Shared Learning

COSTAIN

The Thameslink Programme Issue Date: 16th Feb 2016 - For further info contact sharon.fink@networkrail.co.uk

Issue Number: TLP051 Title: Tower Crane Dismantling

Overview of Event:

Whilst a mobile crane was being used to dismantle a tower crane (TC2) at London Bridge Station during a possession, a load (hoist drum) became unstable and inverted. As a result of the load 'inverting', objects including two 2.5m scaffold tubes, fell from the load. The scaffold tubes struck the newly installed canopy of Platform 10 and a train carriage berthed at Platform 11. There were no injury to persons. There was a high potential of injury to persons involved in the activity.

The dismantling of TC2 methodology required the mobile crane to 'take the weight' as the locating pins of the hoist drum section to the tower crane were removed. This would allow the load to then be lifted and lowered to the ground. As the final locating pin was removed the load 'sprang', inverted and the load was left suspended on two wire rope slings with the 3rd still attached but not effective (slack rope). A rigging operative directly involved had attached his lanyard to the load prior to removing the pins. As the load inverted he was taken with the load. He remained attached but was able to get himself onto another section.

General Key Messages:

- Centre of gravity should be understood and taken into account for all lifting operations
- Exclusion zones should be planned and enforced

Causes:

Incorrect slinging arrangement coupled with incorrect application of lifting force together caused the load to become unstable.

Root and Underlying Causes

Procedure: The manufacturer failed to provide sufficiently clear information in their manual on the variability of the weight of the machine platform relative to the length of rope on the hoist drum. Too much force was applied to the load. A reduced (lift) load would have been adequate to remove the securing pins; this would have allowed the level machine platform to be moved in a more controlled manner toward the centre of slew ring of the tower crane (front of counter-jib) releasing the machine platform from the C-hooks.

Training : The Appointed Person (Lifting) did not identify that the weight of the load was different to that stated in the manual – as the manual was for a set amount of rope. The actual amount of rope on the drum was less and therefore the difference in weight affected the centre of gravity of the load. This was not taken into consideration by the AP.

Communication: During the installation of a previous tower crane (TC1) it had been identified that an additional shackle was needed to allow the load to lift level. This was never onward communicated for inclusion in lift plans / briefings. Due to this lack of communication the operatives decided (incorrectly) where to introduce the shackle. The slinging arrangement was incorrect: The lifting beam was attached in the wrong configuration. This, in combination with the other vector forces being applied by the lifting operation, contributed to the shifting of the relative centre of gravity.

Design: The machine platform and counter-jib do not have proprietary designed anchor points to attach harness lanyards to. The operative attached his lanyard to the wire rope sling on the load. The lack of attachment points was a significant cause in the operative being swept off the crane by the load.

Design / Procedure: The illuminated signs on top of the crane were secured to the crane's ballast weights by scaffold tubes. This resulted in loose materials when the signs were removed. The failure to remove or safely secure these items resulted in the damage caused to railway and project assets (train and canopy) when they fell.

Photo of Event :

Actions Taken As a Result of the Investigations:

- Manufacturer requested to update their manual
- System introduced to make sure the AP takes account of weight where component parts have variances in weight
- Loads to be applied when lifted are to be documented in the methodology paperworks
- Lifting points (lugs) to be identified and marked up for future lifts
- Where additional shackles are required they are to permanently fixed to lifting slings
- All future crane installations are to have permanent / fixed signage
- Anchor points are to be identified with high visibility paint or similar and erection / dismantling work gangs are to be briefed on the clipping on system