

Research Brief



Limits on vertical track alignment through station platforms T815 - May 2010

Background

Over the past 118 years there have been a number of requirements put in place for the gradients applied to tracks through station platforms which has culminated in the current requirement in Railway Group Standard GI/RT7016, Interface between Station Platforms, Track and Trains, which requires platforms to be located on track with vertical track alignment (ie average track gradient through station platforms) no steeper than 1 in 500.

The earliest known requirement for a specific track gradient through station platforms can be traced back to a Board of Trade document issued in 1892, which had a requirement of 1 in 260; with the gradient requirement appearing in numerous subsequent documents over the years. The change to the current 1 in 500 came in a version of the 'Blue Book' in or around 1950 and is believed to have arisen in response to a shift from plain bearings to roller bearings across all rolling stock.

Although there has been a requirement not to exceed the 1 in 500 gradient for 60 years, the research has shown that there are over 600 existing stations with gradients of 1 in 400. There have recently been seven stations constructed with platforms on gradients steeper than 1 in 500, where a derogation from GI/RT7016 has been granted.

As part of the research, several train operators were consulted to establish their views and what they considered to be the greatest risk at stations with steep gradients. The outcome was that it was not seen as high risk and no more so than starting/stopping at a gradient elsewhere such as a signal.

A review of incidents over the last 15 years has shown that there have been five incidents reported through The Safety Management Information System (SMIS), at stations with gradients of 1 in 500 and nine National Incident Reports (NIRs) where a train has rolled on a gradient at a platform. In the majority of cases these can be attributed to driver error or faulty brakes.

The research concluded that removing the 1 in 500 requirement from GI/RT7016 would not present an unacceptable risk.

Aims

The aim of this research project was to establish if the current gradient limit of 1 in 500 through station platforms could be reduced or removed without increasing the level of risk to passengers and staff.

The reduction or removal of the gradient limit will lead to reduced costs to the railway industry through the removal of the requirement to obtain a derogation against the standard and/or a reduction in construction costs to make the station site compliant.

Findings

The research has documented the investigation into the origins of the current Railway Group Standard requirement, the proliferation of non-compliant platforms and a review of relevant incidents. It has concluded that the current limit could be removed from the standard.

The research has determined that while there has been a limit on gradients at station platforms since 1892 there are many stations where this has not been possible and there are over 1000 in existence including some recently constructed stations that do not meet the present 1 in 500 gradient limit specified in GI/RT7016. A derogation is required where the limit is exceeded.

Consultation with train operators has shown that the hazards associated with gradients at stations are treated no differently to gradients elsewhere on the network, for example at signals. This experience is supported by the very small number of incidents that have been recorded.

Method

The research focussed on the following key activities, all of which are contained in one or more of the three phases and are covered in the final report:

- Investigation into the history and evolution of gradient requirements as platforms.
- Investigation into the current legal obligations and mandatory requirements such as the Technical Specifications for Interoperability (TSI).
- Review of current best practice from other industries.
- Survey of existing platforms to determine the extent of non-conformant platforms.
- A review of incidents contained in rail industry data bases (SMIS/NIR) for relevant incidents.

- A study of rolling stock design to determine how the development of rolling stock over the years has reduced the likelihood incidents.
- Feedback from train operators on the key issues associated with gradients through platforms.
- Hazard Workshop with train operators, civil engineers and rolling stock engineers to identify and evaluate the risks associated with gradients through platforms.

The research was conducted in three phases:

Phase one investigated the origins of the current gradient requirement, determined the proliferation of non-compliant platforms and what incidents have occurred at such platforms.

Phase two sought the views of train operators through questionnaires and through a hazard identification workshop. The purpose of the workshop was also to identify risks associated with stopping and starting a train at stations on gradients.

Phase three built on the work done in phase 1, further investigated the development of the rolling stock over the years and the outcome of the phase two activities.

Next Steps

This study has shown that there is a case for revising or removing the requirement for horizontal track alignment through station platforms in Railway Group Standard GI/RT7016 Interface between Station Platforms, Track and Trains. RSSB will use the findings of the report to support a proposal to revise GI/RT7016.

The benefits to the railway industry that could be realised include a reduction in costs associated with either complying with the standard through construction works or following the derogation process, and potentially a reduction in timescales associated with new construction projects.

Contact

For more information please contact:

Head of Engineering Research
R&D Programme
RSSB
research@rssb.co.uk