

# Shared Learning from a Formal Investigation



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Title: Derailment of a passenger train departing Liverpool Street station, 23 January 2013

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Chair shuffle marks

## Overview of Event:

- As the departing train passed over a sharply-curved section of line (125.4m radius) within the moveable area of a switch diamond, the fastening system holding the fixed left-hand (outer) rail failed, allowing the gauge to widen. Several right-hand wheels of the train dropped into the four-foot. The majority of these wheels were re-railed after striking a fishplate at a common crossing, but the two axles remained in a derailed state until they were re-railed by riding up the heel blocks of a set of trailing points.
- After re-railing itself the train ran normally until reaching its destination, 2¾ hours later. There it was examined by a member of technical staff, who observed damage consistent with derailment. At approximately the same time Network Rail maintenance staff reported finding track damage that indicated a derailment might have occurred.

## Underlying Causes:

### Track design

- At the point of derailment the track design had several non-standard characteristics that increased the probability of track fastening system failure.

### Track recording

- The manual track geometry recording regime was inadequate in frequency, coverage, analysis and its ability to measure the layout in a dynamic state.

### Supervisors' inspections

- Supervisory and Engineer's inspections were not covering the entire track layout in sufficient detail.

### Environmental conditions

- The environmental conditions within the layout made the various inspections particularly difficult to achieve and increased the rates of deterioration of the components.

## Key Messages:

1. Track Maintenance Engineers should identify locations where non-standard or unusual track configurations may lead to increased rates of wear or failure. Inspection and maintenance staff should be briefed on particular signs to look for, and actions to take to ensure that track quality is maintained. The RAM (Track) should provide guidance and assistance as necessary.
2. Robust inspection plans must be put in place for all levels of track inspection and for geometry recording. The use of patrol diagrams is mandated by NR/L2/TRK/001 and at locations with complex track layouts it would be good practice to provide similar diagrams to ensure complete coverage by supervisory inspections, engineer's inspections, and track geometry recording. Section Managers should monitor Basic Visual Inspection to verify both compliance with the patrol diagram, and the overall quality of the inspection.
3. The results of manual track geometry recording should be subject to analysis by technically trained individuals to identify trends, repeat failures and incipient failures.
4. Track Maintenance Engineers should identify, and take action to reduce or mitigate, any environmental problems that may hinder inspection and maintenance of the track, such as poor lighting, or contamination from litter, grease, train toilet waste.