Rail Accident Investigation Branch

# Overspeeding near Manor Park, 24 September 2024

## Important safety messages

This incident demonstrates the importance of:

- transport undertakings ensuring that route risk assessments identify the opportunities needed for drivers to effectively refresh their route knowledge, particularly where there are alternative routings available
- infrastructure managers ensuring that lineside signs are positioned in the correct location and that they are visible to staff and remain legible at all times.

## Summary of the incident

At around 08:11, train reporting number 9W38, the 06:50 passenger service from Heathrow Terminal 5 to Shenfield, operated by MTR Elizabeth line, passed over a set of points east of Manor Park station, East London, while travelling at a speed of 45 mph (72 km/h). This was above the permissible maximum speed for this set of points, which is 25 mph (40 km/h). The train had been diverted to pass over this junction from its originally booked route because of a track circuit failure.

Passing over the points at this speed caused the train to jolt sideways. Although there were no reported injuries, CCTV footage from inside the train shows that the sudden movement resulted in some passengers losing their footing and that at least one passenger fell to the floor.

The train did not derail during the incident and no damage was caused to the infrastructure or to the vehicles involved. After the incident occurred the train continued on its journey.

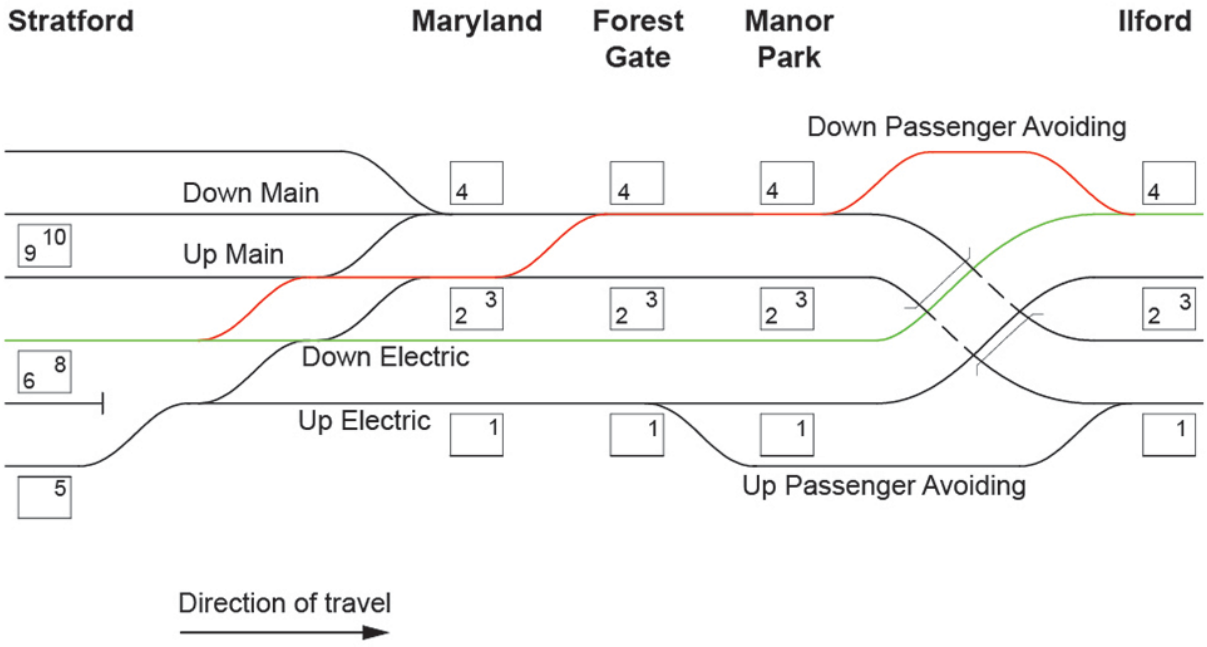
## Cause of the incident

The incident happened because the driver became confused about the train's location after being routed off its booked route. As a result, the driver did not reduce the train's speed to the 25 mph (40 km/h) limit required over the points.

