Corporate Health & Safety Newsflash

Porta-Davit Failure

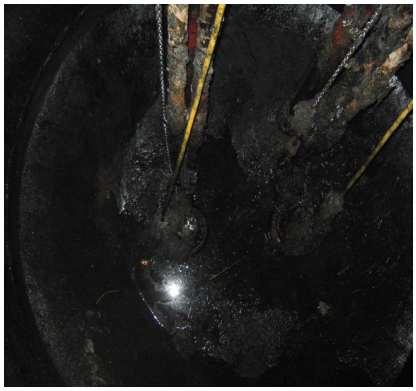
OHS/SNF/73

Incident Details

A wastewater treatment operative suffered an injury to his head when the porta-davit both he and his colleague were using to lift a submersible pump from a distribution chamber failed. As a result of this failure the top section of the davit buckled and then sheared. As it fell, the damaged section struck the injured person who was standing at the edge of the chamber.

Davit position and chamber covers

Failed Davit Arm



Wet Well guide rails

Findings from investigation

An initial investigation has highlighted a number of contributory factors relating to this incident, with the primary cause being that the porta-davit has came into contact with the raised chamber cover as the lift was being carried out. Due to the location of the davit socket, the angle of the lift has resulted in the pump locking against the guide rails as the operatives attempted to raise it. The edge of the cover has then acted as a pivot point for the top section of the davit arm resulting in excessive force being applied to the side of the davit arm, in an area not designed to cope with such pressure. This has led to the metal alloy initially buckling then shearing. An independent assessment of the failed davit has confirmed that the davit was in good condition and that there were no inherent structural faults which would have led to the davit failing prior to the lift being undertaken.

Other factors relating to this incident include:-

- The position of the davit socket used during the task is located too close to the open cover, restricting the amount of clearance that was required to ensure a safe lift.
- The davit socket was measured as being only 650mm from its centre to the top of the lifting point. This meant that the davit was being used out side of the manufacturers recommended operational design parameters of between 800mm – 1200mm radius
- The position of the davit socket has resulted in the pump being lifted at an angle, instead of the required vertical lift
- There was another davit point available which was installed during the construction of the site; however this was not used as the operatives raised safety concerns in relation to its position at the handover stage.
- The guide rails displayed signs of corrosion and a build up of and waste materials. This could have also contributed to the pump becoming jammed during the lift
- As a result of the pump becoming jammed the operative applied additional force in an attempt to free it. This force combined with the total weight of the pump and chain block brought the davit arm onto the edge of the cover creating a pressure point on the side of the davit arm

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In conclusion, this incident happened due to the combination of a poorly positioned davit socket located directly behind the open cover and the angle of the lift which prevented the free movement of the pump during the lift. These factors combined with the weight of the pump, chain block and amount of force applied by the operative as the pump jammed, meant that the davit arm was pulled forward onto the raised cover putting the davit arm under a force it was not designed for, causing it to buckle and fail.

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Actions to Prevent a Re-ocurrence

A full investigation has been undertaken that provides detailed recommendations to prevent similar incidents in future. The following points should be addressed by the relevant Managers who have teams undertaking mechanical lifting tasks as part of their duties ensure that:

- Those carrying out mechanical lifting tasks must ensure adequate clearance is available within the designated lifting zone to facilitate an unobstructed lift.
- Excessive force is not applied if the item being lifted becomes jammed. In such circumstances, a new assessment of the activity should be undertaken, and where necessary, the task should be deferred until an alternative method is identified to ensure the item can be removed safely.
- All mechanical lifting activities are carried out in such a way that the load is lifted vertically and not at an angle.
- During all mechanical lifting operations Scottish water employees wear the appropriate PPE: gloves, safety footwear and hard hats
- All lifting equipment being used has been inspected by a competent person prior to use and it is within the recommended period of inspection.
- All lifting equipment is used within the manufactures required design parameters. Advice on these parameters can be obtained from the manufacturer or supplier of the equipment
- The design of all lifting equipment for new pumping stations must comply fully with the manufacturers design criteria.

If you require any additional advice and guidance please contact a member of the Corporate Health & Safety Team