Interface between Station Platforms, Track, Trains and Buffer Stops

Synopsis
This document sets out requirements for the design and maintenance of station platforms for their safe interface with trains, track and buffer stops.
Issue Record

<table>
<thead>
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<tr>
<td>One</td>
<td>02/06/2018</td>
<td>Original document. Merges GIRT7016 issue five Interface between Station Platforms, Track and Trains with GCRT5033 issue two Terminal Tracks - Requirements for Buffer Stops, Arresting Devices and End Impact Walls and GIGN7616 issue two Guidance on Interface between Station Platforms, Track and Trains. Requirements on the overrun risk zone, headroom on platforms, platform recess, platform height and the aerodynamic effects of passing trains in GIRT7016 issue five have been revised. Guidance on platform gap fillers has been added. Editorial changes throughout.</td>
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<tr>
<td>1.1</td>
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<td>Issue 1.1 amends clause 3.1.1.3 by removing the word ‘vertical’. This is to provide clarity relating to the change of ‘Normal’ clearance in GIRT7073 from 50mm to 40mm for platforms.</td>
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Revisions have been marked by a vertical black line in this issue.

Superseded Documents

The following Railway Group documents are superseded, either in whole or in part as indicated:

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<td>All</td>
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Supply

The authoritative version of this document is available at [www.rssb.co.uk/railway-group-standards](http://www.rssb.co.uk/railway-group-standards). Enquiries on this document can be submitted through the RSSB Customer Self-Service Portal [https://customer-portal.rssb.co.uk](https://customer-portal.rssb.co.uk)/
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**Rail Industry Standard**  
**RIS-7016-INS**  
**Issue:** 1.1  
**Date:** June 2019

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Part 1 Purpose and Introduction

1.1 Purpose

1.1.1 This document sets out requirements for the design and maintenance of station platforms for their safe interface with track, trains and buffer stops.

1.2 Introduction

Principles

1.2.1 This document contains Great Britain (GB) industry agreed interface requirements for platforms, track, trains, and buffer stops at stations on the GB mainline railway.

1.2.2 The platform and other station assets have an interface with the energy subsystems on electrified lines; requirements concerning those are additional to those set out in this document and can be found in GLRT1210, GMRT2111 and GLRT1212.

1.2.3 The Railways and Other Guided Transport Systems (Safety) Regulations (ROGS) 2006, in regulation 19, requires that transport operators, including infrastructure managers (IMs), perform a suitable and sufficient risk assessment and implement control measures to ensure safe operation. ROGS 2006 requires that the safety management system (SMS) of transport operators, including IMs, describes the processes they have in place to ensure this, including when making changes.

1.2.4 Additionally, the Railway (Interoperability) Regulations (RIR) 2011 requires that, for entities seeking authorisation to place into service a new, upgraded or renewed structural subsystem (such as infrastructure), compliance with applicable Technical Specifications for Interoperability (TSIs) and National Technical Rules (NTRs) and safe integration is demonstrated.

1.2.5 To help discharge these legal obligations, all the requirements in this document are applicable where changes are being made concerning the interface between station platforms, track, trains, and buffers and are intended to be adopted by IMs when making changes concerning these aspects. The requirements in this document represent the GB industry agreed approach for dealing with these interfaces for the GB mainline railway. They are applicable when making changes that may affect the interfaces covered in this document.

1.2.6 This document is also intended to be read in conjunction with the TSI Infrastructure (INF TSI) and the TSI Accessibility for Persons with Reduced Mobility (PRM TSI) which also contain requirements concerning the interface between station platforms, track, trains, and buffer stops.

1.2.7 Requirements for height of platforms (3.1.1), offset of platforms (3.2.1) and width of platforms (4.1) are in scope of NTRs and are included in this document for consistency and are also reproduced in GIRT020 for the purpose of notification to the European Union (EU). These NTRs support the UK specific cases included in the INF TSI for platform height and offset, and a provision for NTRs for the ‘danger area’ width on platforms included in the PRM TSI. The application provisions for these requirements are also included in this document in Part 12.
1.2.8 European legislation transposed into UK law obliges the Department for Transport (DfT) to notify rules in scope of NTRs. For the GB mainline railway, NTRs are contained in Railway Group Standards (RGSs). However, the NTR requirements concerning platform height, offset and width are also reproduced in this document to provide a full set of applicable GB requirements concerning interface requirements for platforms, track, trains and buffer stops at stations.

Structure of this document
1.2.9 This document sets out a series of requirements that are sequentially numbered. This document also sets out the rationale for the requirement, explaining why the requirement is needed and its purpose and, where relevant, guidance to support the requirement. The rationale and the guidance are prefixed by the letter ‘G’.

1.2.10 Some subjects do not have specific requirements but the subject is addressed through guidance only and, where this is the case, it is distinguished under a heading of ‘Guidance’ and is prefixed by the letter ‘G’.

Related requirements in other documents
1.2.11 The following Railway Group Standards contain requirements that are relevant to the scope of this document:

- GCRT5021 sets out the requirements for track geometry, track system, track components and S&C to provide for the safe guidance and support of rail vehicles.
- GIRT7020 sets out requirements for platform height, platform width and offset of platforms that are in the scope of NTRs.
- GIRT7033 sets out the specification of lineside operational signs and a process for introducing new designs. It also sets out, in a non-mandatory appendix, the process for introducing lineside safety signs.
- GIRT7073 sets out the requirements for positioning infrastructure and maintaining the position of track relative to infrastructure to achieve gauge compatibility with rolling stock.
- GLRT1210 sets out the requirements for the AC energy subsystem and the interfaces to rolling stock operating over the AC electrified railway.
- GLRT1212 sets out the requirements for the DC conductor rail energy subsystem and the interfaces to rolling stock operating over the DC electrified railway.
- GMRT2173 sets out the methods of determining the swept envelope of rail vehicles. It sets out specific gauge requirements for the lower sector and specific items of equipment and sets out minimum requirements for the recording of vehicle gauging data.

Supporting documents
1.2.12 The following Rail Industry Standards, Guidance Notes and documents support this RIS:

- GIGN5633 gives a recommended method which, if followed, would meet the requirements of RIS-7016-INS regarding buffer stops and end impact walls.
- GIGN7608 gives guidance on interpreting the requirements of the Infrastructure Technical Specification for Interoperability 2014 (INF TSI) for application to the GB mainline railway.
- GLGN1620 gives guidance on the application of the Control of Electromagnetic Fields at Work Regulations in the railway environment, and supplements the processes set out in the Health and Safety Executive’s guidance on the regulations.
- RIS-7700-INS provides a standard on station infrastructure for IMs responsible for managing and operating stations, to use if they so choose.
- RIS-7702-INS provides a standard on lighting at stations for the IMs responsible for managing and operating stations, to use if they so choose.
- RIS-8060-CCS sets out the minimum engineering requirements for the facilities used in dispatching trains from platforms.
- RIS-8270-RST sets out the requirements and responsibilities for the assessment of technical compatibility at route level for vehicles and infrastructure.
- RIS-0737-CCS sets out the signal sighting assessment process that is used to confirm compatibility of lineside signalling assets with train operations (signal sighting).
- RIS-2747-RST sets out GB requirements for exterior doors and selective door operation (SDO) systems.
- RIS-2703-RST contains requirements and guidance for on-train camera / monitor system associated with driver only operation of passenger trains.
- ‘Taking Safe Decisions’, a RSSB document which sets out the industry consensus view of how safety is taken into account when taking decisions. It describes the principles that companies apply to protect people’s safety, satisfy the law, respect the interests of stakeholders and meet commercial objectives.
- The Office of Rail and Road’s policy on electrical clearances to standing surfaces for 25kv overhead electrification.

### 1.3 Application of this document

1.3.1 Compliance requirements and dates have not been specified because these are the subject of internal procedures or contract conditions.

1.3.2 If you plan to do something that does not comply with a requirement in this RIS, you can ask a Standards Committee to comment on your proposed alternative. If you want a Standards Committee to do this, please submit your deviation application form to RSSB. You can find further advice in the ‘Guidance to applicants and members of Standards Committee on using alternative requirements’, available from RSSB’s website www.rssb.co.uk.

### 1.4 Health and safety responsibilities

1.4.1 Users of documents published by RSSB are reminded of the need to consider their own responsibilities to ensure health and safety at work and their own duties under health and safety legislation. RSSB does not warrant that compliance with all or any documents published by RSSB is sufficient in itself to ensure safe systems of work or operation or to satisfy such responsibilities or duties.
1.5 Approval and Authorisation

1.5.1 The content of this document was approved by Infrastructure Standards Committee on 07 March 2018.

1.5.2 This document was authorised by RSSB on 17 May 2019.
Part 2 Location of New Platforms

2.1 Requirements for locations of platforms

2.1.1 Station platforms shall not be located on horizontal curves with radii less than 1000 m.

2.1.2 Where the particular characteristics of the geography and railway at the proposed location of a platform extension do not provide a reasonable opportunity for achieving 2.1.1, it is permitted for platform extensions to be located on horizontal curves with radii less than 1000 m but not less than 500 m.

Rationale

G 2.1.3 A platform on the outside of a curved track increases the potential for reduced sight lines for train dispatch. Where a train dispatcher can stand at the back of a 2.5 m wide platform located on a curved track the following approximate lengths of sight lines are available:

a) 1000 m radius: 70 m sight line.
b) 500 m radius: 50 m sight line.
c) 200 m radius: 30 m sight line.

G 2.1.4 Platform to train stepping distances will increase on curves, depending on the direction of curve, installed cant and door position relative to bogies. The gap between train and platform away from the doors also increases on curved platforms.

G 2.1.5 It is recognised that in many cases it would not be reasonable to change the curvature of the track at a location where a platform is to be built or where a platform is to be extended. Some typical constraints include the proximity of adjacent lines, bridges, junctions and the need to fit within the existing station layout. The permission for platform extensions on curves with radii less than 1000 m but not less than 500 m recognises the additional constraints for extending a platform where the extension can only be located at either end of an existing platform.

Guidance

G 2.1.6 GIGN7608 gives guidance on the INF TSI requirement for >300 m radius.

G 2.1.7 It is best practice to install station platforms on straight track.

G 2.1.8 Where station platforms have to be located on curved track, considerations will include:

a) Train to platform stepping distances, taking the types of train likely to call at the platform into account.
b) Visibility (either direct, by means of closed-circuit television (CCTV) screens, or by mirrors) along the length of trains for train crew and station staff responsible for dispatching trains.
c) Gauge analysis and clearance to rolling stock authorised to use the line.

G 2.1.9 It is best practice to avoid extending platforms that would limit electrical clearances to any overline structures.
G 2.1.10 GCRT5021 requires that the normal limiting design value for cant adjacent to a station platform is 110 mm, with an exceptional limiting design value of 130 mm.

G 2.1.11 GMRT2173 sets out requirements for the position of train footsteps on rolling stock designed for passenger use, and their relative position to platforms that meet the height and offset requirements in GIRT7020.

G 2.1.12 GIRT7073 sets out the requirements for platforms on curves less than 360 m radius, to give a larger offset. The larger offset presents an increased gap between the platform and the train, and therefore locating platforms on curves less than 360 m radius is undesirable and suitable mitigation will be required.

G 2.1.13 RSSB Research Report T726 considered platforms on curves less than 200 m radius. There are approximately 90 platforms on the mainline network on curves less than 200 m radius, and although it is unlikely that these platforms can be economically modified, any new platforms on such tight radii are not permitted.

G 2.1.14 A number of deviations against GIRT7016 section 2.1 have been approved which address the following points:

a) Stepping distances.

b) Length of platform on a curve; for example whether the curve is localised on the platform, over a short length.

c) Whether a platform is on the inside or the outside of a curve.

d) Length and type of trains using the platform; the shorter the train the less severe the potential problems with sight lines.

e) Whether coupling / uncoupling activities are within platform limits.

f) Presence and nature of driver-only operation equipment.

G 2.1.15 Access to approved deviations can be found at https://www.rssb.co.uk/standards-and-the-rail-industry/how-to-deviate-from-standards.

2.2 Guidance for vertical track alignment through platforms

G 2.2.1 The mandatory requirement for vertical track alignment through station platforms was withdrawn in issue four of GIRT7016, based on work carried out to support deviations against issue two of GIRT7016 for specific stations and the findings of RSSB Research Report T815: ‘Limits on vertical track alignment through station platforms’.

