

Shared Learning

COSTAIN

The Thameslink Programme

Issue Date: 27th June 2016 - For further info contact sharon.fink@networkrail.co.uk
Issue Number: TLP057 Title: Escalator End Panel Fell

Overview of Event:

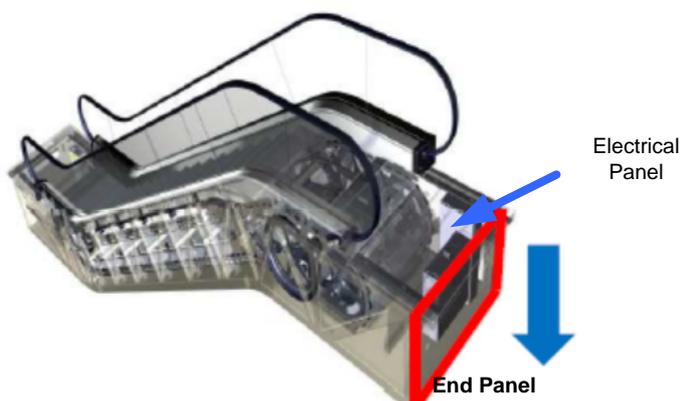
During the escalator installation process, a steel end plate at the top of the escalator being installed detached and fell 10 metres to the new concourse level below. The escalator was one of a pair being installed to provide access to platform level. Immediately prior to the plate falling, the installation team noticed it was loose. The installation supervisor was aware that other Contractors were working below (not directly) and took immediate action to inform the other Contractor's Supervisor to withdraw his men from their work area. An exclusion zone was then created using chapter 8 barriers. Within a short time (approximately 1 minute) the plate fell and struck a chapter 8 barrier cutting it in half. The end plate is a permanent component that is attached to the main structure of the escalator during manufacture. The fastenings are pop rivets. All rivets holding the end panel in place failed allowing the plate to detach. The other escalator was inspected and it was discovered that all of the rivets with the exception of 1 had also failed. This end plate was safely removed in a controlled manner. There were no injuries however there was a high potential of significant injury to persons working in and passing through the area below this activity.

General Key Messages:

- **Transport and storage of materials / equipment:** considerations should be given to the impact on materials or equipment during transportation / storage
- **Co-ordination:** works taking place on site should be co-ordinated and the transfer of risk considered and appropriate controls implemented
- **Falling materials:** appropriate exclusion zones should be established where work at height is taking place

Photo of Event :

Fig 1 Diagram of Escalator with End Plate Location Outlined in Red Arrow Shows Direction Plate Fell



Actions Taken As a Result of the Investigations:

- A secondary plate has been introduced inside the escalator frame to prevent the electrical panel exerting pressure on the end panel.
- Allen bolt fixing arrangement implemented in addition to the pop rivets.
- A pre-lift checklist and monitoring regime implemented for checking when lifting off wagons and before lifting into location.
- Project documentation updated to include specifics on inspections.
- Briefing sessions undertaken for all staff involved in the escalator works.

Causes:

Immediate Cause – Failure of pop rivet fixings that secured the top end plate to the escalator frame.

Root and Underlying Causes

Design: The design did not identify the loading on the end plate. The fixings were critical to securing the plate. During transportation and storage, the electrical control panel, weighting approx. 120kgs imposed a local load on the end panel. This load was transferred to the pop rivets, resulting in sequential failure.

Hardware: The pop rivets were not of adequate capacity to withstand the load imposed and failed.

Procedure: There was no formal inspections in place to make sure the load (the escalator) was safe to transport, store and lift into position. This inspection was not specified in any project documentation.

Training: There is no evidence of the load i.e. the end panel being checked by the Slinger / Signaller before the lifting operation. An unsafe load was therefore lifted.