

# RAIB Report: Collision between passenger trains at Salisbury Tunnel Junction

October 25, 2023



RAIB has released its report into a collision between passenger trains at Salisbury Tunnel Junction, Wiltshire, 31 October 2021.

## Summary

At around 18:43 hrs on 31 October 2021, train reporting number 1L53, the 17:20 hrs South Western Railway passenger service from London Waterloo to Honiton, passed a red signal and collided with the side of train 1F30, the 17:08 hrs Great Western Railway passenger service from Portsmouth Harbour to Bristol Temple Meads. At the point of collision, train 1L53 was travelling at approximately 52 mph (84 km/h) and train 1F30 at 20 mph (32 km/h). The collision took place at Salisbury Tunnel Junction, which is on the immediate approach to Fisherton Tunnel, near Salisbury in Wiltshire.

The impact of the collision caused the front two carriages of train 1L53 and the rear two carriages of train 1F30 to derail. Both trains continued some distance into Fisherton Tunnel before they came to a stop. Thirteen passengers and one member of railway staff required treatment in hospital as a result of the accident, which also caused significant damage to the trains and railway infrastructure involved. A

potentially far more serious collision between train 1L53 and an earlier train travelling in the opposite direction was avoided by less than a minute.

The causes of the accident were that wheel/rail adhesion was very low in the area where the driver of train 1L53 applied the train's brakes, that the driver did not apply the train's brakes sufficiently early on approach to the signal protecting the junction to avoid running on to it, given the prevailing low level of adhesion, and that the braking systems of train 1L53 were unable to mitigate this very low adhesion.

The level of wheel/rail adhesion was very low due to leaf contamination on the railhead, and had been made worse by a band of drizzle that occurred immediately before the passage of train 1L53. This leaf contamination resulted from the weather conditions on the day of the accident, coupled with an increased density of vegetation in the area which had not been effectively managed by Network Rail's Wessex route. Network Rail's Wessex route had also not effectively managed the contamination on the railhead with either proactive or reactive measures.

RAIB's investigation found that a probable underlying factor was that Network Rail's Wessex route did not effectively manage the risks of low adhesion associated with the leaf fall season. RAIB also found that South Western Railway not effectively preparing its drivers for assessing and reporting low adhesion conditions was a possible underlying factor.

RAIB has also made two safety observations. These relate to the application of revised design criteria for the Train Protection and Warning System and the assessment of signal overrun risk and how this accounts for high risk of low adhesion sites. Two issues were found relating to the severity of the consequences. These were a loss of survival space in the driver's cab of train 1L53, and the jamming of internal sliding doors, which obstructed passenger evacuation routes.

Since the accident, Network Rail has reviewed its training and competence framework for off track staff at network level, and is also reviewing its adhesion management standards. Network Rail's Wessex route is reviewing its arrangements for proactively responding to reports of low adhesion, including how it undertakes railhead treatment.

South Western Railway has made changes relating to training and briefing of its drivers to ensure information on autumn arrangements has been effectively briefed and understood.

Network Rail and South Western Railway have also jointly updated their annual autumn leaf fall working arrangements to ensure that sites at high risk of low adhesion are identified, reassessed, managed and monitored.

The Rail Safety and Standards Board has revised the rail industry standard that provides guidance for the rail industry regarding the management of low adhesion. Cross-industry working groups have also issued revised guidance regarding low adhesion.

In December 2021, the safety authority for the mainline railway in Great Britain, the Office of Rail and Road, issued an improvement notice to Network Rail's Wessex route requiring it to improve its vegetation management and its assessment and control of low adhesion risks.

## Recommendations

As a result of the investigation, and accounting for the work done by the industry since the accident, RAIB has made ten recommendations. Seven of these recommendations are made to Network Rail. These relate to: a review of the processes, standards and guidance documents relating to the management of leaf fall low adhesion risk; the training and competence of staff dealing with vegetation management and seasonal delivery; responses to emerging and potential railhead low adhesion conditions; management of railhead treatment regimes; assessment of the risk of overrun at signals which have a site at high risk of low adhesion on their approach; and a review of the retrospective application of design criteria for the Train Protection and Warning System.

One recommendation is made to South Western Railway to review and improve its arrangements for training and briefing drivers to ensure that they are able to effectively identify areas of low adhesion and report them as appropriate.

One recommendation is made to the Rail Delivery Group in consultation with train operators and the Rail Safety and Standards Board regarding the review of technologies other than sanding systems and wheel slide protection to improve braking in low adhesion conditions.

One recommendation is made to Porterbrook, Eversholt and Angel Trains regarding the design of the internal sliding doors on class 158 and 159 carriages.

Andrew Hall, Chief Inspector, Rail Accident Investigation Branch said: “This was a very serious accident and the first time since our inception in 2005 that RAIB has investigated the collision of two passenger trains travelling at significant speed. Fourteen people were taken to hospital, including two who were seriously injured.

“The phrase ‘leaves on the line’ may cause some to smile. But the risks associated with leaves being crushed onto the top of rails by the pressure of trains’ wheels, resulting in a slippery layer, is very real and long known. As with many accidents, this one resulted from a combination of many different circumstances coming together, both in the time before the accident and on the day. As a result, the barriers put in place to avoid this type of event did not work effectively.

“Accidents like this are thankfully very rare, but it is vital that we learn the lessons when things do go wrong. Along with action already taken by industry, the ten recommendations we have made today will minimise the chances of an accident like this happening again.”

## Response

Claire Mann, Managing Director of South Western Railway (SWR), said: “SWR thanks RAIB for its report, which highlights the importance to the industry of the management of low adhesion during the leaf fall season and SWR welcomes the actions that Network Rail has taken in response to the recommendations made by RAIB. SWR has already reviewed its arrangements for training and briefing drivers and additional enhancements were implemented soon after the incident in 2021.

“SWR’s commitment to the safety of our customers and colleagues is our number one priority. The incident at Salisbury Tunnel Junction was a stark reminder of the challenges autumn poses to the railway and we continue to work closely with Network Rail and the wider industry to learn the lessons, continuously improve and reduce the risk of it happening again.”

Mark Killick, Network Rail Wessex Route Director, said: “The incident at Salisbury nearly two years ago will live long in our memory and our thoughts remain with those customers and colleagues involved in this accident.

“We welcome the RAIB report and accept its recommendations. We have been working closely with RAIB over the past two years to implement a number of responses following the initial findings and our own internal investigation, to make improvements in the way we manage the risk of poor rail adhesion during Autumn.

“Autumn is the railway’s most challenging season and we work closely with our industry partners to keep trains running safely and reliably. Ahead of last Autumn, we utilised train mounted high-definition cameras to complement the efforts of our fleet of specialist autumn leaf busting trains, and this year are also testing the use of drones to enhance our rail head leaf fall inspections.”

A spokesperson for the Rail Delivery Group said: “We welcome the publication of the Rail Accident Investigation Branch’s report into the incident at Salisbury Tunnel Junction, now nearly two years on from the accident.

“The Rail Delivery Group believes it is vital that lessons are learned and it is positive the report emphasises why the management of low adhesion between rails and train wheels during the leaf-fall season remains so important.

“We will reflect on the report’s findings and will work with industry partners to assist in responding to its recommendations.”

A spokesperson for Angel Trains said: “We are aware of the conclusion of RAIB’s investigation into the collision of two trains at Salisbury Tunnel Junction in 2021. We are undertaking a review of the findings and recommendations from the final report and will collaborate with other railway industry stakeholders on a response.”

*Photo and video credit: RAIB*