G 2.2.2 For many years it had been considered good practice in GB to locate platforms on gradients not steeper than 1:260, except where geographic constraints made this unavoidable. This requirement was later changed to refer to a gradient of 1:500, possibly because of a shift from plain bearings to roller bearings across all rolling stock.

G 2.2.3 In the circumstances where the INF TSIs impose limiting gradients through passenger platforms, the limit is 2.5 mm/m; that is, 1:400.

G 2.2.4 Where platform extensions or new platforms are proposed, it is good practice to implement a vertical and horizontal alignment scheme although, usually, the overall
track gradient profile will not be altered. The platform extension or new platform will, in most cases, be constrained as to where it can be located with respect to the existing track gradient.

G 2.2.5 It is good practice for the gradient through a platform to be constant, unless the particular geographical characteristics of the site and associated railway infrastructure at the proposed location of the platform do not provide a reasonable opportunity for achieving this.

G 2.2.6 Where the gradient is not constant, the average gradient is to be understood as the representative gradient under a stationary train, derived by combining the values and lengths of the different track gradients through the platform, and taking account of the stopping position and lengths of the different trains using the platform. The equation to calculate the average slope is:

\[
\text{slope(average)} = \frac{(\text{length}_1 + \text{length}_2)}{(\text{length}_1 / \text{slope}_1 + \text{length}_2 / \text{slope}_2)}
\]

G 2.2.7 For example, where the train length is 20 m and it stops on a track at a platform with a 1:600 gradient for 90% of the train’s length and a 1:200 gradient in the same direction for the remainder of its length, the:

\[
\text{slope(average)} = \frac{(18 + 2)}{(18 / 600 + 2 / 200)} = \frac{20}{(0.03 + 0.01)} = \frac{20}{0.04} = 500
\]

G 2.2.8 When considering locating platform extensions or new platforms on a gradient, points to consider when assessing the risk arising from the proposed change include:

a) Actual gradients and length of gradients.
b) Stopping position of the train relative to the gradient.
c) Whether trains terminate, reverse or stand for an extended period at the platform.
d) Operational activities required in platform, for example being coupled / uncoupled, driver changing ends.
e) Braking capability of trains using the platform.
f) Engine noise from trains when pulling away from the platform.
g) Power limitations of trains when pulling away from the platform.
h) Mitigating circumstances in the event of a runaway (for example catch points, train protection warning system (TPWS) fitment and adjacent geography and gradients).
i) History of adhesion issues.

G 2.2.9 For terminal platforms on a gradient, additional considerations include:

a) Approach speed.
b) Signalling and control arrangements (for example approach control signals and TPWS).
c) Buffer stop and end impact wall arrangements.
d) Structures and facilities in overrun risk zone.
2.3 Guidance for throws due to switches and crossings (S&C) near platforms

Guidance

G 2.3.1 The alignments of S&C layouts vary greatly and may include virtual transitions, reverse curves, sharp radii curves etc. Due to these variations, it is important to accurately measure the track geometry and calculate the effects of centre and end throws to ensure that there is no conflict with the surrounding infrastructure, particularly the platform coping stones.

G 2.3.2 Where platforms and S&C are located adjacent to each other, the effects of vehicle end throw and centre throw are important in the calculation of clearances.

G 2.3.3 It is not desirable to position an S&C layout in a platform area; however, there are operational and site constraints that may require S&C to be positioned adjacent to a platform. Where this is the case, assessment of centre and end throws on all available routes, for a range of vehicles including non-standard wheelset arrangements such as track maintenance vehicles, will enable any potential gauge infringements to be identified.

G 2.3.4 Before undertaking design work on the track in a platform area, it is good practice to consider other factors or proposals that may affect the suitability of the design for the future. These may include:

a) Proposals to renew, replace or remodel S&C.
b) Development and adoption of track designs based on a long-term design aspiration.
c) Designs that conform with long-term plans to renew other infrastructure, such as bridges, so that the full benefit can be taken to improve compliance.
d) Designs that conform with future electrification schemes or changes to existing installations.
Part 3 Standard Platform Position Relative to the Adjacent Track

3.1 Platform height

Important: The following four requirements are NTRs set out in GIRT7020 issue one. There is a legal obligation to comply with applicable NTRs under The Railways (Interoperability) Regulations (RIR 2011) and when compliance is required, then any alternatives will need a deviation application to be submitted to RSSB.

3.1.1 Requirements for height of platforms

3.1.1.1 For new platforms and alterations (as defined) to existing platforms, the design height at the edge of the platform measured perpendicular to the plane of the rails shall be 915 mm (within a tolerance of +0 mm, -15 mm), except for platforms where defined legacy rolling stock is permitted to operate.

3.1.1.2 For new platforms and alterations (as defined) to existing platforms where defined legacy rolling stock is permitted to operate, the design height at the edge of the platform measured perpendicular to the plane of the rails shall be 915 mm (within a tolerance of +0 mm, -25 mm).

3.1.1.3 An additional +10 mm tolerance is permitted when a new platform or platform extension is constructed. Where this +10 mm is used, the related values for the lower sector clearance (given in GIRT7073) shall be reduced by 10 mm. GIRT7073 sets out the requirements for clearances at station platforms which take into account the additional +10 mm tolerance. The tolerances are illustrated in Figure 1.

3.1.1.4 Where a new platform or an alteration (as defined) to an existing platform abuts an existing platform, any discrepancy in height of the platform shall be gradually tapered into the existing platform. The transition gradient shall not exceed 1:40.

Rationale

G 3.1.1.5 The standard position of the platform edge relative to the track provides for boarding and alighting of trains, assuming that the trains are built to the requirements of GMRT2173. It also provides for the passage of trains at speed, including freight trains, in accordance with the requirements for gauge clearance.

G 3.1.1.6 For the GB railway, which generally provides for network-wide utilisation of passenger and freight vehicles and open access, this standard platform height is the target position.

G 3.1.1.7 A number of studies have considered alternative platform heights for the mixed traffic railway, but the target platform height has been confirmed as 915 mm. More information on these studies can be found in the Platform Train Interface Strategy, which is on the RSSB website.

Guidance

G 3.1.1.8 These requirements support the GB specific case for 'Platform Height' permitted by the INF TSI.
G 3.1.1.9 When planning or designing a new platform, or alterations (as defined) to an existing platform, the relationship between the position of the platform and the energy subsystem is to be taken into account. The requirements detailing the clearance requirements of an electrification system is contained within GLRT1210.

G 3.1.1.10 The datum position for the location of a platform is the reference (design) position of the track adjacent to the platform, including any designed cant. The track may move from this reference (design) position during its maintenance cycle and the amount of this variation will depend on the track fixity provided. The maintenance tolerance on the track position is given in Network Rail standards, but the amount that the track moves within the maintenance tolerance may be outside the tolerances on platform position given within this standard.

Figure 1: Diagram for tolerance on platform height

G 3.1.1.11 When building a new platform or extending a platform, the design geometry of the track adjacent to the platform can be used for setting out for both structural and
coper position, provided that the track is in its reference (design) position. It is undesirable to adopt this methodology if the track is not in its reference (design) position, as any irregularities in the top and line of the track will be locked in to the platform edge alignment. This problem can be avoided by using alternative setting out datums/checks. Use of a single survey scheme for the complete length of the site will minimise problems of mismatching positions. The vertical curvature of the track is also relevant when considering platform heights.

G 3.1.1.12 If there is no design track alignment, then a suitable reference position for the track is normally used for platform positioning. Once built, datum plates fixed to the platform wall can be used to record the design offset, level and cant of the track.

G 3.1.1.13 The additional +10 mm tolerance is for build / maintenance of the platform and is not available for design. Stepping distance is calculated from the nominal 915 mm platform position.

G 3.1.1.14 Defined legacy rolling stock will not achieve positive clearance to a platform height of 900 mm (which is the nominal height of 915 mm less 15 mm tolerance) and therefore the minimum height of 890 mm (915 mm less 25 mm tolerance) is permitted on routes where this stock operates. These routes are defined in the Sectional Appendix.

G 3.1.1.15 For the lengthening of existing platforms that are to a substandard height, GIRT7020 requires that the new length of platform is designed to a height of 915 mm (within a tolerance of +0 mm, -15 mm) and a transition length not steeper than 1:40 between the new and existing platforms. The actual position of this transition length is generally sited to best suit boarding and alighting of the trains that call at the platform (for example, if possible, avoiding aligning with doors) and also to best suit station access and egress arrangements (for example, not opposite stairs or lifts).

G 3.1.1.16 Alteration is defined in this document as: the substantial lengthening or rebuilding of all or part of an existing platform and/or an associated structure, or renewal of station equipment or platform furniture, which provides a reasonable opportunity to bring the items concerned into conformity with the requirements of this document.

G 3.1.1.17 Whether a project provides a reasonable opportunity to bring the items concerned into conformity has to be determined on a case-by-case basis, taking into account:

a) Size of project.
b) Balance of risks and mitigation options.
c) Cost of the opportunity to bring existing non-conforming areas into conformity.
d) Future plans for the asset and related assets.
e) Best long-term interests of the railway system as a whole.
f) Views of stakeholders.
### 3.2 Platform offset

**Important:** The following two requirements are NTRs set out in GIRT7020 issue one. There is a legal obligation to comply with applicable NTRs under The Railways (Interoperability) Regulations (RIR 2011) and when compliance is required, then any alternatives will need a deviation application to be submitted to RSSB.

#### 3.2.1 Requirements for offset of platforms

**3.2.1.1** For new platforms and alterations (as defined) to existing platforms, the platform edge shall be the distance from the adjacent track (within a tolerance of +15 mm, -0 mm) as detailed by the lower sector infrastructure gauge set out in GIRT7073. The offset is measured parallel to the plane of the rails.

**3.2.1.2** Where a new platform, or an alteration (as defined) to an existing platform, abuts an existing platform, any discrepancy in the alignment of the platform shall be tapered over a length commensurate with complete platform coper unit lengths, but at a rate not exceeding 1:80.

**Rationale**

G 3.2.1.3 The standard position of the platform edge relative to the track provides for boarding and alighting of trains, assuming that the trains are built to the requirements of GMRT2173. It also provides for the passage of trains at speed, including freight trains, in accordance with the requirements for gauge clearance.

G 3.2.1.4 For the GB mainline railway, which generally provides for network-wide utilisation of passenger and freight vehicles and open access, the standard platform offset is the target position.

**Guidance**

G 3.2.1.5 Requirements for platform offset in connection with a standard TSI platform height are set out in the INF TSI. UK (GB) has a specific case for platform height and for platform offset that refers to the NTR as set out in this document.

G 3.2.1.6 When planning or designing a new platform, or alterations (as defined) to an existing platform, the relationship between the position of the platform and the energy subsystem is to be taken into account. The requirements detailing the clearance requirements of an electrification system is contained within GLRT1210.

G 3.2.1.7 For the majority of locations, the required platform edge position will be 730 mm to 745 mm from the adjacent rail. Designing the position to the middle of this range will facilitate construction by retaining tolerances.

G 3.2.1.8 The datum position for the location of a platform is the reference (design) position of the track adjacent to the platform, including any design cant. The track may move from this reference position during its maintenance cycle, and the amount of this variation will depend on the track fixity. This variation in the maintenance position of the track may be outside the tolerance on platform position; the maintenance tolerance on the track position is set out in Network Rail standards.
G 3.2.1.9 When building a new platform or extending a platform, the design geometry of the track adjacent to the platform can be used for setting out for both structural and coper position, provided that the track is in its reference (design) position. It is undesirable to adopt this methodology if the track is not in its reference (design) position, as any irregularities in the top and line of the track will be locked in to the platform edge alignment. This problem can be avoided by using alternative setting out datums / checks. Use of a single survey scheme for the complete length of the site will minimise problems of mismatching positions.

G 3.2.1.10 Where the platform is adjacent to ballasted track, it is important that the front wall foundations are kept clear of any normal track maintenance / renewal equipment. It is good practice for the face of the front wall foundations to be continued to a minimum depth of 600 mm below the underside of the sleeper before any foundations extend out into the track bed. This will avoid disturbance to the foundations during track renewal and maintenance work. There may be circumstances where this is not practicable, for example at underbridges.