The infrastructure of the Elizabeth line (other than within the Crossrail Central Operating Section) is managed and maintained by Network Rail. Signalling in the area where the overspeed took place is by lineside colour light signals. To inform drivers which route a train is going to take, some signals are fitted with route indicators. Permissible speed restrictions (PSRs), including those that apply over points at junctions, are indicated to drivers by lineside reflective speed signs. Outside of the central operating section, there is no in-cab indication given to Elizabeth line drivers about their authority to move, their route or permissible speeds.

On the day of the incident, the driver booked on for duty at 04:33 at Plumstead sidings. The train left the sidings and then formed a passenger service from Abbey Wood to Heathrow Airport before becoming train 9W38, the 06:50 passenger service from Heathrow Terminal 5 to Shenfield.

Evidence from the train's forward-facing CCTV and on-train data recorder (OTDR) shows that train 9W38 was brought to a stand at 07:51 on the approach to Stratford station at the signal protecting platform 8. The driver contacted the signaller and was informed that there was a track circuit failure ahead on the Down Electric line. The train was then routed into platform 8 at Stratford, running about 10 minutes late. Before departing the platform, the signaller informed the driver that the train would be routed onto the Down Main line and then onto the Down Passenger Avoiding line, before rejoining the Down Electric line.




**Track diagram from Stratford to Ilford, showing the booked route in green and the route of 9W38 in red. (Not to scale and simplified to remove non-relevant track.)**

The train departed Stratford station at around 07:59. On departure, the train crossed onto the Up Main line and stopped at Maryland station. It then crossed onto the Down Main line before stopping at Forest Gate station. At the next station, Manor Park, the driver entered platform 4 on the authority of a single yellow aspect. The train departed Manor Park at approximately 08:09. The next signal it encountered, signal L329, was displaying a red aspect, which cleared to a double yellow aspect as the train approached. The route indicator box displayed the letters 'DA' to inform the driver that the train was to be routed onto the Down Passenger Avoiding line ahead.

The driver believed that the train was already on the Down Passenger Avoiding line and so did not realise that there were points ahead for which the train's speed should be no more than 25 mph (40 km/h). This also meant the driver did not react to the route indicator.

Around 14 seconds after signal L329 cleared to double yellow, while approximately 330 metres on approach to the points, the driver applied power. Around 5 metres before the points, with the OTDR recording that the train was travelling at a speed of approximately 45 mph (72 km/h), the train passed an incorrectly placed, inconspicuous and dirty 25 mph (40 km/h) PSR sign indicating the speed restriction over the points leading to the Down Passenger Avoiding line.

While the recorded speed of 45 mph (72 km/h) was within the maximum permissible speed for the Down Main line (on which the train was travelling) this would have been above the maximum permissible speed of 25 mph (40 km/h) on the Down Passenger Avoiding line (which the driver believed they were already on).

The overspeed was reported to MTR control by a member of staff travelling on the train at the time of the incident. The driver felt the train jolt when it traversed the points but did not believe that this was severe enough to report. The driver continued with their shift, finishing duty at 12:09.

RIS-3702-TOM, 'Management of Route Knowledge', issue 3 dated March 2020, states that one of the most effective methods of retaining route knowledge is by working regularly over a route during normal operations. The standard also states that consideration should be given to how drivers can retain their familiarity with infrequently used routes to avoid knowledge fade. This can be achieved through route refresher training and the use of visual aids where it is not practicable to drive the routes.

Route refresher training is undertaken by drivers working for MTR Elizabeth line. RAIB found that, while this refresher training covers some less frequently used routes on the Elizabeth line, it uses facilitated briefings rather than access to driving cabs to view routes. Access to driving cabs to view a route is only provided for the high-level Liverpool Street and Paddington stations, as MTR defines those as diversionary routes.

Since their initial training, the driver had passed regular driving assessments on the route including Manor Park. The driver stated, however, that they were unfamiliar with the sequence of lines that the train had passed over and had not driven over the Down Passenger Avoiding line in the 5 years since they had completed initial driver training on the route, which had covered alternative routes through the area. In March 2024, they had successfully completed a depot and diversionary route briefing as part of their ongoing competency management. There is no record of whether the Down Passenger Avoiding line was included in this briefing.

