तेल उद्योग सुरक्षा निदेशालय
Oil Industry Safety Directorate
ISO 9001:2015 certified

CASE STUDY

OISD/CS/2021-22/E&P/07 Dt.: 15.03.2022

INTRODUCTION

Title: Fall of The Travelling Block
Location: On-land Drilling Location
Loss/ Outcome: Loss of life and equipment damage

BRIEF OF INCIDENT

In the night shift open end drill pipe was run up to desired depth to place repeat cement plug and the well was kept under circulation prior to cement plug job. In the day shift, only four drilling crew reported for duty. Preparation for cement job was underway mean while well was continuously kept under circulation at the same place without any movement of drill string. Installation manager (victim) came to rig floor and asked assistant shift-in-charge, who was working as shift-in-charge and two other drilling crew to go for lunch as after that pulling out of drill pipe was planned after the placement of cement plug. Then Installation manager asked shift driller to reciprocate the string. Shift driller who was working at the brake engaged low clutch and pressed foot peddle, drill string went up to 5 meter and after that suddenly started falling. He disengaged low clutch and applied mechanical brake and at the same time applied auxiliary (disc) brake to stop falling of travelling block, which did not work and mechanical brake was unable to stop movement of free falling travelling block. Victim after seeing this came to help him in applying mechanical brake; they together pressed mechanical brake but were unable to stop. Upper Kelly cock hit Kelly bushing and bell got disengaged from hook, resulting in falling of travelling block on rig floor. Elevator link hit driller console and poles supporting an overhead temporary iron sheet shed. Victim fell down on rig floor and trapped under the iron sheet and travelling block & elevator link. Shift driller also fell on other side but was unhurt. Cementing engineer, who was present on the rig floor raised alarm and rig crew came and first retrieved victim and put him into ambulance. As per eye witness, victim was found in unconscious condition and with very little breath. Ambulance along with the victim reached hospital, where he was declared brought dead.

OBSERVATIONS/ SHORTCOMINGS

Following observations were found during investigative inquiry carried out by visit of the incident site, interaction with the related officials, their written statements thereof and available documents:

- There was no alarm system for low rig air pressure, driller has to inform mechanical crew after seeing the air pressure gauge to start compressor. Loader and unloader valve system is used with compressors to maintain air pressure in normal working range.
- Compressor was running since last three hours and had a history of tripping. No person has gone to see whether this compressor had tripped or running after change-over. Mechanical Person who joined after change-over was not sure that compressor had started or tripped. He was also unable to communicate with the committee.

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- For last three days, low clutch was having problem in engaging and had been reported in the drilling Daily Progress Report. Low clutch problem was rectified and running in was completed in previous shift without any further problem.
- It was observed that auxiliary braking system was changed from eddy current braking system to disc brake type without any management of change. The potential risk of using same air power for auxiliary braking system and for emergency braking was not considered. This aspect was not brought into notice by any internal audit or corporate audit done by the company.
- Auxiliary braking system was of disc brake type operated with air but it was not built on fail safe principle.
- During close examination of accident site, it was observed independent rotary drive system console was fitted on a stand, which was placed behind the driller's position. Thus blocking escape path of driller.
- A shed was built overhead of driller's position with supporting pole and iron sheet, under which the victim was trapped.
- Management of change procedure was not followed for all the changes as described above.
- Only four out of eight drilling crew had reported for duty, which is a matter of concern. One mechanical crew was also overstaying since previous shift.
- Person operating the brake at the time of accident was not regularly working on the brake and was observed to be less proficient, he might have taken more time in reacting to the situation.
- Frequent problem in working of low clutch and compressor 'A' shows that preventive maintenance of equipment was not adequate.

ROOT CAUSE OF THE INCIDENT

- Poor co-ordination between driller and mechanical person as no one ensured whether compressor was running or not prior to start of draw works operation.
- Failure of braking system. Compressors along with storage and receiving air tank fail to supply adequate air to low clutch, disc brake and emergency brake to operate.
- Lack of alertness of driller working on brake to stop travelling block movement before it got momentum.

  Failure of braking system is the main cause of this fatal accident. Low clutch, auxiliary braking system and emergency brake failed to actuate in the absence of adequate air supply.

RECOMMENDATIONS

- Low rig air pressure alarm should be provided at driller's console. ONGC should explore possibility of interlocking clutch operation with minimum air pressure requirement.
- Draw works should be maintained as per Regulation - 42, para-f of OMR 2017
- All available compressors should be run in such a way that it ensures continuous supply of rig air at all time.
- Gaps in predictive and preventive maintenance should be identified and all effort should be taken to ensure uninterrupted services of all critical equipment.
- A committee at ONGC corporate level should be constituted to carryout comprehensive review of Rig auxiliary braking system and provision for fail safe type of braking should be explored.
- A committee should be constituted, which should identify all modification jobs done on Rigs/ Installations without approved management of change. Hazard analysis to be done for all such modifications and approval should be taken at appropriate level as per OISD-STD-178 on management of change.

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This committee should specifically review:

i. Positioning of independent rotary drive system console panel
ii. Temporary shed over driller's console

- Internal audit by ONGC needs improvement so as to capture all hazards and shortcomings. It is recommended to follow OISD-STD-145 for carrying out internal audit.
- CCTV footage should be used to identify unsafe act and condition and should be reported and compliances of same should be ensured. Internal audit team should also review CCTV footage on sample basis to identify safety non-compliances.
- ONGC should formulate a policy on minimum manning norms, below which operation should be suspended.
- Gaps in competency level of rig crew should be identified and addressed as per OISD-STD-176.

View of place of accident



Travelling Block came towards Driller



Final position of Travelling Block



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