G 3.2.1.11 When lengthening existing platforms that have a substandard offset, GIRT7020 only requires that the existing section of platform is rebuilt to the standard platform offset if there is a reasonable opportunity to do so. Where a transition is required between the existing and new platform sections with differing offsets from the track, this is generally sited to minimise the requirement to board and alight within the transition length (for example, by avoiding alignment with doors) and also to minimise any risks for access from stairs, lifts and access routes.

G 3.2.1.12 Alteration is defined in this document as: the substantial lengthening or rebuilding of all or part of an existing platform and/or an associated structure, or renewal of station equipment or platform furniture, which provides a reasonable opportunity to bring the items concerned into conformity with the requirements of this document.

G 3.2.1.13 Whether a project provides a reasonable opportunity to bring the items concerned into conformity has to be determined on a case by case basis, taking into account:

a) Size of project.
b) Balance of risks and mitigation options.
c) Cost of the opportunity to bring existing non-conforming areas into conformity.
d) Future plans for the asset and related assets.
e) Best long-term interests of the railway system as a whole.
f) Views of stakeholders.

3.3 Requirements for maintaining standard platform height and offsets

3.3.1 At existing platforms that conform to the requirements of platform heights and platform offsets, the standard platform position shall be maintained when track or structural maintenance, renewal or alterations (as defined) is carried out.

Rationale

G 3.3.2 In most cases, it is the movement of the track that affects the relative position of the platform and track. This movement is usually caused by traffic, track geometry
maintenance and track renewal works. Carrying out routine platform surveys to monitor the position of the track will identify the need for any corrective adjustment.

**Guidance**

G 3.3.3 The majority of track geometry maintenance work is carried out using on-track machines and automated track realignment design techniques working to prescribed tolerances. It is important to ensure that when track is realigned, its position relative to the platform is (at least) maintained.

### 3.4 Requirements for stepping between the train and the platform

#### 3.4.1 Alterations (as defined) shall be designed so as not to increase the platform stepping distances unless they are associated with achieving the standard platform height set out in 3.1.1.1 or the platform offset requirements set out in GIRT7073.

#### 3.4.2 Where an alteration (as defined) is carried out at an existing platform which is higher than 915 mm and site constraints prevent the full achievement of the standard height and offset, it is permissible to increase the platform stepping distances where the platform height is lowered so that it is closer to meeting the requirement of 3.1.1.1.

**Rationale**

G 3.4.3 A DfT study called ‘Significant Steps’ investigated the effect of the vehicle platform step and gap on the ability of passengers to board and alight from a train. The study concluded that a maximum dimension of 200 mm, when the step height and gap width are added together, enables the majority of participants to use rail vehicles.

G 3.4.4 The PRM TSI specifies a maximum step height and gap width below which boarding aids are not required for wheelchair passengers. In most cases these step heights and gap widths are exceeded on the GB mixed traffic railway.

**Guidance**

G 3.4.5 GMRT2173 sets out the requirements for footsteps for passenger use on new trains relative to a platform positioned in accordance with 3.1.1.1 and 3.2.1.1

G 3.4.6 Setting the position of a platform edge to meet the requirements of 3.1.1.1 and 3.2.1.1 could result in the stepping distances set out in GMRT2173 being exceeded in the case for some trains that do not meet the current requirements of GMRT2173.

G 3.4.7 Mitigating measures that can be considered where stepping distances are large include the following:

a) Provision of warning signs and platform markings.

b) Provision of announcements.

c) Staff attendance.

d) Selective Door Operation.

G 3.4.8 The maximum horizontal, vertical and diagonal stepping distances are considered to be extreme dimensions. It is good practice to minimise the dimensions within these limits subject to providing appropriate gauging clearances.
G 3.4.9 Where platforms are located on curves, the provision of ‘MIND THE GAP’ or ‘MIND THE STEP’ warnings adjacent to the platform edge can be considered. Where this is deemed to be an effective mitigation, such warnings are in white paint and placed as near as is reasonably practicable to the position of the greatest gap between train and platform. This positioning takes account of the typical stopping position and the door locations of the different train configurations that stop at the platform.
Part 4 Usable Width of Platforms

Important: The following eight requirements are NTRs set out in GIRT7020 issue one. There is a legal obligation to comply with applicable NTRs under The Railways (Interoperability) Regulations (RIR 2011) and when compliance is required, then any alternatives will need a deviation application to be submitted to RSSB.

4.1 Requirements for width of platforms

4.1.1 The usable width of a new single face platform, and alterations (as defined) to existing single face platforms, shall not be less than:

   a) 3000 mm where the permissible or enhanced permissible speed on the line adjacent to the platform exceeds 100 mph (160 km/h).

   b) 2500 mm at other platforms.

4.1.2 Where the characteristics of the railway infrastructure do not provide a reasonable opportunity to achieve 4.1.1, it is permitted that the minimum usable width of a single face platform extension can be reduced to 2000 mm over the last 20 m of the platform where all of the following apply:

   a) The permissible or enhanced permissible speed on the line adjacent to the platform does not exceed 100 mph (160 km/h).

   b) The last 20 m does not constitute a normal access to, or egress from, the platform.

   c) The last 20 m is not a location where passengers congregate, for example commuters positioning themselves to be nearest the exit for their arrival station.

   d) Agreement has been reached with all affected parties.

   e) The last 20 m is not an emergency access route or refuge area.

4.1.3 The usable width of a new double face platform, and alteration (as defined) to existing double face platforms, shall not be less than:

   a) 6000 mm where the permissible or enhanced permissible speed on both lines adjacent to the platform exceeds 100 mph (160 km/h).

   b) 5500 mm where the permissible or enhanced permissible speed on only one line adjacent to the platform exceeds 100 mph (160 km/h).

   c) 4000 mm at other platforms.

4.1.4 Any new buildings, structures, furniture or equipment on platforms and alteration (as defined) to existing buildings, structures, furniture or equipment, shall be located to provide the following minimum distances to the platform edge:

   a) 3000 mm where the permissible or enhanced permissible speed on the line adjacent to the platform exceeds 100 mph (160 km/h).

   b) 2500 mm at other platforms.

4.1.5 Where particular site constraints prevent compliance, isolated columns shall not be located within a distance of 2000 mm from the platform edge.
4.1.6 The position of supports for new DOO CCTV and other DOO equipment (for example, stop markers) on platforms and alterations (as defined) relative to existing DOO CCTV and other DOO equipment on platforms shall take into account both:

a) The need to provide a clear area between the support and the platform edge.
b) The need for the driver of the train to be able to see the DOO CCTV screen or other DOO equipment

4.1.7 If the distances to the platform edge of the DOO equipment meet the requirement of 4.1.4, no further justification is required.

4.1.8 In all cases, the DOO equipment shall be at least 450 mm clear of the swept envelope (as defined in GIRT7073) of trains using or passing through the station, and shall be positioned so as not to restrict the movement of people (see also RIS-8060-CCS).

Rationale

G 4.1.9 These requirements are to ensure that platform width is adequate to manage crowding for the maximum anticipated usage of the platform. The platform width needs to consider passengers in waiting / standing areas, as well as the flow of passengers along the platform from / to entrances / exits. Passengers’ belongings (luggage / wheelchairs / buggies / bicycles etc) also need to be clear of areas where they may be in danger of being struck by trains or falling onto the track.

Guidance

G 4.1.10 The PRM TSI does not give fixed dimensions for required platform widths but provides these in relation to the ‘danger area’. The ‘danger area’ is not defined in the PRM TSI and the ERA Guide for the Application of the PRM TSI (ref ERA/GUI/02-2013/INT) states that ‘The limits of the danger area are defined in National rules’. GIRT7020 is the relevant National rule for the GB mainline network and requirements for platform widths are given directly, rather than by reference to a danger area, except where the aerodynamic risk from passing trains is specifically considered.
G 4.1.11 Figure 2 illustrates an example in applying the minimum usable platform width dimensions for a double face platform where speeds on both lines adjacent to the platform do not exceed 100 mph.

**Figure 2:** Example of the determination of the minimum usable platform width for a double face platform (not to scale)

G 4.1.12 The usable widths specified are not default design criteria, they are minimum values and additional space may be advantageous. Every platform is different and each is sized by taking into account a range of factors, including the maximum number of passengers anticipated to be on the platform at any given time, the usage of the platform, forecast passenger growth, overcrowding associated with special events or train service perturbation.

G 4.1.13 The platform width dimensions specified within this standard are applicable from the platform surface up to the minimum headroom requirements as specified in ‘Requirements for minimum headroom to station roof from platform’ of RIS-7016-INS.

G 4.1.14 When designing platforms, including the location of furniture and equipment, it is important to consider the position and deployment of access ramps for passengers and services.

G 4.1.15 Platform widths should include consideration for unscheduled detraining of passengers onto an already busy platform. In establishing the number of people to allow for in the unscheduled detraining of passengers, the maximum number of people can be based on the most appropriate of the following methods, with consideration of particular circumstances prevailing at the platform:

a) Planned and foreseeable train and platform occupancy.
b) Measurements of train and platform occupancy at peak times.
c) The result of any practical tests conducted to confirm the maximum train and platform occupancy.

G 4.1.16 The PRM TSI permits the platform width to taper at the platform end but no dimension is specified for the length of the taper. GB has requested clarity on this
issue but no further information is available. GB guidance is that a taper would not normally be more than one vehicle length.

G 4.1.17 The usable width of the platform could vary over its length. It is typically the case that the platform needs to be wider near access facilities and can be narrower at the platform ends, but nowhere less than these requirements. When determining the usable width of a new platform, the immediate platform edge area is excluded from the capacity analysis as this area is not an area where people are expected to stand. The dimensions of this area will be site specific.

G 4.1.18 Where new stairs, lifts or other facilities will greatly improve accessibility to and from the platform, a reduction in distance to the platform edge might be justified. Justification would need to show how the improvements gained from the modification outweigh the reduction of the clear area to the platform edge. Factors to consider could include:

a) The change in risk associated with the reduction of the clear area to the platform edge, alterations in the passenger flow and standing room for passengers on the platform.

b) The impact of changes to sight lines for train dispatch.

c) Additional measures to mitigate the reduction of the clear area to the platform edge. These mitigation measures could include:

i) Signage and platform markings warning not to stand at a particular location.

ii) Moving the stopping position for trains calling at the station so that the doors are positioned at locations on the platform that reduce risk.

iii) Arranging the new stairs, lifts or other facility so that the flow of passengers is improved.

iv) Station supervision and monitoring in peak periods to manage passenger flow and potential crowding.

v) Positioning other platform features (for example, canopies) to encourage passengers to adopt preferred walking routes and standing positions.

G 4.1.19 It is good practice to ensure that the positioning of buildings and structures (including supports to station roofs/platform canopies and any associated barriers that protect structures from impact, platform furniture and isolated columns) do not restrict the movement of passengers on the platform.

G 4.1.20 The PRM TSI sets out that ‘If the distance between any two small obstacles is less than 2400 mm they shall be deemed to form one large obstacle.’ This dimension can therefore be used as a guide to determine if columns could be considered as isolated. The closer the spacing of columns the more likely it is that they present a large obstruction. In designing a column to fulfil its purpose, consideration should be given to its effect on the flow of people and sight lines for train dispatch. A round section column is likely to present less of a hazard to people than an angular section, particularly if people or baggage come into contact with it.

G 4.1.21 The PRM TSI states that ‘Equipment required for the signalling system and safety equipment shall not be considered as obstacles in this point’. GB practice is to consider any item, regardless of its use, as an obstacle; although this standard does
recognise that the position of some DOO equipment is constrained by the need to be visible to the driver.

G 4.1.22 Additional requirements for platforms for the protection of people from aerodynamic effects of passing trains can be found at section 10.1 and section 10.2 of RIS-7016-INS.
Part 5  Overrun Risk Zone

5.1  Requirements for overrun risk zone

5.1.1  Except as permitted in 5.1.3, new structures, including buildings and load bearing columns, shall be located outside the overrun risk zone extending 20 m behind the face of the buffer stop and 5 m either side of the projected centre line of the track approaching the buffer stop. This area is referred to as the ‘overrun risk zone’. An example of an overrun risk zone is shown in Figure 3.

5.1.2  Except as permitted in 5.1.3, alterations (as defined) to an existing structure or track layout shall not:

a)  Cause a structure that is outside the overrun risk zone to come within the overrun risk zone.

b)  Cause a structure that is within the overrun risk zone to become closer to the centre line of the track and/or closer to the face of the buffer stop.

c)  Cause an increase to the risk when assessed against the last risk assessment.