RIS-3702-TOM requires transport undertakings to carry out risk assessments to identify the information that staff need to know to operate safely and effectively over a specific route. This is captured in a route risk assessment, which is then used as the basis for a number of considerations, including the minimum frequency that a staff member needs to operate over a route to ensure that their route knowledge does not expire.

MTR had a route risk assessment in place at the time of the incident for the Elizabeth line which included routes with low use or that are infrequently driven. The route risk assessment includes mitigations, such as route refresher training and driver competence. However, the route risk assessment did not explicitly identify the Down Passenger Avoiding line as a line with low use or that it was infrequently driven over by some drivers. MTR is currently updating its route risk assessments in response to this incident and recommendation 1 of RAIB's investigation report into the 2022 overspeeding incident at Spital Junction, RAIB report 06/2023 (see previous similar occurrences section).

To reinforce drivers' route knowledge (including alternative routes), lineside signs are provided to indicate where train speed restrictions apply and change. RAIB found that the speed restriction sign applicable to train 9W38 as it approached the diverging junction was neither in the position, nor of the design, specified in the approved installation documentation. This shows that it should have been a larger sign with a left-hand direction arrow, positioned on the approach to the bridge before the points. At the time of the incident, the sign was positioned under the bridge, and partially obscured by lineside equipment, which made it difficult to see. It was also covered in dirt, further reducing its conspicuity and legibility.

Network Rail company standard NR/L3/SIG/11303, 'Signalling installation – signals: signs and boards', issue 2 dated December 2010, states that lineside and operational signs should be positioned in accordance with the installation design. Network Rail Track Work Instruction 2L007, 'How to maintain signs', version 1 dated March 2005, also states that signs should be kept clean and in good repair.


**PSR sign before the diverging points.**

# Previous similar occurrences

A number of overspeeding incidents have previously been investigated by RAIB on mainline railways. Some of these incidents had the potential to result in derailment and serious injuries to passengers. Incidents with similarities to the one at Manor Park which were investigated by RAIB include:

- An overspeeding incident at Spital Junction, Peterborough, in 2023 (RAIB report 10/2024) where a passenger train service passed over three sets of points forming part of Spital Junction at excessive speed. The maximum permissible speed over the junction is initially 30 mph (48 km/h) reducing to 25 mph (40 km/h). The OTDR from the train showed the train reached a speed of 66 mph (106 km/h). The sideways movement of the train as it passed over the junction resulted in some passengers being thrown from their seats and receiving minor injuries. The investigation found that the driver had an expectation that the train was being routed straight ahead. RAIB made a number of recommendations, one of which is relevant to this incident. This focused on reviewing training and competence for drivers and providing training in non-technical skills and additional strategies to manage the risk encountered at signals which might show different aspects to those usually encountered.
- A previous train overspeeding incident occurred at Spital Junction in 2022 (RAIB report 06/2023) where a passenger train travelling from Newcastle to London passed over three sets of points at Spital Junction at excessive speed. The maximum permissible speed over the junction is initially 30 mph (48 km/h) reducing to 25 mph (40 km/h). The OTDR showed the train travelled over the points at a speed of 76 mph (122 km/h). The driver had an expectation that the train was being routed straight ahead rather than taking the diverging route. The RAIB recommendations from this investigation were focused on the need to identify and control the risk of trains overspeeding at junctions.
- RAIB investigated an overspeed incident at Fletton Junction near Peterborough in 2015 (RAIB report 14/2016). The train travelled over the junction at 51 mph (82 km/h) and the track layout had a permissible speed of 25 mph (40 km/h). The investigation concluded that it was likely that the train driver had forgotten about the presence of the speed restriction because they were distracted. It also found that lineside signs and in-cab warnings may have contributed to them not responding appropriately as they approached the speed restriction. There were also no engineered controls to prevent the overspeeding. Relevant RAIB recommendations focused on the need to identify locations where there is a risk that train drivers may be unaware of a speed restriction.