Investigation of passenger vehicle footstep positions to reduce stepping distances and gauging constraints T1037

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Accidents during boarding and alighting cost over £10m each year. Stepping distances are one of the main issues and we now know these distances for the whole network.

Aim

Most platforms on the GB rail network were built many years ago to a range of historic heights and offsets, and it is also the case that trains can have a variety of footstep positions in relation to the platforms. This results in a significant variance in platform stepping distances.

This research which follows previous research project T866 - Investigation of platform edge positions on the GB network - has been carried out to increase our understanding of the platform/train footstep interface, and support improvement in the passenger stepping distances.

Findings

The research has provided footstep position information for the fifty eight passenger vehicle types across the GB rail network and, for each station platform, identifies all of the classes of train that routinely stop. This combined station dataset was then used to calculate platform stepping distances.

This research concluded that the predicted stepping distances of most vehicles meet the requirements of the Railway Group Standards (RGS) where platforms occur on straight sections or on the inside of curves:

- For 87% of vehicle door locations, stepping distances are compliant with the RGS against platforms on the inside of curves. Non-compliant stepping distances generally occur on platforms adjacent to track with a radius of 200 metres or less.

- This compares with 67% of vehicle door locations being compliant with RGS on the outside of the curve. The majority of non-compliant stepping distances occur on platforms adjacent to track with a radius of 160 metres or less.

The outputs from this research enable the railway industry to better identify where potential hazards are likely to occur and identify suitable mitigation measures.
Impacts and benefits

This research is intended to inform the ongoing platform train interface strategy work-stream being supported by RSSB. This work-stream is an enabler to:

- Inform GB strategy for platform position and platform train interface to improve safety during boarding and alighting. Accidents during boarding and alighting accounted for 5.5 fatalities and weighted injuries in 2014/15, which represents 12% of passenger risk and equates to over £10m each year on the GB network.
- Improve accessibility for the elderly and disabled as well as those with children and luggage. Around 5% of rail journeys are made by people with a disability or long-term illness alone.
- Ensure that GB interests are taken into account in the development of the Technical Specifications for Interoperability, and that the development of effective solutions are better informed and not unduly constrained.
- Provide useful information to inform rolling stock cascade decision making to optimise platform stepping distances.

The respective client groups and Vehicle/Structures System Interface Committee members have welcomed the outputs of the research and recommend that the dataset provided be used for decision making on improving passenger stepping distances.

This research is also intended to inform related RSSB research into the design of a tool to support duty holders in the assessment of platform train interface risk.

Methodology

The railway industry needed to understand the range of passenger footstep positions on all vehicles and to understand the range of stepping distances across the network to help improve stepping distances in terms of infrastructure works, vehicle fleet deployment and cascade, modification and new vehicle design. In support of this aim:

- Data was gathered to obtain a GB wide view of all vehicle footstep profiles.
- Infrastructure data from Network Rail’s National Gauging Database was used to identify the coordinates of the platform edge, together with the associated track geometry along the length of each station platform. This data comprised:
  - 5,737 individual platforms
  - 157,654 individual measured profiles
- Vehicle classes currently calling at particular platforms were identified
- A particular part of the study has looked at the variables influencing vehicle footstep position and this has been used to calculate a range of stepping distances that is closer to the range likely to be experienced.
This combined station dataset was then used for the basis of the stepping distance calculations.

Where to find out more

To help facilitate the collation of data, a series of datasheets has been created for each platform and vehicle type, compiled under two separate reports:

**Phase 1:** Passenger train footsteps positions study to better understand platform/train stepping distances.

**Phase 2:** Platform/train stepping distances study based on train stopping patterns.

The summary reports have been published under T1037 on www.sparkrail.org; the datasets can either be downloaded (by RSSB members only) from SPARK, or obtained by sending an email to enquirydesk@rssb.co.uk.