5.1.3  Where an energy absorbing device, as set out in 11.1 and compatible with all trains calling at the platform is installed, and a risk assessment demonstrates the risk to be acceptable, it is permitted to locate structures other than major structures (load bearing columns, overhead line masts) inside the overrun risk zone or cause a structure that is within the overrun risk zone to become closer to the centre line of the track and/or closer to the face of the buffer stop.

Rationale

G 5.1.4  The requirements are intended to manage the risk from trains overrunning a buffer stop. A buffer overrun could lead to injury to people in the overrun risk zone, damage to structures and potential structural collapse leading to damage or injury in other parts of the station. The risk to people travelling on the train is covered by the requirements in section 11. The 20 m distance is approximately one vehicle length, based on experience.

Guidance

G 5.1.5  GIGN5633 provides guidance for buffer stops and end impact walls, and the consideration of structures in the overrun risk zone. It provides a risk assessment methodology for considering the likelihood of buffer stop overrun and the potential consequences, and an approach for assessing the risk from trains overrunning a buffer stop when either new structures, or alterations (as defined) to existing structures or track layouts, are being considered in the overrun risk zone.
Figure 3: The overrun risk zone divided into risk areas A, B and C

G 5.1.6 Models and tools such as those provided in GIGN5633 are an aid to the assessment of risk when used in conjunction with professional expertise and judgement.

G 5.1.7 At stations categorised as national hub (Category A) and regional hub (Category B) stations (examples are provided in RIS-7702-INS), there are some platform / concourse areas that become particularly congested for short times during peak periods. This is often the case where fully loaded passenger trains arrive at terminal stations within a short period of time and there is congestion whilst queuing to exit automatic ticket gates. In a number of cases, to provide additional space for such situations, a frangible type of decking over the track forming the slide path behind the buffer stop has been installed. Further guidance on these types of decking is given in Appendix A of this document.
Part 6 Lighting of Platforms

6.1 Requirements for lighting on platforms

6.1.1 Platforms shall be provided with lighting which produces an average maintained illuminance of not less than 10 lux, measured on the platform surface. At busier stations, this value will need to be exceeded on a risk-based assessment of the passenger levels in line with Table 1.

6.1.2 There shall be a minimum vertical illuminance of 10 lux measured vertically at a point 1.0 m above the platform surface and perpendicular to the platform edge along the useable platform length.

6.1.3 The required value shall be measured opposite the first luminaire on the platform at the departure end(s). The measurement point shall be directed towards the observer.

6.1.4 The design uniformity for vertical illuminance along the usable platform edge area shall be no less than 0.3.

6.1.5 All design figures for illuminance quoted shall be based on the maintained illuminance levels. All maintained illuminance levels shall be determined without the presence of trains in platforms.

6.1.6 Sufficient illumination shall be provided for passenger information signs to be visible in the hours of darkness or in low light conditions when the station is open to station users.

Rationale

G 6.1.7 All platforms are required to have sufficient lighting over the usable platform edge area to enable safe use by passengers and staff in the hours of darkness or low light conditions. Uniformity (that is, ratio of minimum to average level) assesses the range of lighting levels on an individual platform, and this is limited to avoid problems with the delay as the human eye takes time to adapt to a change in lighting levels.

Guidance

G 6.1.8 Lighting is only required to be provided for passengers and staff in the hours of darkness or in low light conditions. There is no requirement for the lighting to remain on when the platforms are not in use. It is good practice to design a lighting solution which caters for any foreseeable unusual events, such as the emergency detraining of passengers from a failed train unit, or for the use of staff during an overnight possession.

G 6.1.9 Requirements for horizontal illuminance and uniformity, $u_0$, are provided in the PRM TSI by reference to EN 12464-1 (which covers indoor work places) and EN 12464-2 (which covers outdoor work places). These documents consider platforms as ‘Open’, ‘Covered’, or ‘Fully enclosed’ and the number of passengers as ‘Small’, ‘Medium’ or ‘Large’ - see Table 1.
Passengers | Open platform | Covered platform | Fully enclosed platform
--- | --- | --- | ---
Small number | 5 lux ($u_0 = 0.2$) | 50 lux ($u_0 = 0.4$) | 100 lux ($u_0 = 0.4$)
Medium number | 20 lux ($u_0 = 0.3$) |
Large number | 50 lux ($u_0 = 0.4$) | 100 lux ($u_0 = 0.4$) | 200 lux ($u_0 = 0.5$)

Table 1: Values for horizontal illuminance and uniformity from the PRM TSI

G 6.1.10 a) Note 1. The illuminance levels shown in Table 1 are average maintained figures.
b) Note 2. The illuminance level of 5 lux shown for the open platform should be exceeded for UK platforms in accordance with 6.1.1.
c) Note 3. The illuminance level of 200 lux shown for the fully enclosed platform is possibly excessive in some cases, and certainly should not be exceeded. At very busy stations an assessment should be carried out on the provided lighting level by the designer / project sponsor.

G 6.1.11 Some of the clauses of the ENs are not included by the TSI reference, such that only some of the combinations of the above platform categories are covered. The values in bold text for platforms with large numbers of passengers are given in the EN but are NOT referenced in the TSI and so can be taken as guidance only. The values not in bold text are mandatory.

G 6.1.12 GB guidance is that the applicable lighting requirements for categories of platform that are not called up by the PRM TSI will be those for the next lowest number of passengers.

G 6.1.13 Neither the EN nor the TSI provide definitions of the different platform types or passenger numbers.

G 6.1.14 For platform types, GB guidance is that ‘Fully enclosed’ applies to a very small number of stations / platforms, which may be those already considered (for example, for fire purposes) as ‘underground’. RIS-7702-INS uses the terminology of ‘sub-surface’ platforms for these locations. ‘Covered’ applies to those platforms which have a full roof and back wall such that little natural light will enter. Platforms which have a partial canopy, but no back wall, along with those that have no canopy, could be considered as ‘open’.

G 6.1.15 For passenger numbers, no GB guidance is given.

G 6.1.16 It is considered unlikely that an illuminance level of 5 lux (as stated in EN 12464-2 for open platforms with small numbers of passengers) is adequate for normal use. The previous GB minimum requirement was 10 lux, and 20 lux may be more relevant for modern train dispatch methods.

G 6.1.17 The DfT issued ‘Design Standards for Accessible Railway Stations version 4’ in March 2015. Section H.1 of this document deals with lighting. This document summarises the elements of the PRM TSI applicable to lighting and aligns with this standard. Within the yellow / orange framed box sections there are a number of lighting levels
which are given for lifts, escalators, waiting rooms and platforms. It should be noted that these lighting levels are aspirational levels given by the DfT but are stated within Code of Practice Guidance, not as an industry requirement.

G 6.1.18 It is good practice in the design of new stations and alterations (as defined) to existing stations to avoid the creation of sharp transitions of light by allowing natural light to enter the station area for a reasonable distance to maintain an acceptable level of visual performance by drivers during the adaptation process.

G 6.1.19 It is good practice to consider, and avoid where possible, shadowing, for example of platform furniture.

G 6.1.20 Where a particular platform includes a combination of sections that are fully enclosed, covered and/or open, then the applicable EN requirements for the different areas will be relevant, together with the uniformity requirements. For example, a platform for a medium number of passengers that is partly covered (50 lux) and partly open (20 lux) would still be able to meet the more onerous uniformity requirement (0.4 for the covered section) without increasing the illuminance on the open section.

G 6.1.21 Requirements for the location of isolated columns for new lighting or alterations (as defined) to lighting are set out section 4.1. Requirements for the headroom to suspended lighting are set out in 7.1.

G 6.1.22 Guidance on the lighting of stations is provided in RIS-7702-INS.

G 6.1.23 RIS-7702-INS gives guidance that the lighting specification be based on requirements for the performance of particular visual tasks at stations rather than solely according to the station category.

G 6.1.24 RIS-7702-INS gives guidance on risk assessments to consider the transition from sunlit areas to artificially lit areas at stations and vice versa.

G 6.1.25 RIS-7702-INS gives guidance on consideration of the environmental impact of lighting installations, including light pollution.

G 6.1.26 RIS-7702-INS gives guidance on the use of detection systems or time clocks to dim or switch lighting based on ambient conditions, train times or the presence of passengers. Good practice is that such equipment be fail safe and return to full illuminance levels in three seconds when triggered.

6.2 Requirements for lighting and location of DOO equipment on platforms

6.2.1 At DOO platforms using mirrors and driver line of sight only, the horizontal illuminance over the usable platform edge area shall not be less than 20 lux at platform level, along the extent of the platform length to which DOO applies.

6.2.2 At DOO platforms using mirrors and driver line of sight only, there shall be a minimum design vertical illuminance of 6 lux measured vertically at a point 1.0 m above the platform surface and perpendicular to the platform edge area, along the extent of the platform length to which DOO applies.

6.2.3 Where CCTV camera, monitors and on-train camera/monitor systems are used, the equipment shall be suitable for operation at the lower vertical illuminance value and
the cameras shall be aimed such that screen contrast is not impaired by glare from the luminaires.

6.2.4 All design figures for illuminance quoted are based on the maintained illuminance levels. All maintained illuminance levels shall be determined without the presence of trains in platforms.

6.2.5 The colour of light emitted from lighting installations shall be suitable in terms of spectral composition for human vision and the video cameras.

6.2.6 Luminaires, video cameras and monitors shall be located to ensure the view of driver or staff involved in train working is not impaired by:
   a) Glare created by luminaires in the same field of view as DOO monitors and mirrors.
   b) Reflection of the light emitted from luminaires off DOO monitors and mirrors.
   c) Light from luminaires falling onto DOO camera lenses.

6.2.7 The design of new stations and alterations (as defined) to existing stations shall minimise the creation of sharp transitions of light by allowing natural light to enter the station area for a reasonable distance to maintain an acceptable level of visual performance by drivers during the adaptation process.

Rationale

G 6.2.8 All platforms at DOO stations are required to have sufficient lighting over the useable platform edge area, along the extent of the platform length to which DOO applies, to enable safe use by passengers and staff in the hours of darkness or low light conditions.

Guidance

G 6.2.9 In designing new or modified lighting arrangements, it is good practice to consider possible future use of platform or train mounted equipment for train dispatch.

G 6.2.10 Where vertical illuminance is simulated using lighting design software, the measurement point is to be established in the software model to predict that the vertical illuminance meets the requirement; this negates the need for site verification.

G 6.2.11 RIS-7702-INS gives guidance on risk assessments when considering the transition from sunlit to artificially lit areas and vice versa at stations.

G 6.2.12 RIS-2703-RST provides a standard for the on-train camera/monitor system associated with driver only operation of passenger trains.
Part 7  Headroom on Platforms

7.1  Requirements for minimum headroom to station roof from platform

7.1.1  The minimum headroom to new station roofs and platform canopies or alterations (as defined) to station roofs and platform canopies, suspended equipment, signs and lighting shall be 2300 mm for the following distances from the platform edge:

a)  3000 mm where the permissible or enhanced permissible speed on the line adjacent to the platform exceeds 100 mph (160 km/h).

b)  2500 mm at all other platforms.

Rationale

G 7.1.2  The minimum headroom requirements are based on a nominal 915 mm high platform and a train footstep position in accordance with GMRT2173. The headroom requirements provide for people standing on the platform, together with people boarding and alighting from the train, possibly with umbrellas or other long items.

Guidance

G 7.1.3  The PRM TSI contains no information on headroom on platforms. The INF TSI has a specific case for the height and offset of platforms for the GB network.

G 7.1.4  When planning or designing a new platform, or alterations (as defined) to an existing platform, the relationship between the position of the platform and the energy subsystem is to be taken into account. The requirements detailing the clearance requirements of an electrification system are contained within GLRT1210. Additionally, consideration of maintenance tasks near live overhead lines is necessary.

G 7.1.5  Driver only operation mirrors are mounted such that they can be viewed by the driver to see along the train and platform. In some cases, the position of the mirror will be constrained by station roofs, platform canopies or other equipment. In such situations the headroom could be compromised at the mirror and, because of the proximity to the platform edge, it is not appropriate to fence off the reduced headroom area underneath the mirror. In these situations, consideration of a deviation from the above requirements might be appropriate.

