



CASE STUDY

OISD/CS/2023-24/P&E/08

Dt.: 02/08/2023

INTRODUCTION

Title: **Fatal accident during construction activity**

Location: **Refinery**

Loss/ Outcome: **Death of 1 persons**

BRIEF OF INCIDENT

As a part of a project, a pipe rack was to be built in the offsite area. Foundations of the trestles of the pipe rack were under construction. Pits of 6.2 m x 6.2 m with a depth of 4 m, from ground level, were dug to lay the raft and subsequently erect the pillar for the pipe rack. As the pits were in the mid of the dyke wall of tank, the depth of the pits from top of dyke on two sides were approximately 6 m. Absence of shoring/sloping/strutting in nearly all pits had been reported repeatedly. Job had been suspended 2 days prior to incident based on a high-level management visit and noting of absence of shoring/sloping/strutting. Consequently, two construction workers had descended to prepare sloping/shoring in one of the pits. Heavy rain had occurred till the morning hours of the day of incident. The personnel descended in the pit before noon. At around 11:50 Hrs, emergency call was raised that the mud on one side of the pit had collapsed burying the two persons. The personnel were taken out with assistance of others and after giving first aid, the injured were shifted immediately to Hospital for further treatment.

OBSERVATIONS/ SHORTCOMINGS

- It was observed that shoring was not there in the excavated pit, where accident took place. Shoring was absent even in the adjacent excavated pit. There was no proper approach to the excavated site and lot of iron rods and clamps were lying there.



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- Number of safety observation/ Near miss was reported regarding absence of sloping/benching/shoring for excavated area. Observations had been closed in the system without compliance. The requirement of the safeguards were mentioned in the JSA and in the soil test report also. In soil test report, it was mentioned that sub soil was in a very loose condition upto the depth of 12 meter and a note stating “Precaution shall be taken for slope of excavation during execution of work” was given.
- In the excavation permit the clauses of a) shoring to be provided, b) Batter the sides to 45 degrees or less, c) Means of access provided d) Barricading to be done were marked yes by the issuer although same was not complied in field.
- In the confined space entry permit also, following points to be complied prior to man entry in the pit were marked yes. However, actual compliance in field was absent.
 1. Proper means of exit/escape provided.
 2. Stand by personnel provided from process/maintenance/contractor/fire and safety dept.
 3. Attendant at man way provided for entry into confined space (2 no.)
 4. Trained attendant provided with rescue equipment/SCBA.
- During interaction it was observed that the lead safety engineer of sub-contractor was not aware about the basic safety requirements in such type of construction activities.
- Number of observations of non-compliance of safety were reported against the Contractor. Furthermore, penalty had been imposed on contractor due to noncompliance of safety.
- It was observed that no safety training being provided to the contract labour. Further, it was observed that toolbox talk was purportedly not given by either PN or PJ.

REASONS OF FAILURE/ ROOT CAUSE

Non-provision of sloping/shoring/strutting was the cause of soil collapse of one wall of the pit. The pit depth from ground level was 4 m. The mud dyke wall height was approximately 2 m. Accordingly, the effective depth of the pit bottom from top of the mud dyke was 6 m. Angle of repose was not maintained for excavation and steep vertical excavation was done. The unavailability of safeguard resulted in soil collapse of 6 m of the steep vertical mud wall instigated by the activities of the contract workers.

CONCLUSION

- Recommendations for requisite safeguards in multiple documents like JSA, soil test report, OISD standards, etc. for excavation were overlooked. Deviations reported by number of people in various forums and portals were marked as liquidated without actual compliance. Permits were issued without actual compliance in field. Improvement in behaviour of contractor in spite of strictures and penalty was missing.

RECOMMENDATIONS

- All excavation should be done as per clause no 6.1 of OISD-GDN-192 by providing shoring and strutting and maintaining angle of repose for ensuring the structural stability of the pit. Other requirements as per clause 6.1 of OISD-GDN-192 and OISD-GDN-207 should be followed during excavation work.
- Compliance of work permit system as per OISD-STD-105 to be ensured. Actual situation in field is to be verified before mentioning the conformity of stipulated conditions in the permit. The recommendations and safeguards of JSA are to be followed. Recommendations of soil test report should be followed or appropriate/alternate mitigatory measures should be ensured.

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- Accessibility to any job site should be improved for removing constraints in taking proper safeguards while conducting a job; that is in avoiding makeshift arrangements.
- Proper evaluation method for selection of contractor in terms of safety culture and awareness prior to assigning the work order should be developed and followed. Penalty system should be reviewed and made more stringent. Audit of construction sites should also be carried out.
- Management should take safety violations, incorrect closure of unsafe condition/act, issuance of incorrect work permit & inadequate supervision seriously and take necessary corrective actions for improvement.
- Management shall carry out gap analysis of the safety management system with respect to OISD-STD-206 (Revised 2023). Necessary corrective actions shall be taken as per the gap analysis recommendations. Compliance of the recommendations should be reviewed at appropriate level with a view to update the procedures/ systems and prevent incidents in future.
