

Shared Learning

COSTAIN
The Thameslink Programme

 Issue Date: 9th February 2018 - For further info contact sharon.fink@networkrail.co.uk

Issue Number: TLP084 Title: Vacuum Lifter Failure

Overview of Event:

Whilst a Glass Reinforced Concrete (GRC) panel was being installed at height, the vacuum lifter failed. A Spider Crane using a GSK1000 vacuum lifter (with a Safe Working Load of 600kg for a vertical load) was being used to lift the 240kg panel into position.

The panel locates on fixing arrangements, top and bottom of the panel, to the secondary structural steelwork previously installed. The GRC panel had been located onto the bottom 'J' brackets of the structural steelwork. At this stage, the vacuum lifter remains attached until the alignment of the panel is complete and the top fixings can be completed. The installation had been completed and a survey undertaken to confirm exact position. The survey identified that the panel needed to be removed to allow 1No. bottom bracket to be adjusted. In the process of removing the panel, the seal of the vacuum lifter failed and the panel tilted towards the crane coming to rest on the end of the crane jib. The operatives in the basket of a scissor Lift positioned immediately in front of the panel restrained the panel by pushing it back into the vertical position [the bottom of the panel was located preventing it from dropping].

General Key Messages:

- Lifting arrangements need to be clear, documented in a Lift Plan and carried out by competent personnel
- All equipment used for lifting requires identification and routine checks for condition
- Specialist lifting equipment i.e. vacuum lifters, should always be operated by personnel with additional training and plant familiarisation;
- On site observations of lifts should be undertaken to identify failure points

Actions Taken / To Be Taken as a Result of the Investigation:

- The continuous angle design has changed to eliminate potential proximity hazards that can result in the panel snagging underneath the angle. In areas where this cannot be removed, additional controls have been introduced. e.g. Hold Point to review Proximity Hazards.
- Only approved crane operators who have been assessed and formally approved with an appointment letter will undertake lifting with the vacuum lifter attachments. A limited number of 2 teams have been identified to carry out these tasks.
- A new Task Briefing Sheet (TBS) was produced which included prescriptive requirements for the safety critical steps of the activity e.g. Crane Supervisor to survey in detail the intended location of the panel to identify proximity hazards.
- The Lift Plan was revised to include elimination/avoidance of proximity hazards & hold point to make sure the panel fixing location is surveyed & Crane Supervisor inspects final position of GRC panel prior to lifting to identify any such hazards.
- In every case, the Supervisor or Crane Supervisor must undertake a Point of Work Risk Assessment (PoWRA) before starting the lifting operations – this will assess the actual against the planned works i.e. test if the TBS and Lift Plan are accurate. If there is any deviation from the Lift Plan, then the Appointed Person must be consulted.
- Where head and panel size allow, the use of the Hyraulica 600 will be considered in preference to the GSK 1000. The project will continue to evaluate other vacuum lifting equipment.
- Inspection and Test Plan (ITP) for installation of GRC panels to be peer reviewed to investigate opportunities to reduce the amount of lifting. Separate follow on workshop to be arranged between delivery team, quality and lifting team.
- Secondary slinging re-reviewed but found not to be practical for these installations where no-go areas can be enforced.
- The use of robotic vacuum lifting equipment to be considered for lower loads due lifting capability and reduced manual guidance of loads.

Causes:

Immediate Cause – Sudden and complete loss of suction due to the failure of the vacuum lifting device pad seal and consequent detachment of the vacuum lifting device from the load being 'lifted' [the GRC panel] following incorrect verbal instruction between Crane Supervisor and Crane Operator.

Underlying Causes :

Design - The continuous angle that was fixed to the top of the structural steel to which the panel was going to be fitted presented a hazard to lift the panel.

Training - Whilst the Crane Operator had 6 continuous months operating spider cranes, he had only 4 days {15 no. GRC panels} experience of lifting GRC panels.

Procedure - The TBS did not prescriptively set out the safety critical steps associated with panel installation there was an absence of a hold point requiring the Crane Supervisor to ensure that the fixing was free of proximity hazards {e.g. continuous channel}.

Procedure- Whilst a Lift Plan was very comprehensive and detailed it did not have the hold point requirement for the supervisor to survey the intended fixing location before lifting a panel in to place.

Procedure - A PoWRA was not done and this was a missed opportunity to identify minor changes that were required to carry out the task safely.