Figure 4: Requirements for Headroom at Station Platforms
G 7.1.6 GIRT7073 sets out requirements for defining and maintaining clearances to trains.

Required clearance to swept envelope (see GIRT7073)

2300 mm (Minimum)

x = 3000 mm where speed > 100 mph, or 2500 mm elsewhere
Part 8  Usable Length of Platforms

8.1  Requirements for usable length of platforms

8.1.1  The usable length of platforms shall be long enough to accommodate the longest train formation regularly booked to stop at a platform, with allowances for inaccurate stopping and operational requirements.

8.1.2  Where the characteristics of the railway do not provide a reasonable opportunity to achieve the requirements in 8.1.1, it is permissible for the usable length of a platform to be shorter than is sufficient to accommodate the longest train formation booked to stop at the platform, provided that procedures are in place to protect the safety of passengers and train crew boarding and alighting in accordance with the SMS.

8.1.3  On all through platforms, information or signage shall be provided to drivers to enable them to stop their trains at the correct point. Among the arrangements in use are stop markers, mandated distances from starting signals and contrasting painted platform copers.

Rationale

G 8.1.4  These requirements are to enable safe access to and egress from trains, reducing the risk of passengers or staff alighting from trains at a point beyond the extremity of the platform.

Guidance

G 8.1.5  Typical allowances for inaccurate stopping and operational requirements are set out in the table below. Note that when designing / altering the operational assumptions, and determining the actual distance allowances, full consultation is recommended with the affected Train Operating Companies.

<table>
<thead>
<tr>
<th>Operational requirement</th>
<th>Allowance</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inaccurate stopping (Through Platforms)</td>
<td>4 m</td>
<td>Can be reduced to 2 m where physical constraints preclude the construction of a platform of the required length, and the control systems of the train allow for accurate stopping</td>
</tr>
<tr>
<td>Inaccurate stopping (Terminal Platforms)</td>
<td>5 m</td>
<td>Can be reduced where physical constraints preclude the construction of a platform of the required length, and the control systems of the train allow for accurate stopping</td>
</tr>
</tbody>
</table>
### Interface between Station Platforms, Track, Trains and Buffer Stops

<table>
<thead>
<tr>
<th>Operational requirement</th>
<th>Allowance</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Buffer stop stand back</td>
<td>2 m</td>
<td>Distance between the front of a train at its intended stopping position and the face of a buffer stop</td>
</tr>
<tr>
<td>Dividing a train</td>
<td>2 m</td>
<td>Dividing a train to form two separate trains</td>
</tr>
<tr>
<td>Joining two trains</td>
<td>6 m</td>
<td>Joining two trains to form a single train. Allow 4 m for the inaccurate stopping of the second train, plus 2 m to allow for the operation of joining the trains</td>
</tr>
</tbody>
</table>

**Table 2:** Typical distance allowances for inaccurate stopping and operational requirements

G 8.1.7 At terminal platforms, where the buffer stop lies within the length of the platform, the space for the buffer to operate is in addition to the usable length. Requirements for buffers stops are set out in Part 11.

G 8.1.8 Where the platform is not long enough to accommodate all trains booked to call and procedures are in place to protect the safety of passengers and staff, the platform would ideally be long enough to accommodate all passenger and crew doors and to allow for inaccurate stopping. If this is not the case, then the priority would be for the platform to be long enough to cover all passenger doors.

G 8.1.9 RIS-2747-RST describes the consideration for design of a system of selective door operation (SDO) to be adopted for new trains where there are no alternative means to accommodate all doors on a train within the usable length of a passenger platform.

G 8.1.10 The usable length of the station platform may need to be restricted to maintain electrical safety distances (see GLRT1210 and GMRT2111 for further information).

G 8.1.11 Where additional passenger capacity is required on specific routes, there will be operational pressures to increase the train capacity, often therefore leading to longer train lengths. Some platforms may be constrained in length by bridges or track junctions, which are costly to resolve, leading to pressure to adopt an SDO system rather than extend platforms. The ultimate choice is predominantly a financial one; however, typical factors to be considered when choosing between platform extensions and adoption of SDO might include:

a) Passenger loading and flow patterns (peak / off-peak) at the station.
b) Timely advice to passengers of the need to move forward through the train to disembark by announcements or train crew intervention.
c) Extended station dwell times.
d) The positioning of train stop markers in relation to platform starting signals.

e) The potential for passenger alarm operation following restart of the train.

f) The potential for train crew being unable to access the operating position for SDO equipment due to standing passengers or overcrowding.

g) Usable platform width.

h) The peak period passenger flows.

i) The number of trains booked to stop at the platform.

j) Plans for the introduction of vehicles to the route without the functionality of SDO.

k) The number of passengers alighting at the platform.

l) The number of passengers boarding at the platform.

m) Station and platform access and egress arrangements.

n) Station lighting and signage.

o) Station supervision.

p) Structures or other physical limitations.

q) The availability of alternative platforms.

G 8.1.12 GIRT7033 sets out requirements for the design of platform stop markers.

G 8.1.13 RIS-8060-CCS requires that platform mounted mirrors and monitors for train dispatch are located based on a stopping tolerance of ±1 m from the marked train stop location.

G 8.1.14 In determining the usable length of platforms, it is important to consider the stopping positions of trains with respect to the position of the signal(s). RIS-0737-CCS sets out particular requirements and guidance for signals on platforms and visibility for train drivers that affects the usable length of platforms.
Part 9 Other Requirements for Safety of Passengers Boarding or Alighting from Trains

9.1 Requirements for platform loading

9.1.1 All useable areas of a platform shall be designed to withstand a minimum characteristic load of 5 kN/m².

9.1.2 The platform shall be designed for any other loads that could be applied to it (for example, vehicular loads where access to the platform is required).

Rationale

G 9.1.3 Station platforms are required to be designed to support the loads that are imposed by passengers boarding or alighting trains, and also other loads such as those that arise from maintenance activity (for example, plant or equipment necessary for maintenance) and vehicular access (for example, transport of people with reduced mobility).

Guidance

G 9.1.4 Table 6.2 of BS EN 1991-1-1 sets out recommended values for the design of areas that are susceptible to large crowds (Category C5 – see Table 6.1).

G 9.1.5 The minimum characteristic value of 5 kN/m² is considered to represent the general effects of crowd loading.

G 9.1.6 Other loads that could be applied to platforms, for example from vehicles or due to maintenance activity, are best determined on a project-specific basis where the normal and exceptional use of platforms, and the access requirements for maintenance, can be assessed. The application of other loads is determined for a specific project.

G 9.1.7 Determination of actions induced by ‘transport vehicles’, ‘special devices for maintenance’, and ‘vehicle traffic areas (excluding bridges)’, is set out in clauses 6.3.2.4, 6.3.2.5, and section 6.3.3, of BS EN 1991-1-1.

9.2 Requirements for crossfall on a platform

9.2.1 For new platforms and alterations (as defined) to existing platforms, the surface shall be constructed to provide a fall away from the rear edge of the platform coper, or platform edge if there is no separate platform coper.

9.2.2 If copers are provided, for new or altered platforms they shall be nominally level from the platform edge to the rear of the coper.

9.2.3 The fall shall be at a nominal gradient of 1:50 and within the limits 1:80 to 1:40.

Rationale

G 9.2.4 A crossfall is provided on a platform to provide for drainage and to prevent objects with wheels, for example trollies, baby buggies and suitcases, running off the platform onto the track. However, if the crossfall is too steep it can make it difficult
for wheelchair users and for people with ambulatory difficulties to make their way along the platform.

G 9.2.5 The DfT publication ‘Inclusive Mobility’ indicates a number of reports that suggest that 1:50 is a preferable crossfall with 1:40 being regarded as the steepest acceptable for wheelchair users.

Guidance

G 9.2.6 For double face platforms, the arrangements of the crossfall on the two platform faces is typically considered together, as there can be an added complication where one of the adjacent tracks is significantly higher than the other track. In this situation, a wheeled object could run from the higher platform face and develop sufficient momentum that it will run off the lower platform face. The potential for such a situation depends on a range of factors that include:

a) The two crossfalls involved and the width of the double platform.
b) The friction properties on the platform surface in dry or wet conditions.
c) How the wheeled object is taken off a train.
d) The nature of the wheeled object: types of wheels, brake characteristics and method of steering.
e) The nature and speed of passing trains.
f) The location on the platform where users are likely to leave wheeled objects, for example, waiting shelters, stairs, lifts.

G 9.2.7 In designing the gradients for a double face platform, a number of factors are typically considered, including:

a) The difference in height between the two adjacent tracks.
b) The platform surface arrangements.
c) Whether a step, fence or planting bed can be installed where the two crossfall gradients intersect.
d) How the station is supervised.
e) What announcements are made on board the train and at the station.

G 9.2.8 There are many platforms which historically are not at the correct height. For low platforms, solutions are possible to achieve a short section of standard height platform. Where such a section of platform is installed, with ramps each side of the raised section to tie into the existing platform, the requirement for the crossfall of the raised area is set out in 9.2.1 to 9.2.3. The ramps from the raised section of platform to the existing low platform should not have a gradient steeper than 1:20. If there is a height difference from the back of the raised platform to the existing platform, a fence or barrier is likely to be required.

9.3 Requirements for platform recess

9.3.1 For new platforms or a platform subject to alteration (as defined), a recess with a minimum width of 300 mm measured horizontally from the platform / coper edge and at a minimum height of 480 mm measured from rail level (see Figure 5), shall be
formed beneath the platform edge. The recess shall be kept clear of cables and other obstructions.

Figure 5: Under platform recess

Rationale

G 9.3.2 The requirements are in place to provide a clear space where a person who had fallen off the platform could, as a last resort, lie clear of a train. Should a person fall under the train or between the train and the platform, this space provides a route for emergency services to access the person by crawling the length of the train within the platform recess area.

Guidance

G 9.3.3 Research Project T1062, "Platform recess - review of requirements", reviewed the suitability of the recess. The output from this research project considered the required space, including access for emergency services, and concluded that a width of 300 mm, in most cases, is adequate. Where platforms serving either freight or passenger type rolling stock which is fitted with current collection equipment (that is, similar to the W6a or LSVG profiles), the recommendation is for the recess width to be increased to 400 mm.

G 9.3.4 Provision of a wider recess is particularly beneficial where there is a platform or other obstruction on both sides of the track.

G 9.3.5 Provision of a mesh screen under voided platforms 500 mm from the platform edge can help to mitigate rubbish accumulation and trespass.

G 9.3.6 Although the datum for the recess dimension is the platform edge, it is important to recognise that the dimension from the platform wall to the adjacent track is an important consideration for providing a clear space.
9.4 Guidance for platform and coper surfaces

**Guidance**

G 9.4.1 The PRM TSI requires that ground surfaces be slip-resistant.

G 9.4.2 A stable, even and anti-slip surface is necessary for safe walking. Wheelchairs can be propelled most easily on surfaces that are hard, stable and even. Irregular surfaces, such as cobblestones, can significantly impede wheelchair movement.

G 9.4.3 Depressions, humps or other irregularities in the platform surface, except tactile surfaces provided for visually impaired persons, can cause the platform to be unsafe for users. Avoiding breaks in the surface such as single steps, thresholds to doors, and drainage channels at points of access, can help reduce potential trip hazards for users walking on the platform.

G 9.4.4 The DfT document ‘Department for Transport / Transport Scotland Accessible Train Station Design for Disabled People: A Code of Practice’ sets out requirements for the tactile surface.

G 9.4.5 RSSB Research Report T158 entitled ‘The use of tactile surfaces at rail stations’ offers further information on the types of tactile markings suitable for platforms.

9.5 Requirements for provision of colour contrasting markings on obstructions

9.5.1 Colour contrasting markings shall be provided on isolated columns or other obstructions, when new or subject to alteration (as defined), where these obstructions could interrupt the movement of visually impaired people.

9.5.2 Appropriate markings or other protection to vertical glazing and cladding shall be provided to prevent accidental collision by station users, including visually impaired people.

**Rationale**

G 9.5.3 For the visually impaired, increasing the contrast between an object and its background will generally make the object more visible.

**Guidance**

G 9.5.4 The PRM TSI requires transparent obstacles such as glass doors or walls to be marked and highlighted unless passengers are protected by other means such as handrails or continuous benches.

G 9.5.5 Guidance can be found in ‘Accessible Train and Station Design for Disabled People: A Code of Practice’, published by the DfT.

