CASE STUDY

OISD/CS/2024-25/P&E/04 Dt.:6/6/2024

INTRODUCTION

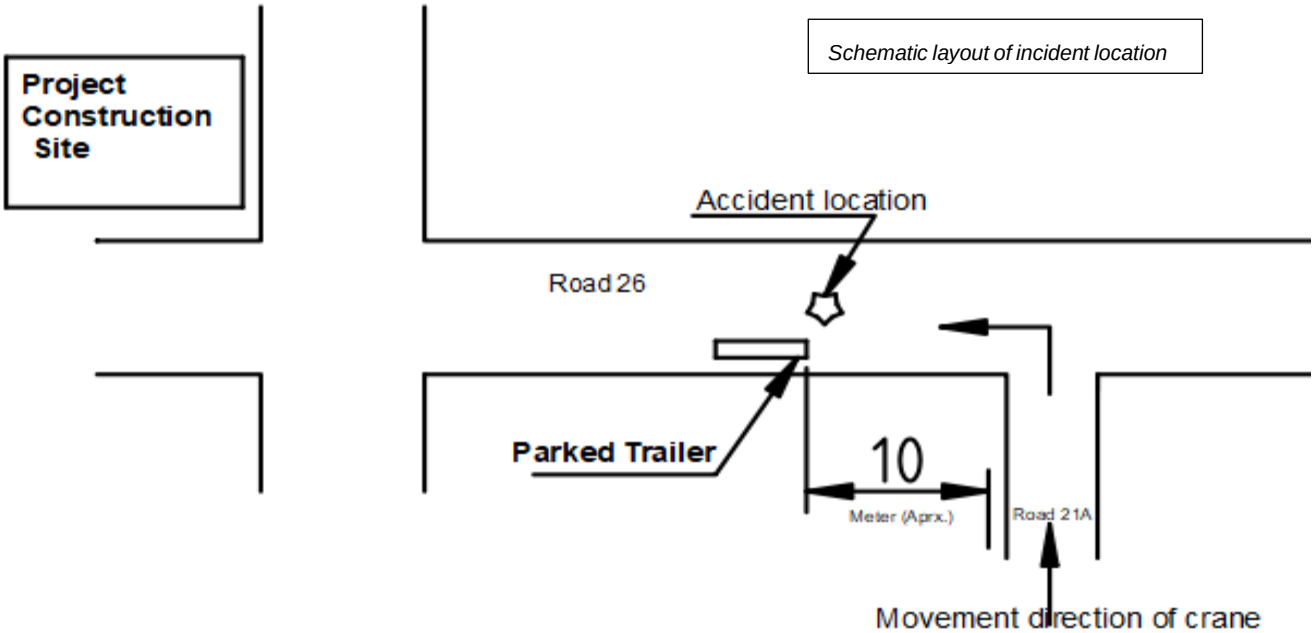
Title: Fatal accident by hook-loaded FARANA crane.

Location: Battery area of a Refinery.

Loss/ Outcome: Fatality of a contract worker.

BRIEF OF INCIDENT:

Construction of a new process unit was going on in a vacant plot in a refinery. Due to space constraint, construction material (pipe spool, structure module/ members, etc.) were kept beside a road around 200m away from the construction site. The incident occurred when a Farana crane was transporting members (C-sections of around 300kg and length of 2m max.) from the storage location to the construction site. The material was being transported hook-loaded through the battery area road. A flagman and only one rigger were assisting the crane-operator in the transportation.



At a road junction, the rigger was hit by the Farana crane. The flagman, who was marching forwards, guiding the crane operator, shouted for help. The people working in nearby area rushed to the incident site. The fire station was also informed, and ambulance reached the site. The rigger, hereinafter called as Injured Person (IP), was shifted to refinery hospital by ambulance at 13:20hrs. After IV infusion and wound dressing, IP could not survive due to profuse bleeding.

