may have an effect. However, where work is accomplished through the organization of individuals, the safety of those individuals becomes the obligation of those in the line of authority. Holding those in authority responsible for the implementation of safety procedures is the key to success in that organization. Responsibility and accountability are the brick and mortar of organized means of accomplishing work through others (Grimaldi, Simonds, 1989).

Proper safety awareness, attitude and direction come from the top. Employees perform their tasks based on what they perceive the rewards or punishments will be. In other words, if the employees think risk-taking is acceptable, then they will devise ways to accomplish a task that may put them at great risk. They are driven by the fact that consequences of not completing the task will outweigh the possibility that their actions will result in injury or a fatality. Top management can prevent these situations from occurring by promoting an organizational culture that says safety should never be compromised.

**Recommendation #5 - The employer should develop a system of successively heavier penalties for violation of safe work practices.**

Discussion: For safety to succeed, it should be more cooperative from a worker’s standpoint then enforced by management. After all, employees should be willing to act in the interest of their own safety. Supervisors, however, are responsible for ensuring safe work practices are followed (Grimaldi, Simonds, 1989). In this situation, the supervisor allowed work to progress without having the proper equipment. The crane operator from the trucking company could also have stopped the operation.

Employers must send a clear message to everyone, employees and supervisors, that all safety regulations and instructions are expected to be followed. Safety regulations must be taken just as seriously as any other company directive. The message should also include the fact safety

measures, written or unwritten, are part of the requirements for performing jobs.

As a last resort, employers should use a system of successively heavier penalties for violation of safe work practices. For example, the first clear and deliberate violation may bring an official reprimand; the second, a short layoff; the third dismissal (Grimaldi, Simonds, 1989).

## **REFERENCES**

1. 29 CFR 1910.178 (m) Code of Federal Regulations, Washington, D.C.: U.S. Government Printing Office, Office of the Federal Register.
2. 29 CFR 1910.180 (h)(3)(v) Code of Federal Regulations, Washington, D.C.: U.S. Government Printing Office, Office of the Federal Register.
3. ANSI B56.6 - 1992 American National Standard, The American Society of Mechanical Engineers, United Engineering Center
4. Grimaldi, J.V., Simonds, R.H. Safety Management, 5<sup>th</sup> ed. Homewood, IL: Irwin 1989