9.6 Requirements for signs and markings on platforms

9.6.1 Where there are wide gaps and large stepping distances between the train and the platform edge, warning signs and platform markings shall be provided (see 3.4).
Rationale

G 9.6.2 Warning signs and platform markings are provided to ensure that passengers are not caught unawares by the gaps and large stepping distances between the train and the platform edge.

Guidance

G 9.6.3 At all stations it is considered best practice to provide passenger information signs that clearly indicate the station name to passengers on board trains standing at, or passing through, the station.

G 9.6.4 **10.1.2** sets out requirements for signage to warn passengers about the aerodynamic effects of trains passing at speeds exceeding 100 mph (160 km/h).

Part 10 Protection of People from Aerodynamic Effects of Passing Trains

10.1 Requirements for aerodynamic effects of passing trains on the platform

10.1.1 At a station platform, where the permissible or enhanced permissible speed on the adjacent line is greater than 125 mph (200 km/h), people shall be prevented from gaining access to the platform.

10.1.2 At a station platform, where the permissible or enhanced permissible speed on the adjacent line is greater than 100 mph (160 km/h), a yellow line shall be provided on the platform, together with warning signs. The yellow line shall be positioned so that people standing immediately behind the line are at least 1500 mm away from the platform edge.

Rationale

G 10.1.3 Slipstream velocities to which passengers and staff on stations are exposed by passing trains have to be limited for comfort and safety.

G 10.1.4 The key factors influencing slipstream strengths are the train speed; the distance from the side of the train; the type, shape and finish of the surface of the train; and the ambient wind speed and direction.

Guidance

G 10.1.5 The PRM TSI does not give fixed dimensions either for required platform width or for the ‘danger area’ at the platform edge. The ERA Guide for the Application of the PRM TSI (ref ERA/GUI/02-2013/INT) states that ‘the limits of the danger area are defined in National Rules’. The current document is the relevant National Rule for the GB mainline system.

G 10.1.6 Descriptions of train slipstream effects are given in EN 14067-2:2003 ‘Railway applications - Aerodynamics - Part 2: Aerodynamics on open track’ and in RSSB Research Project T248 final report ‘Review of train slipstream effects on platforms’. More background on aerodynamic effects in platforms is given in Appendix B.1 of this document.

G 10.1.7 At a station platform, where freight trains (including container traffic but excluding those trains with the same aerodynamic profile as passenger trains, such as mail trains) pass, or are proposed to pass, on the adjacent line at speeds greater than 45 mph (75 km/h), it is good practice to take action to reduce the risk from the aerodynamic effects of passing trains to lightweight objects and vulnerable passengers on station platforms (for example, pushchairs, the elderly or frail). See Appendix B.

G 10.1.8 In terms of the safety of people and wheeled items in stations, the risk from slipstream effects can be mitigated by frequent passenger warning announcements, increased yellow line clearances from the platform edge or even segregated safe zones on the platform. It may not be possible in certain station configurations to ensure complete safety from the slipstreams of passing high-speed trains and thus
through-operations might have to be prevented or passengers prevented from being on the platform during such passings.

G 10.1.9 GIRT7033 sets out requirements for the design of a warning sign for aerodynamic effects on station platforms.

G 10.1.10 Where an IM or RU makes any changes to the existing situation, either through improvement works which result in a line speed upgrade, or where the speed of passing trains is increased, it is a legal requirement for the party making the change to consult with all affected parties, which will include the IM (Stations) so that any risk assessments and mitigation measures can be amended.

10.2 Requirements for position of yellow line required for aerodynamic effects

10.2.1 Where the position of a yellow line at 1500 mm away from the platform edge is likely to lead to overcrowding, it is permissible to reduce the distance between the yellow line and the platform edge. In this case, action shall be taken to mitigate the risk from the aerodynamic effects of passing trains.

Rationale

G 10.2.2 Reducing the distance of the yellow line from the platform edge will increase the slipstream risk. This increase can be mitigated by the introduction of suitable measures. Depending on the specific circumstances at the platform under consideration, a risk assessment can identify the most appropriate measures to be introduced.

Guidance

G 10.2.3 Appendix B provides a risk assessment methodology for the assessment of the aerodynamic risk from passing trains. It also gives advice on the factors to take into account in a risk assessment to determine the action required to mitigate the risk from the aerodynamic effects of passing trains, and the mitigation measures to consider.

G 10.2.4 When the conditions set out in 10.1.2 or 10.1.7 exist, the actions required are determined on the basis of a risk assessment that takes into account a number of factors, including:

a) The anticipated number of lightweight objects and vulnerable station users at risk.
b) The speed, type and frequency of trains passing.
c) The layout of station structures on the platform.
d) The level of exposure of the platform to cross-winds.
e) The level of station staffing.
f) Any recorded incidents or accidents at the station caused by the aerodynamic effects of passing trains.
g) Platform falls and surfacing.

G 10.2.5 Where both passenger trains at speeds greater than 100 mph (160 km/h) and freight trains at speeds greater than 45 mph (75 km/h) pass, the risk assessment and subsequent actions are normally considered together.
When determining appropriate action, consideration is given to a range of mitigation measures, including:

a) The provision of warning signs and platform markings.
b) The provision of marked safe areas for the use of waiting passengers and their belongings.
c) Poster campaigns to alert people to the dangers from the slipstream effects of passing trains, particularly to unrestrained pushchairs.
d) Announcements warning passengers of the risk.
e) The level of station staffing.
f) The agreement of the railway undertaking (RU) to load their freight trains in a homogeneous manner, thus reducing the aerodynamic effects of the train. An example of this might be a container train avoiding gaps where containers have not been loaded by using all unloaded container vehicles at the end of the train, or by using empty containers to fill any gaps between loaded containers.
g) The agreement of the RU to reduce the speed of trains.

Research Project T749 ‘Guidance on protecting people from the aerodynamic effects of passing trains’, developed and tested a quantitative method for undertaking station risk assessments and to supplement the guidance above.

The risk assessment methodology contained within Appendix B of this document is based on research undertaken for Railtrack by British Rail Research. Its suitability was tested as part of T749 through desktop trials for selected stations, interviews with station staff, and a workshop for key station safety stakeholders. An Excel spreadsheet version is available at https://www.rssb.co.uk/rail-risk-portal. Guidance on application of the methodology is included in Appendix B and includes feedback from stakeholders concerning the need for guidance (see Appendix F of the T749 report).

The risk assessment methodology may be used to provide a comparison of the unmitigated risk between different platforms. However, there is also a need for a qualitative assessment to take account of the benefits of potential mitigation measures, once the unmitigated risk has been assessed.

The effectiveness of typical mitigation measures was assessed at an additional workshop with key industry station safety stakeholders. Guidance on assessment of the impact of mitigation measures on the aerodynamic risk from passing trains is included within Appendix B of this document.
Part 11 Requirements for Buffer Stops and End Impact Wall

11.1 Requirements for new buffer stop construction at stations

11.1.1 Energy absorbing buffer stops shall be provided at terminal or bay platforms.

11.1.2 The determined impact speed shall be not less than 10 km/h.

11.1.3 Trains shall be brought to a controlled halt from the determined impact speed with an average retardation rate not exceeding 0.15g (1.47 m/s^2). Where site constraints make it unavoidable, lightweight trains may be subjected to higher retardation rates, but the average retardation rate for any train shall not exceed 0.25g (2.45 m/s^2).

11.1.4 Where sliding or friction buffer stops are proposed, an appropriate length of straight track shall be provided behind the buffer stop to accommodate the designed movement of the buffer stop and its associated friction shoes (sometimes referred to as slave units).

Rationale

G 11.1.5 Modern buffer stops are designed to operate, when required, in a manner that controls the speed of the train whilst ensuring that the retardation rates do not reach levels which would introduce excessive risk to the people travelling on the train.

Guidance

G 11.1.6 It is good practice to provide a length of straight track, greater than the length of the longest vehicle permitted to use the track, at the approach to the buffer stop. The intention is that the leading vehicle of a train approaches the buffer stop perpendicular to the buffer stop.

G 11.1.7 The type of buffer stop selected and its design shall take into account the following factors:

a) Types of rolling stock.

b) End impact wall arrangement.

c) History of train overruns, if appropriate for new construction of buffer stops.

d) Any running lines, structures, walking routes, or other areas of risk behind the buffer stop.

e) Numbers of trains proposed to use the line.

f) Requirements for insulated rail joints and electrical insulation of the buffer stop.

g) Rolling stock coupling systems.

h) Minimum and maximum train weights.

i) Approach gradient.

j) Likely track adhesion conditions, including the effect on braking performance of the weather and the covering or otherwise of the track.

k) Signalling arrangements and sighting distances.

l) Permissible speed (shown in the Sectional Appendix) on the approach to the buffer stop.

m) Lighting conditions.

n) Space required for designed movement of the buffer stop.
11.1.8 sets out the requirements for the impact speed to be used in design calculations following an assessment of the relevant factors listed above.

G 11.1.9 Consideration is normally given to the provision of additional safety measures at locations where:

a) An assessment of the factors listed in 11.1.7 suggests that there may be a high probability of train overruns.

b) An assessment of the factors listed in 11.1.7 suggests that there may be severe consequences from a train overrun.

G 11.1.10 These additional safety measures include, but are not limited to:

a) Improved illumination.

b) Countdown marker boards; the use of these is described in GIRT7033.

c) Permanent speed restrictions on the approaches to the buffer stop.

d) Screening or removal of driver distractions, for example advertising hoardings.


11.2 Requirements for existing buffer stops in stations

11.2.1 Buffer stops shall be provided at terminal or bay platforms.

Rationale

G 11.2.2 To ensure that the train can be halted in a safe manner that reduces the risk of serious injury to people on the station platform and train.

Guidance

G 11.2.3 The current risk assessment will indicate whether the buffer stop is adequate for the location concerned. The risk assessment takes account of:

a) Risk of harm to people.

b) Risk to critical structures.

c) The factors listed in 11.3.

d) The type and condition of the buffer stop provided.

e) The history of buffer stop collisions.

G 11.2.4 GIGN5633 gives a method of risk assessment.

11.3 Requirements for end impact walls in stations

11.3.1 End impact walls shall be provided where this is reasonably practicable and they would reduce the risk of a train overrun causing harm to people and damage to critical structures.

Rationale

G 11.3.2 If a train overrun were to occur, the end impact wall ensures that the train is unable to go onto the station platform.
When assessing the risk of a train overrun, the following are taken into account:

a) The positioning of critical structures and supports.
b) The positioning of workplaces and retail outlets.
c) The areas where people are likely to congregate.
d) Other areas of risk behind buffer stops.

For tracks serving passenger traffic, the requirements for the design of end impact walls are set out in BS EN 1991-1-7 Accidental Actions.

It is good practice to consider the buffer stop and end impact wall together as a single system.

The purpose of the buffer stop is to stop an overrunning train safely and without permanent damage, and with minimal injury to passengers and staff.

The purpose of the end impact wall is to prevent an overrunning train from intruding into the zone being protected. In this case, permanent damage or deformation to the train might be incurred.

Where the risk assessment and particular factors prove that an end impact wall is the preferred design solution, it is good practice to design the end impact wall to a minimum height of 1.3 m above the top of the rail.

When designing the end impact wall, it is good practice to ensure there are no features or protrusions that might cause particular local damage to a train colliding with it, for example, penetrating the cab of the train.

Exceptionally, where the end impact wall is providing protection to a structure that, if impacted, could collapse onto the track or cause other significant potential for injury, the design could promote deflection of the train laterally away from the structure.

Terminal tracks at stations in tunnels shall be provided with an adequate length of overrun tunnel.

A sufficient length of track behind the buffer stop is required to ensure that, if the train does overrun, it does not impact into a wall.

The factors to take into account in determining the length of overrun required are listed in 11.1.7.

A buffer stop shall be provided where a terminal track is created by temporary arrangements, for example during works to a station or track remodelling.
Rationale

G 11.5.2 If engaged, the buffer stop can halt the train in a safe manner that reduces the risk to people or structures.

