Oilfield Worker Struck by Drilling Block in Wyoming

SUMMARY

A 39 year old male chain hand died when he was struck by a travelling block that had fallen from a height of 40', striking him in the pelvic area. A co-worker operating the draw works heard a "pop", and engaged both the hand brake and the electrical brake in an ttempt to keep the block from falling. He yelled to the crew to clear the area. Two co-workers successfully moved out of danger behind 90' stands that were to the right of the downhole. The victim, while trying to get away by running toward the doghouse (drillers' office), was struck and crushed beneath the 12,000 pound block and hook assembly.

The rig site is located over 35 miles from the nearest sheriff or ambulance service, and is accessible through a combination of Interstate, Primary, County, ranch, and oilfield roads. Medically trained oil rig personnel responded from a rig site within four miles of the incident, and ambulance personnel arrived 45 minutes after the incident had occurred.

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

- **Assure that the crown block/traveling block arrangement is secured against failure and that braking systems and cables are secure and in good working condition.**
- **Provide for ample checks of equipment and systems**
- **Provide adequate training for personnel in high-risk areas.**

INTRODUCTION

On a Wednesday morning, July 8, 1992, the victim and his co-workers were on the floor of a drill rig in a remote desert area of the state, involved in the task of tripping pipe. Another crew member was operating the draw works when the traveling block fell from a height of approximately 40'. The drawworks operator warned the crew to clear the area and they tried to move out of danger.

INVESTIGATION

Through reciprocal notification agreements with the OSHA Administrator of the Wyoming Department of Employment, the WY-FACE Project was notified of this incident on the morning of July 10, 1992. Communications were established with the employer and with ambulance personnel. Pertinent reports were requested and received from the county sheriff and coroner.

Formal safety meetings which are routinely conducted on a weekly basis, had not been held since operation began on the new hole (spudding in). Although the victim had been employed for this job for little over a month, he had worked for the company on three previous jobs, was considered to be a safe worker and experienced in tripping and other oil rig operations.

The task being conducted was tripping (the process of pulling the drill pipe out of the hole, making adjustments as required, and returning the pipe into the hole) to retrieve a cone-shaped cutter that had dislodged from the drilling bit. During a round trip over the previous 18 hours from a 12,000' depth and an overnight return trip to near the 9000' level, there had been no problems reported with either the drawworks or the braking system. The final stage was for the day crew to continue tripping in, and the victim's job was to throw the spinning chain around the pipe being connected to a stand that is currently in place, and use the chain to start pipe rotation. That joint is then tightened with tongs, and the pipe is lowered into he hole.

Mechanical inspection of the drawworks and braking system found the electrical brake system was mechanically and electrically within functional limits and fully operational. There was some indication that the hand brake shaft key slot, the fulcrum key slot and the key had excessive wear, which may have caused a glazing on the brake pads. Investigations conducted for Wyoming OSHA said the wear was not causative, but was repaired as a preventive measure.

When the traveling block began falling, the drawworks operator heard an unexplained noise that he described as a "pop", and the drill pipe being lowered into the hole increased in speed. He then engaged the electrical brake, "leaned hard" on the hand brake, and called a warning to the three workers on the rig floor. Two of the workers ran behind the stands of pipe that had not yet been lowered into the downhole, while the victim ran toward the drillers' office for protection.

The assembled traveling block and hook weighs approximately 12,000 lbs. and was connected to 100 stands of drill pipe, bringing the total weight to approximately 185,000 lbs. There was approximately 40' of drill pipe from the elevators to the rotary table when the speed began to increase, and from 3 to 5 seconds elapsed from the time the speed increased to the time when they hit the drilling floor. The hook fell across the front of the victim's upper legs, causing almost complete amputation and splitting the pelvic area open. There was a 12" long indentation into the rig floor where the hook had landed. The victim was struck some 8 to 10' from the spot where he had been standing when the warning was issued.

The victim had been employed by the company for slightly over a month, but had worked for them on three previous occasions and was experienced in tripping pipe, and in other oil rig operations. He was recognized as an above-average worker and was considered by his peers to be a safe worker.

The job involved tripping pipe to retrieve a lost cone. An earlier crew had tripped out of the hole from a depth of over 12,000' to attach a magnet which was then tripped back into the hole. A second crew had retrieved the cone during the night, tripped back out of the hole, attached a new bit to the drilling string, and begun tripping back in. During that process, they had cut 100' of drilling line. The victim and co-workers surrounded the down hole on the rig floor while the pipe was being lowered into the hole. As a new stand of pipe was attached to the length of pipe already in the hole, the victim's job was to apply a spinning chain and rotate the pipe, to tighten the joint that connects it to the pipe in the downhole.

