Learning from Incidents
Safety Alert from Safety Engineers Association (SEA)

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Title: Fatal Incident due to Hydra Crane Toppling

What Happened

A hydra crane got toppled inside a refinery plant where it was engaged for shifting jib of a dismantled crane. Out of total 08 jibs, 4 jibs were already safely dismantled & shifted to its designated location. While shifting the 5th jib, from centre of road to side shoulder of the road, it got imbalanced & toppled. The operator could not able to come out and got trapped, received severe injury and lost his life during treatment.

Observations / Shortcomings

⇒ Hydra toppled towards right side of driving position & out of five telescopic booms, four booms of hydra were found in extended position. The door of cabin of hydra was found in open & damaged condition.

⇒ As per eyewitnesses, the body of operator was trapped under cabin of hydra barring his shoulder & head.

⇒ The lifting load was of 2.3 MT & the safe lifting capacity at boom radius of 8.5m was around 2.43 MT. The load lifted by crane was almost same to its SWL.

⇒ Work permit was taken for the work / activity.

⇒ As per weather condition record of the day, the weather was normal (Temp: 32°C) & wind speed was 6 Km/Hr.

⇒ Inbuilt fixed counterweight of 06 MT was available with hydra.

⇒ Checklist of hydra confirmed healthiness of system; Moreover, this hydra was 6-month-old, second generation machine with inbuilt safety features. Safe working load indicator (SLI) was provided in cabin of hydra, however during investigation it was found in switched off condition.

Root Cause

⇒ While shifting the crane jib, the boom radius was approx. 8.5m & lifting load (2.3 MT + sling etc.) was very close to safe load (approx. 2.43 MT). While moving backward and then articulating & swinging the boom towards right, there was imbalance & eccentric loading that led to sudden toppling of the hydra.

⇒ It revealed during investigation that the operator tried to escape by opening the door & got trapped.

⇒ Trying to get out of the crane cabin due to panicky situation could be the vital reason for getting trapped in between crane body and ground level and resulted in death of the operator.

⇒ Lack of proper supervision:- availability of a competent supervisor could have prevented the incident from happening by instructing the operator to control the swinging of load and could have stopped the operator from coming out of the crane cabin during toppling of crane.

Incident Photographs

Damaged operator cabin


Toppled hydra after incident

Recommendations

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⇒ Preferably Hydra Cranes should not be used for shifting of load with boom articulation when safe load is just marginally higher than lifting load.

⇒ Rigging, shifting, fixing of load must be conducted under supervision of a competent person (rigging foreman / supervisor).

⇒ Safe load indicator must be in working condition and surprise checks shall be conducted from time to time to ensure the working of SLI.

⇒ Tag line of adequate length shall be used to balance the load (not allowing to swing) during handling by such cranes. Tagline controller / handler must maintain suitable distance (away from the crane wheel) perpendicular to crane in operation.

⇒ Human error and other unknown factor (operational error, wind load, jerk load generated due to uneven surface at working area etc.) must be considered while deciding safe working radius and SWL of the crane.