Guidance

G 11.5.3 It is good practice for the design of the buffer stop to take into account the factors listed in 11.1 and also take into account:

a) The duration of the temporary arrangements.

b) Any worksite or temporary structures behind the buffer stop.
Part 12  Application of the Requirements for Height of Platforms, Width of Platforms and Offset of Platforms

12.1  Scope

12.1.1  The requirements for Platform Height 3.1.1, Platform Offset 3.2.1 and Platform Width 4.1, which are duplicated in GIRT7020, apply to all new and modified infrastructure (this excludes like-for-like replacement) affecting platforms.

12.1.2  New, renewed and upgraded infrastructure as defined in the Railways (Interoperability) Regulations 2011 (as amended) are required to comply with the TSI and all relevant NTRs.

12.1.3  The requirements in this document do not apply retrospectively, so action to bring existing infrastructure into compliance with the requirements in GIRT7020 is not required.

12.2  General compliance date

12.2.1  The requirements in 3.1.1, 3.2.1 and 4.1 are to be complied with from 01 September 2018.

12.3  Deviations

12.3.1  Where it is considered not reasonably practicable to comply with the requirements in 3.1.1, 3.2.1 and 4.1, which are duplicated in GIRT7020, permission to comply with a specified alternative should be sought in accordance with the deviation process set out in the Railway Group Standards Code.

12.3.2  In the case where TSI compliance is required for a new, renewed or upgraded vehicle or structural subsystem, the derogation process to be followed is set out in the Railways (Interoperability) Regulations 2011 (as amended).

12.4  Exclusions to general compliance date

12.4.1  There are no exceptions to the general compliance date specified in 12.2.

12.4.2  If, at the time the requirements are to be complied with, a project is at an advanced stage of development, having regard to the impact that a change in technical specification would have on the project, it is permissible to continue to meet the equivalent requirements in the Railway Group Standards applying before these requirements are to be complied with.

12.4.3  If the project requires an authorisation for placing into service, a decision to continue to meet the equivalent requirements in the Railway Group Standards applying before these requirements are to be complied with, this should be discussed with the Office of Rail and Road.
Appendices

Appendix A  Frangible Decking at Terminal Stations

A.1  Frangible decking at terminal stations

A.1.1  At stations categorised as national hub (Category A) and regional hub (Category B) stations, there are some platform / concourse areas that become particularly congested for short times during peak periods. This is often the case when fully loaded passenger trains arrive at terminal stations within a short period of time and there is congestion whilst queuing to exit automatic ticket gates. In a number of cases, to provide additional space for such situations, a frangible type of decking over the track forming the slide path behind the buffer stop has been installed (see Figure 6).

A.1.2  A frangible type of decking is formed from a number of decking units supported by beams. When impacted by a buffer stop, the beams guide the decking units and allow them to move freely and smoothly with the buffer stop. At other times, the decking units provide a solid platform surface for people.

A.1.3  Where this arrangement exists, buffer stops are fitted with impact brackets that are capable of applying the impact loads to the decking units. These comprise of fabricated plates welded to the rear flange of the buffer stop structure at the height required to contact with and collect the decking units as they move with the buffer stop.

A.1.4  RIS-7016-INS requires energy absorbing buffer stops to be provided at terminal or bay platforms. The key requirement is that buffer stops are to be designed to arrest the full range of trains between the heaviest and lightest using the given track, without risk of serious injury to people on the train. It is important that the performance of the buffer stop is not to be materially affected by the use of a frangible type of decking, so that any greater risk of serious injury to people on the train is avoided.

A.1.5  Frangible types of decking have only been used at national hub and regional hub stations. It is likely that the use of such systems can only be justified if the safety benefits arising from having increased passenger space are greater than the safety disbenefits arising from the very unlikely event of a train impacting the buffer stop, and subsequently connecting with the frangible decking units. The factors to consider in this justification include:

a) The safety benefits arising from having increased passenger space.

b) The safety disbenefits arising from the very unlikely event of a train impacting the buffer stop and causing movement of the decking units with passengers still on them.

c) How close the decking units will be to the buffer stop impact bracket. The greater the distance between the buffer stop impact bracket and the nearest decking unit, the less likely it is that the decking units will be affected in the event of a minor buffer stop impact.

d) If access to the area can be limited to only the busiest times, for example by cordoning off the area.
A.1.6 The design considerations for frangible decking considers a number of factors, including:

a) The performance of the buffer stop is not to be materially affected by the use of a frangible type of decking, so that any greater risk of serious injury to people on the train is avoided.

b) The decking is capable of supporting the maximum anticipated loading from passengers and vehicles required to use it.

c) How the decking units move in the event of a buffer stop contact and their effect on people on the platform.

d) The need to inspect and maintain the buffer stop and its friction slide units.

e) How the performance of the system can be maintained throughout its service life.

A.1.7 Frangible decking is intended to be moveable and therefore is not suitable for buildings; for example, kiosks and ticket machines should not be positioned on frangible decking.

Figure 6: Frangible decking at a national hub station
Appendix B

Assessment of Risk from the Aerodynamic Effects of Passing Trains at Stations

B.1 Assessment of risk from the aerodynamic effects of passing trains at stations

Introduction

B.1.1 This appendix contains a risk assessment method, which can be used to estimate the unmitigated level of risk at a platform due to the aerodynamic effects of passing trains. This risk concerns a non-stopping passenger or freight train passing adjacent to a platform where passengers are waiting for stopping trains.

B.1.2 When trains travel through still air conditions, they create flow disturbances that propagate into their surroundings and are felt as changes of static pressure with sharp variations in air speeds. Importantly, as the nose of a train passes, the air around it is displaced outwards from the sides of the train and upwards over the roof, accelerating as it does so. Accompanying this, there are relatively large changes in pressure during the time taken for the first few metres of the train nose to pass. To a stationary observer, these changes are felt as fluctuating forces accompanied by strong gusts of air.

B.1.3 Further along passenger trains, flows becomes more settled and streamlined, as they follow the generally smooth contours of the train. A general exception to this are the regions near unfaired intercar gaps and around the underbody, particularly close to exposed bogies, where roughness elements continue to disturb the flow laterally, which is significant for those working by the track. For such trains, the highest induced wind speeds occur after the tails of the trains have passed.

B.1.4 For freight trains, the flows after the leading locomotive may remain very unsteady and gusty due to the roughness of the sides of the freight wagons and discontinuities in the wagon profiles, particularly for part-loaded container flat wagons. This poses higher risks to passengers on platforms than for passenger trains as the strongest airflows occur during the passing of the train.

B.1.5 The mainly longitudinal airflows created by train slipstreams may produce hazardous aerodynamic effects at the trackside. The potential consequences of the slipstream effect of the passing train are that passengers or passengers’ belongings can be swept along, blown over, or drawn into the path of the train with the potential for damage or injury, as well as trackside workers and their equipment or station operators’ service trolleys. Slipstream effects are significantly enhanced by the presence of strong cross-winds, and it has been found that the worst cases occur on open trackside or at station sites on the leeward side of trains.

B.1.6 The following method evaluates the risk, based on the likelihood and potential severity of these events according to platform and traffic characteristics.

B.1.7 The risk assessment method calculates an unmitigated risk score. The score produced by the method is then used to assign a platform risk category (high, medium or low) as set out in the Risk Reduction Mitigation Table in B.2. The appropriate mitigation measures may then be considered for implementation to reduce the risk (see Mitigation Measures Table in B.2 of this document).
B.1.8 The method can be used to assess current platform conditions over a typical busy weekday, but may also be useful to assess other scenarios, when required, such as:

a) Proposed changes to the use of a platform, or passing train traffic patterns.

b) Temporary changes to traffic levels, which might result in a short-term increase in aerodynamic risk, for example, due to infrastructure works or possession activities.

c) Considering off-peak, peak times, or short-term busy periods (such as special events).

B.1.9 An Excel spreadsheet version of all of the forms and the risk assessment calculation sheet are available at [https://www.rssb.co.uk/rail-risk-portal](https://www.rssb.co.uk/rail-risk-portal). The spreadsheet automatically calculates the risk score and records the required information. These forms include:

a) Assessment details sheet.

b) Aerodynamic risk assessment calculation sheet.

c) Aerodynamic risk assessment weighting factors sheet.

**Aerodynamic risk assessment data collection form**

B.1.10 The following form captures the information that is required for the assessment method to produce a ‘Total Platform Unmitigated Risk Score’ for each platform. This data is supplemented by weighting factors which are explained in more detail in page 59 Tables A-F.

B.1.11 The letters in parentheses indicate where the various factors are used in the manual Aerodynamic Risk Assessment Calculation Sheet.

B.1.12 The information required comprises essential information that is needed to complete the assessment (assessment details) and optional information which may be helpful for assessment of the effectiveness of mitigation measures and for completion of the risk assessment.

<table>
<thead>
<tr>
<th>Assessment details</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Station name</td>
<td></td>
</tr>
<tr>
<td>Platform</td>
<td></td>
</tr>
<tr>
<td>Assessment completed by</td>
<td></td>
</tr>
<tr>
<td>Assessment date</td>
<td></td>
</tr>
</tbody>
</table>
### Assessment filter questions

<table>
<thead>
<tr>
<th>Question</th>
<th>Answer</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Is the platform a bay platform?</td>
<td>Yes / No</td>
<td>If response is ‘yes’ then an assessment is not required (negligible aerodynamic risk)</td>
</tr>
<tr>
<td>Does non-stopping traffic pass adjacent to the platform?</td>
<td>Yes / No</td>
<td>If response is ‘no’ then an assessment is not required (negligible aerodynamic risk)</td>
</tr>
</tbody>
</table>

### Local platform factor

<table>
<thead>
<tr>
<th>Category</th>
<th>Weighting</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Geographical location factor:</td>
<td></td>
<td>Low, medium, high geographical effect due to prevailing local wind conditions? (See map in Table A for suggested location factors. Increase or decrease if local conditions are not typical)</td>
</tr>
<tr>
<td>What is the geographical location factor for the station?</td>
<td>Low</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>Medium</td>
<td>4.4</td>
</tr>
<tr>
<td></td>
<td>High</td>
<td>4.8</td>
</tr>
<tr>
<td>(A)=</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Platform layout factor:</td>
<td></td>
<td>Select the most appropriate category based on the general descriptions in the platform layout Table B</td>
</tr>
<tr>
<td>What are the platform layout and wind exposure characteristics?</td>
<td>Open</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Enclosed</td>
<td>0.8</td>
</tr>
<tr>
<td></td>
<td>Intermediate</td>
<td>0.5</td>
</tr>
<tr>
<td>(B)=</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Local platform factor = \((A\times B\times 0.03)\)

### Stopping trains

<table>
<thead>
<tr>
<th>Number of stopping trains per day</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>(C)</td>
<td></td>
</tr>
</tbody>
</table>

Number of stopping passenger trains during a typical busy weekday

Estimate traffic density based on best available information (the ‘weighting’ is the actual estimated number of trains per day)
## Interface between Station Platforms, Track, Trains and Buffer Stops

### Additional notes

Normally only trains passing the platform being assessed are included. However, for narrower or open island platforms which are busy, the number of stopping and passing trains per day for either platform is the total for both platforms. This is due to waiting passengers moving without restriction between both platforms and therefore exposed to passing trains on both sides.

For wider island platforms – particularly those having extensive buildings, railings, or other type of ‘barriers’, which effectively separate the two platforms – it is permissible to consider the two platforms to be completely separate.