The drilling operation is in a badlands area in the southwestern part of the state. The rig included a derrick atop a downhole, with a cable connected crown block/travelling block system attached to elevators for purposes of lifting and lowering casing or drill pipe. The five-man crew on duty consisted

of a driller (who was operating the drawworks), a derrick man (inserting pipe into the elevator 80 feet above the rig floor) and three floor workers. The five men were supervised by a rig superintendent who was also at the site, but not on the rig floor. At the time of the incident, 99-90' stands of pipe had already been lowered into the downhole, and the 100th stand had been attached and was being lowered. An additional 34 stands of pipe to the right of the downhole were ready for connection and insertion into the hole.

The victim was standing with co-workers on the rig floor, watching the pipe being lowered when a warning was issued that the travelling block was falling. He, along with the others, tried to escape the object, but was struck in the abdomen, knocking him to the floor and pinning him there. Other workers were within range of audio/ visual contact. The worker on the drawworks called a warning, and all three of the men on the rig floor ran to safety. Two escaped injury, and the third was struck by the falling block.

The victim was killed instantly from exsanguination caused by lacerations and fractures of the pelvis due to crushing impact to the lower trunk and extremities. The rig supervisor called the Sheriff's Department for help, and also requested assistance from medically trained personnel at a rig a few miles from the scene. The hook was lifted off the victim, and a deputy sheriff, arriving about 39 minutes after notification, could find no pulse. EMTs arrived approximately 5½ minutes after the deputy. Blood and urine tests on the deceased showed no alcohol or drugs present at the time of the incident. Coroner's findings were that more immediate medical treatment would not have saved the victim.

The rig operation was shut down pending OSHA investigation. Under OSHA supervision, the block was restrung and put into operation where the braking system was determined to be working properly. Inspection of the brake system found mechanical and electrical operation to be within functional limits. Excessive wear was noted on the key, shaft key slot and fulcrum key slot of the hand brake, which may have prevented the brake pads from properly disengaging from the drum; a situation which could create a glazing effect over time.

The rig was equipped with forgiving surfaces, safety nets, automatic oxygen and a shower/eyewash area. The victim was wearing the required safety equipment of hard hat and hard toed shoes. An additional finding was that neither safety belts nor tie-ons were being used by persons working 10' or more above the rig floor, as required by OSHA standards. While this finding had no bearing on the incident that occurred, or on it's severity, the practice poses unnecessary risk for derrick workers.

CAUSE OF DEATH

The Medical Examiner listed the cause of death as Exsanguination due to pelvis fractures.

RECOMMENDATIONS/DISCUSSION

This incident could have been prevented if operation of the braking system had performed as expected. It could also have been less severe if the victim had run in another direction to avoid contact; but it is not practical to expect that a worker should make that clear, analytical decision under such emergency

conditions. Under the circumstances that existed, the victim followed the most reasonable escape procedures that he could have known to be available.

Whether conducting the normal weekly safety meeting would have directly prevented this incident is questionable, but there remains the potential that employees are more prepared for emergencies when they have been recently reminded of the risks involved. A meeting of this type may well have been a catalyst for a closer inspection of potential brake-release problems or of increased caution on the part of the drawworks operator or the floor workers.

It would be to the company's advantage to re-institute and use consistently, a formal weekly safety meeting to be available to and attended by each worker at every rig site. In addition, each new hire should receive formal training in regard to the job assigned. There is value to the policy of "go slow with them, keep an eye on them, and help them get the feel of the job", but it should not be exclusive of formalized training on procedure and safety.

It would be to the company's advantage to develop and to make available to all employees and supervisors, a comprehensive site safety program to include factor analysis of any potential hazards that may be created or enhanced by equipment or human error in the event of emergency or unexpected conditions, as well as an analysis of factors that might be subject to mechanical or human error under normal conditions. Safety procedures should be available under a system to review and upgrade existing safety measures by systematic investigation of all elements of process hardware and design, of working conditions and job elements that might result in human error or hazardous event sequences, and of system notification procedures to initiate corrective actions.

It would be to the company's advantage to review all policies and to enforce those policies for the safety of all employees and supervisors. Safety violations, whether or not they affected the outcome of this incident, should not be tolerated by the company or by its employees.

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
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Cheyenne, WY 82002
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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.