OBSERVATIONS / Lapses

- The incident site was around 10 m from the junction of 2 roads. A truck-trailer was parked on the left side of the road at the incident site. The Farana had turned left and then must have swerved slightly right due to parked truck-trailer.
- The incident happened at around 12:45hrs when most of the workers were on lunch break. Crane operator, rigger and flagman were also getting late for lunch.
- As per the statement of flagman, IP was moving on the right side of the crane holding the tag line. The flagman was looking forward and giving signals to the Farana crane operator. When he looked back towards the Farana crane, he saw the IP lying on the ground in front of the right wheel.
- As per joint statement of Site Manger and Area Manager of Project Management Consultant (PMC), referring to their investigation, IP came in proximity of Farana crane (between boom and Farana jack) and was hit by Farana.
- As per the statement of Farana crane operator, he saw IP coming under the boom of the crane for shade, as it was hot and sunny. He also added that IP had been warned against such activity in previous instance also. Then he saw IP falling in front of the crane and immediately applied brake. He reversed the crane on indication of the flagman. He got down from the crane and found IP lying on ground, profusely bleeding from leg.
- As per the postmortem report, tyre marks were observed on IP's thigh, establishing that the IP's thigh was crushed by the Farana crane tyre.
- The Farana crane operator had inadequate experience. His crane operating license was issued just 4 months before the incident. On the contrary, as per the skill assessment record, his experience as crane operator was mentioned as 3 years. Moreover, his training credentials were not as per the requirement of project specifications.
- There were many incidents when noncompliance of safety rules was noted against the crane operator. The statements of the foreman of riggers and other crane operators depict that the crane operator was frequently violating safety norms and conducting unsafe acts.

- Lifting and carrying of hook-loaded material by Farana crane was a regular practice. PMC had issued warning to contractor and its subcontractors against such activities. Fire & Safety group of occupier had also issued emails and given presentations depicting that unsafe act of pick and carry by Farana crane were being carried out. However, these unsafe acts were not being reported in the regular web-based reporting system of the refinery, neither were their closure evident.
- The Lump-Sum Turn-Key (LSTK) contractor had developed a Standard Operating Procedure (SOP) for pick and carry activity by Farana. The SOP was not approved by Owner/ PMC. Following two points of SOP were worth noting:
  - *Farana shall not be used for long distance material shifting on the road.*
  - *Two tag lines shall be used for, while shifting the material for shorter distance and nearest area.*

  Long distance had not been defined. The Farana crane was being used for transporting around 200m. Moreover, only one tag line/ rigger was present at the time of incident. As informed the other rigger had left the refinery in the morning itself due to some urgency without informing the supervisor.
- LSTK contractor had imposed penalty on 25 occasions on the concerned subcontractor in previous one year. HSE matters were left on PMC to handle. Occupier was not involved.
- Project construction activities have been going on for 2.5 years. However, the area coverage in Internal Safety Audit (ISA) was not evident. No CCTV footage was available.

PROBABLE REASON OF FAILURE / ROOT CAUSE

- Inadequate experience of crane operator coupled with possibility of driving fast as they were getting late for lunch resulted in the accident. Furthermore, the trailer parked in the Farana crane movement path deviated the movement, leading to the accident. During left turn at junction followed by taking slight right due to the parked truck-trailer, the load might have swung and IP, being only rigger, could not handle the swinging load and fell in front of the Farana crane.
- Shifting of hook loaded material for a long distance by Farana crane.
- Though, the HSE policies and manuals were available but implementation at ground was lacking inspite of raising the deficiencies and cautioning by means of penalising.

RECOMMENDATIONS

- Vehicles/ trailers shall be parked in designated locations to prevent obstruction of other vehicle movement/ emergency vehicle movement.
- Crane (inclusive of Farana/ Hydra) should not be used for transportation of hook loaded materials in line with Cl. 5.1.9 of OISD-GDN-192.
- Two tag lines shall be used along with two riggers for material movement (only for short distance in exceptional conditions and the distance of movement permitted shall be clearly identified and documented with proper authorization).
- Crane operators shall have minimum training in line with Project HSE document and procedure given in IS13583. Only experienced person shall be deployed for tasks involving skills. A robust mechanism should be developed for competency assessment before deployment.
- Compliance to HSE related guidelines shall be ensured. Any deviation shall be brought to the notice of all concerned. Unsafe Acts/ unsafe conditions to be reported and tracked in addition to near misses.
- Jobs shall be carried out with supervision and shall not be carried out during recess/ absence of adequate manpower.

- CCTV shall be provided at strategic locations with adequate recording facilities. Footage shall be scrutinised/ Artificial Intelligence (AI) techniques to be adopted to identify unsafe acts/conditions and corrective measures taken thereof.
- Appropriate corrective action shall be taken for deviations and penalties shall be imposed for repeat violation. Strict action shall be initiated after repeat penalties or not heeding to warnings. Organization should develop a zero-tolerance policy for operational lapses and fix responsibility on all persons responsible for the lapses and initiate departmental action against them.

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