

## Fatality at Drilling Rig during pipe breaking – a case study

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A Major accident took place at a Deep Drilling onland Rig during drill pipe stand breaking operation. A drilling operational person, who was working at rig floor for drill pipe stands breaking operation was hit on the back side of his head by the stepping board which fell down during drill pipe stands breaking operation. The injured person was immediately shifted to the hospital where his brain surgery was carried out. The injured person had suffered injuries in the back bone, in the ribs and in the head. The injured person was ultimately succumbed to his injuries.

### Brief Description

A deep drilling rig was deployed at an onland location to drill a development well. The well was drilled to target depth, 51/2" production casing was lowered to bottom and cemented. There was around 700M of 2 7/8" tubing in the well and the tubing string was resting on elevator on the rotary table. The rig was waiting for Logging unit. It was decided to break 5" drill pipe stands (which were lying on the derrick floor stacking area) during the waiting period for productive utilization of waiting time. The first stand was picked up and broken into singles and laid down. Second stand was latched in the elevator and picked up to lower into the mouse hole for breaking it. While lowering the stand into the mouse hole, the Travelling block hit the stepping board and as a result the diving board got bend, the lock pins on both side of the pin (holding the stepping board with the diving board) got broken, the cleats of the stepping board came out of the pin. This caused the stepping board to fell down from a height of around 27M on to the rig floor and hit the person who was working there.

### Observations

#### Stepping board (on the derrick floor) and Monkey board

- A) Denting of bottom beam on the left side corner.
- B) Eye pads found bend outward by approx.. by 6 cm from original position.
- C) Impact mark on the right corner of the top railing pipe of the step-in-board.
- D) One sheared lock pin was found on the derrick flooe while the other could not be traced.
- E) Front end of the diving board bent downwards by about 1/2 ft.
- F) The attaching pin of the diving board and step-in-board was found deformed at both ends.
- G) Off-driller side I beam corner of diving board damaged / dented.

A railing of 2" pipe and about one meter height was erected around the three sides of the step-in-board which was not in the original design of the step-in-board.

While the pipe was lowered into the mouse hole, the derrick man noticed that the diving board has bent downwards. He jumped on the driller side fingers platform to escape from falling down. He also observed that the step-in-board got detached from the diving doard and fell on the rig floor.

#### Analysis for ascertaining root cause of the incident:

- The drilling rig was waiting for logging unit after hermetical testing of the well. About 700 meter of production tubing was lowered in the well. The rig crew then started to break drill pipe stands lying on the setback spreader using mouse hole to utilize the waiting time. Before starting the drill pipe stand breaking, it has to be ensured that the axis of inclined stand and mouse hole casing should fall in the same line. Thread protector should have been put on pin of lower shoulder joint to guide and ease the pipe entry into the mouse hole.
- After latching the drill pipe stand in the elevator, the step-in-board was not folded by the derrick man who was working on the monkey board. During pushing the hanging drill pipe stand into the mouse hole, the travelling block and hook assembly have the tendency to swing and lean towards monkey board side. Also, the horizontal separation between travelling block and step-in-board is approximately 1.5 feet
- During lowering of the travelling block to put the drill pipe stand in mouse hole, the driller was not monitoring the movement of the travelling block. The driller have to monitor the movement of the travelling block till it crosses the monkey board level to ensure that it is not touching the step-in board / monkey board.
- There was no effective communication between driller and the derrick man who was working on the monkey board.
- Railing was erected around three sides of the step-in-board, which is a wrong practice. It is not recommended by OEM and international safe practices.
- The step-in-board was not folded after latching the drill pipe stand in the elevator.

#### Recommendations:

- The driller must monitor the vertical movement of the travelling block till it crosses the monkey board level.
- There should be an effective communication between the driller and the derrick man working on the monkey board.
- Erection of railing around the Step-in-board is not recommended. After latching and unlatching the elevator, the step-in-board must be in folded position.
- The long pin which attaches the step-in-board with diving board and its lock pins should be checked regularly for any wear & tear. It should be ensured that the pin & lock pins should be as per the OEM specifications.