Liverpool Lime Street: report and recommendations

Rail Safety and Standards Board has issued its formal inquiry report into the circumstances that led to the two instances of Pendolino trains colliding with buffer stops at Liverpool Lime Street station on 28 October and 2 November 2004.

The formal inquiry was convened under independent chairmanship and included representatives on the panel from the involved parties. As with all such inquiries the panel's task was to establish the immediate and underlying causes of the accident and make recommendations to prevent or reduce the risk of recurrence.

Sequence of events

On two separate occasions, London Euston to Liverpool Lime Street passenger trains, the 1818 hrs service on 28 October 2004 and the 0918 hrs service on 2 November 2004, collided with the buffer stops at platform 7, Liverpool Lime Street station. The trains were formed from Pendolino, ‘tilting train’ rolling stock. Both had been signalled correctly into the station and had arrived at their scheduled arrival time. As they were braking to a stop approaching the buffer stops they failed to come to rest and collided with the buffer stops at a speed of approximately 7mph, pushing the buffer stops back 5 to 6 metres before coming to rest.

A number of passengers and train crewmembers received injuries that received hospital attention, though no major injuries were reported. Both trains sustained some front-end damage in the collisions.

Conclusions

Basic cause
Both incidents were caused by the inability of the trains’ braking systems to respond immediately to a further brake demand required to bring the train to a stand following a short period of slow speed coasting during the final approach to the buffer stops.

Underlying causes
The Wheelslide Protection (WSP) system software contained an anomaly that delayed the re-application of the friction brakes following coasting when WSP activity was present at speeds of 25mph or less.

The software anomaly was present as a result of a modification to validated standard software intended to minimise wheel flat damage during WSP activity at slow speed.

The software modification was not tested in slow-speed or WSP scenario as the Group Standards which controlled vehicle acceptance did not mandate achievement of performance specifications in low adhesion conditions.

Recommendations

The report makes recommendations for improvements in a number of key areas and these are summarised as follows:

- Standards should include requirements for braking performance when WSP is active.
- Processes to ensure that changes made to safety critical software
do not introduce additional risks should be included in the current European technical standard development work.

- Standards should require the threshold speed for the change from dynamic to friction braking be set at a minimum of 25mph.
- The driver-training simulator should be provided with a simulation of an approach into a terminal platform in its suite of layout simulations.
- Staff to be made aware of action necessary to preserve on-train recorded data.
- The continuance of the temporary stop markers provided at terminal platforms as a result of these incidents to be reviewed.
- Should the use of temporary stop markers at terminal stations applicable to Pendolino Class 390 trains be continued, they should be subject to the requirements of signal sighting standards.
- Review of the process by which Late Notices are disseminated to drivers.

RSSB has issued a full copy of the report to each member of the Railway Group and the other organisations involved in the accident. All recipients of the report need to review the findings and recommendations and take actions where appropriate to address identified deficiencies within their own systems. RSSB will track the industry's response to this report.