RAIB report 11/2017: Derailment and subsequent collision at Watford

On publication of RAIB's report concerning a derailment due to a landslip, and subsequent collision at Watford on 16 September 2016, Simon French, Chief Inspector of Rail Accidents said:

"The collision of a passenger train with a derailed train in Watford tunnel on the morning of 16 September last year serves as a reminder of why everyone in the railway industry continues to work so hard to manage risk - the collision of two trains in a tunnel is a scenario we all hoped never to witness.

"The derailment of the 06:19 service from Milton Keynes could so easily have led to a catastrophic sequence of events were it not for two notable factors. The first was the sheer professionalism of the driver who, within moments of becoming derailed, had the presence of mind to apply the brake and then transmit an emergency message using the train's 'GSM-R' radio. His actions alerted the driver of a train approaching in the opposite direction who immediately applied the brake. As a consequence, the northbound train had reduced speed from 79 to 34 mph before striking the derailed train a glancing blow. This reduction in speed may well have made a big difference to the eventual outcome.

"The second mitigating factor was the slotting of one rail of the track in the gap between a gearbox and a traction motor on three of the axles, so preventing the derailed train deviating any further into the path of the approaching train. This unintended consequence of the train's design probably made the difference between a glancing blow and something closer to a head-on collision.

"We've seen this before – RAIB has previously observed trains staying in line following a derailment due to the configuration of bogie mounted equipment. Examples in the UK include derailments at Moy in 2005, Duncraig in 2007, Ardnarff in 2008, Barrow upon Soar in 2008 and Clarborough tunnel in 2010. International examples include the derailment of a Japanese Shinkansen at 204 km/h following an earthquake in 2004 (all Shinkansen trains were subsequently fitted with guide brackets to enhance the chance of effective guidance following a derailment) and a 270 km/h derailment of a high speed train in Taiwan in 2010. I am also aware that certain high speed lines, such as HS1, already have infrastructure features designed to reduce the likelihood of secondary collision in a double track tunnel.

"We continue to urge the rail industry to carry out research into design features that may limit deviation of the bogies from the track during derailment, and to think about ways that such features can be specified in future builds of trains. Modern passenger trains have tended to perform well when derailed, and this is often due to guidance provided by elements of bogie mounted equipment – it would be regrettable if future opportunities to enhance this feature of train design were missed, or if such features were inadvertently designed out. There is also a need to think through how the infrastructure can be adapted to help guide derailed trains at high risk locations.

"I recognise that there is a shortage of authoritative data on the dynamics of high speed derailment. However, useful research has already been undertaken in Sweden and Japan which the UK rail industry can learn from. I hope that the issue of post-derailment guidance is to be taken seriously in the future given the prospect of more trains on our existing network and even higher speeds on new infrastructure such as HS2.

"For those involved, the aftermath of the collision must have been a difficult and distressing experience. The process of checking for injuries, reassuring passengers and then keeping them informed of progress with plans for evacuation required the railway staff on-board to remain calm and focused –which they did.

“Although the staff on board the train responded well in this instance, some of our previous investigations have revealed a different story. I therefore urge train operating companies to consider their readiness to deal with unexpected events of this type - of particular importance are the arrangements to provide support and assistance to those on the train, especially when remote from a staffed station. Furthermore, the robustness of emergency plans should be evaluated by means of realistic training exercises and simulations.

“Lastly, the landslip that caused the derailment occurred at a location that had not been identified as being at high risk (the previous landslip event at this location had occurred during the Second World War). Extreme weather events may cause earthwork failures anywhere on the network, and existing methods of assessing risk may never be a totally reliable method of predicting when and where they will occur. This leads me to conclude that more needs be done to ensure that the fundamental cause of so many earthwork failures, poor drainage, is properly addressed. – hence our recommendation in this area.”

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