### Optional information (note as relevant)

<table>
<thead>
<tr>
<th>Infrastructure</th>
<th>Platform length (m)</th>
<th>Platform width (m)</th>
<th>Platform area unusable by passengers?</th>
<th>Platform area useable by passengers?</th>
<th>Island platform?</th>
<th>Is the platform straight, convex, concave?</th>
<th>Is the line bidirectional?</th>
<th>Is the view of approaching trains obscured (due to line curvature, foliage or infrastructure)?</th>
<th>Is the platform flat or sloped towards or away from the platform edge?</th>
<th>Other relevant infrastructure information</th>
<th>Staff</th>
<th>Is the platform staffed at all times?</th>
</tr>
</thead>
</table>

---

Uncontrolled when printed
Correction release RIS-7016-INS Iss 1.1 supersedes RIS-7016-INS Iss 1 with effect from 01/06/2019

RSSB

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## Optional information (note as relevant)

<table>
<thead>
<tr>
<th>Question</th>
<th>Answer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Is the platform staffed at peak times only?</td>
<td></td>
</tr>
<tr>
<td>Is the platform always unstaffed?</td>
<td></td>
</tr>
<tr>
<td>Number of staff on platform at any one time (during typical busy period)?</td>
<td></td>
</tr>
<tr>
<td>Other relevant staff information</td>
<td></td>
</tr>
</tbody>
</table>

## Crowds

<table>
<thead>
<tr>
<th>Question</th>
<th>Answer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Is platform crowding ever a significant issue?</td>
<td></td>
</tr>
<tr>
<td>Have there been any previous near-miss incidents at the platform?</td>
<td></td>
</tr>
<tr>
<td>Are there ever any local special events, for example football matches?</td>
<td></td>
</tr>
<tr>
<td>Is there a higher than average number of holiday makers with luggage?</td>
<td></td>
</tr>
<tr>
<td>Is there a higher than average number of children/elderly?</td>
<td></td>
</tr>
<tr>
<td>Is there a higher than average number of trolleys/buggies/etc?</td>
<td></td>
</tr>
<tr>
<td>Are there any especially narrow or constricted parts of platform?</td>
<td></td>
</tr>
<tr>
<td>Is there ever an uneven spread of waiting passengers due to platform layout?</td>
<td></td>
</tr>
<tr>
<td>Are there occasions where perturbed traffic at other stations causes increased crowds?</td>
<td></td>
</tr>
<tr>
<td>Other relevant crowd information</td>
<td></td>
</tr>
</tbody>
</table>

## Assessment notes / assumptions / queries / uncertainties
Optional information (note as relevant)

Aerodynamic risk assessment calculation sheet

B.1.13 The following table is used with the weightings tables on page 59 to calculate the individual risk scores for each passing traffic type. An excel copy of the table can be found on the RSSB website.

<table>
<thead>
<tr>
<th>Passing Traffic Type</th>
<th>(P)</th>
<th>(Q)</th>
<th>(R)</th>
<th>(S)</th>
<th>(T)</th>
<th>(U)</th>
<th>(V)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regional rail vehicle</td>
<td>1.50</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Freight train</td>
<td>1.55</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Freight train other than those above</td>
<td>1.20</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Multiple unit / 1-car units</td>
<td>1.15</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>High speed passenger train</td>
<td>1.17</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Aerodynamic risk assessment weighting factors

B.1.14 The following weighting factor reference tables are used to complete the final aerodynamic risk assessment calculation sheet. The letters in parentheses indicate where the various factors are used.

(A) Geographical location factor

<table>
<thead>
<tr>
<th>Region</th>
<th>Weighting</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low (L)</td>
<td>4</td>
</tr>
<tr>
<td>Medium (M)</td>
<td>4.4</td>
</tr>
<tr>
<td>High (H)</td>
<td>4.8</td>
</tr>
</tbody>
</table>

The geographical location weighting is taken from the approximate location of the station on the map. The factor is adjusted if local characteristics are relevant, for example close to open sea, platform on exposed embankment, regular experience of high wind conditions, station enclosed / protected from high wind conditions.
### (A) Geographical location factor

<table>
<thead>
<tr>
<th>Description</th>
<th>Weighting</th>
</tr>
</thead>
<tbody>
<tr>
<td>High</td>
<td></td>
</tr>
<tr>
<td>Medium</td>
<td></td>
</tr>
<tr>
<td>Low</td>
<td></td>
</tr>
</tbody>
</table>

### (B) Platform layout factor

<table>
<thead>
<tr>
<th>Summary</th>
<th>Description</th>
<th>Weighting</th>
</tr>
</thead>
<tbody>
<tr>
<td>Open</td>
<td>Platforms with a predominantly open and exposed environment, possibly with low rear walls, open railings or fences and simple shelters. Use this category when most of the platform length is ‘open’ even if there is a small section of the platform which is ‘enclosed’. Crosswind enhancement of slipstream can occur.</td>
<td>1</td>
</tr>
<tr>
<td>Enclosed</td>
<td>Platforms with a predominantly enclosed environment such as one with solid rear walls or station buildings and a canopy along the full platform length. Possible aerodynamic funneling effects can occur.</td>
<td>0.8</td>
</tr>
</tbody>
</table>
### Interface between Station Platforms, Track, Trains and Buffer Stops

#### (B) Platform layout factor

| Intermediate | Any other mixed platform layout (for example platform with high rear wall/fence but no canopy or platform with canopy but no rear wall). Funnelling and crosswind effects are reduced. | 0.5 |

#### (C) Number of stopping trains per day

| Actual number of stopping trains (see above note on island platforms) | No. of trains per day |

#### (D) Passing train type weighting

<table>
<thead>
<tr>
<th>Passing train type</th>
<th>Weighting</th>
</tr>
</thead>
<tbody>
<tr>
<td>Road vehicle-carrying train (Ford transit van carrier, cartic, carflat) with the load exposed</td>
<td>Autos</td>
</tr>
<tr>
<td>Freightliner / flat-bedded wagons with vertical ends</td>
<td>Containers</td>
</tr>
<tr>
<td>Freight train other than those above (tankers, hopper wagons)</td>
<td>Others</td>
</tr>
<tr>
<td>Multiple unit / loco-hauled passenger train</td>
<td>Regional</td>
</tr>
<tr>
<td>High-speed passenger train (HST, IC225, Eurostar etc)</td>
<td>Intercity</td>
</tr>
</tbody>
</table>

### Additional notes on (C) and (D)

**B.1.15** On island platforms, for narrower and open island platforms which are busy, the number of stopping and passing trains per day for either platform is the total for both platforms. This is due to waiting passengers transferring between both platforms.

**B.1.16** For wider island platforms – particularly those having extensive buildings, railings, or other type of barrier, which effectively separates the two platforms – it is permissible to consider the two platforms as completely separate.
(E) Passing trains traffic weighting

<table>
<thead>
<tr>
<th>Number of trains passing platform without stopping on a typically busy day (see note on island platforms)</th>
<th>0 trains per day</th>
<th>1-5 trains per day</th>
<th>6-20 trains per day</th>
<th>More than 20 trains per day</th>
</tr>
</thead>
<tbody>
<tr>
<td>Road vehicle-carrying train (Ford transit van carrier, cortic, carflat) with the load exposed</td>
<td>Autos</td>
<td>NA - Do not include train type in assessment calculations if 0 trains per day</td>
<td>0.5</td>
<td>1.2</td>
</tr>
<tr>
<td>Freightliner / flat-bedded wagons with vertical ends</td>
<td>Containers</td>
<td>0.4</td>
<td>0.9</td>
<td>1.6</td>
</tr>
<tr>
<td>Freight train other than those above (tankers, hopper wagons)</td>
<td>Others</td>
<td>0.3</td>
<td>0.7</td>
<td>1.2</td>
</tr>
<tr>
<td>Multiple unit / loco-hauled passenger train</td>
<td>Regional etc</td>
<td>0.2</td>
<td>0.5</td>
<td>0.8</td>
</tr>
<tr>
<td>High-speed passenger train (HST, IC225, Eurostar)</td>
<td>Intercity etc</td>
<td>0.1</td>
<td>0.3</td>
<td>0.5</td>
</tr>
</tbody>
</table>

(F) Passing train speed weighting

<table>
<thead>
<tr>
<th>Highest typical passing train speed</th>
<th>Weighting</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than or equal to 45 mph (70 km/h)</td>
<td>17</td>
</tr>
<tr>
<td>Greater than 45 mph but less than or equal to 55 mph</td>
<td>22</td>
</tr>
<tr>
<td>Greater than 55 mph but less than or equal to 65 mph</td>
<td>27</td>
</tr>
<tr>
<td>Greater than 65 mph but less than or equal to 75 mph</td>
<td>32</td>
</tr>
<tr>
<td>Above 75 mph</td>
<td>36</td>
</tr>
</tbody>
</table>

B.2 Post assessment analysis

Risk reduction mitigation measures

B.2.1 The risk assessment method produces a ‘total platform unmitigated risk score’, which gives an indication of the unmitigated level of risk due to aerodynamic effects of
passing trains at the platform. The actual level of risk associated with a platform depends on the level of unmitigated risk and the mitigation measures that are in place to reduce the unmitigated risk. The total unmitigated risk score corresponds to a risk category, as set out in Table 3 below, which makes it possible to classify platforms according to risk and decide what level of mitigation measures may be considered for implementation.

<table>
<thead>
<tr>
<th>Total platform unmitigated risk score</th>
<th>Total platform unmitigated risk score</th>
<th>Platform risk category</th>
<th>Mitigations measures to consider</th>
</tr>
</thead>
<tbody>
<tr>
<td>less than 50</td>
<td>The platform represents a low to negligible risk to passengers due to aerodynamic effects of passing trains. However, a number of best practice mitigation measures may still be considered, even for low-risk platforms, if not already implemented</td>
<td>Low</td>
<td>1 to 9 (plus any others that would be reasonably practicable to implement)</td>
</tr>
<tr>
<td>between 50 and 200</td>
<td>The platform represents an average unmitigated risk to passengers due to the aerodynamic effects of passing trains. This unmitigated risk may already be reduced due to existing mitigation measures. The full set of mitigation measures for medium-risk platforms should be reviewed to identify any additional measures for consideration</td>
<td>Medium</td>
<td>1 to 17 (plus any others that would be reasonably practicable to implement)</td>
</tr>
</tbody>
</table>
B.2.2 A number of mitigation measures relevant to aerodynamic risk, set out in Table 4 below, have been identified through industry expert workshops. These vary from simple best practice measures, which are already in place in most stations, to more complex and costly measures, which are unlikely to be justifiable except in very extreme cases.

B.2.3 To complete the risk assessment process, the full list of identified mitigation measures, set out in Table 4 below, is reviewed to select which are suitable to be considered for the assessed platform. This takes into account the level of risk indicated by the unmitigated risk score and practical considerations of local implementation. Issues to be considered when reviewing the suitability of mitigation measures include:

a) Whether the measure is also relevant to controlling other platform risk areas (that is, other than aerodynamic risk).

b) Whether the mitigation measure is most effective when used in conjunction with other mitigation measures.

c) How difficult the measure is to implement.

d) How costly the mitigation measure is to implement or to maintain, if there are ongoing costs.

e) How effective the measure is in reducing slipstream risk.

<table>
<thead>
<tr>
<th>Total platform unmitigated risk score</th>
<th>Total platform unmitigated risk score</th>
<th>Platform risk category</th>
<th>Mitigations measures to consider</th>
</tr>
</thead>
<tbody>
<tr>
<td>greater than 200</td>
<td>The platform represents a comparatively high unmitigated risk to the passengers due to aerodynamic effects of passing trains. This unmitigated risk may already be reduced due to existing mitigation measures. The full set of mitigation measures for high-risk platforms should be reviewed to identify any additional measures for consideration</td>
<td>High</td>
<td>All (1 to 27, although 20 to 27 are unlikely to be practicable except for very extreme cases or where facilitated within the scope of other projects)</td>
</tr>
</tbody>
</table>

Table 3: Risk reduction mitigation table
As a general guide, measures 1 to 9 are relevant even at low-risk platforms, measures 1 to 17 at medium-risk platforms, and measures 1 to 27 are considered, where practicable, for high-risk platforms (see Table 3 above). If any additional measures are identified as suitable for the platform, these are also to be considered. It may be possible that some ‘medium/high-risk platform’ measures might be justifiable even at a lower-risk platform if it is easy and cost effective to implement.

<table>
<thead>
<tr>
<th>ID</th>
<th>Mitigation title</th>
<th>Mitigation type</th>
<th>Mitigation description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Passenger education campaigns</td>
<td>Educating passengers on aerodynamic risk</td>
<td>Temporary education campaigns for example posters</td>
</tr>
<tr>
<td>2</td>
<td>Targeted best practice</td>
<td>Educating passengers on aerodynamic risk</td>
<td>Targeted dissemination of ‘best practice’ information</td>
</tr>
<tr>
<td>3</td>
<td>Platform edge identification</td>
<td>Improving passenger perception of risk</td>
<td>Platform edges to be clearly identified in accordance with RIS-7016-INS</td>
</tr>
<tr>
<td>4</td>
<td>CIS warning</td>
<td>Warning passengers</td>
<td>Additional information on Customer Information System (CIS)</td>
</tr>
<tr>
<td>5</td>
<td>PA system</td>
<td>Warning passengers</td>
<td>Announcements to improve general awareness</td>
</tr>
<tr>
<td>6</td>
<td>Automated warning announcements</td>
<td>Warning passengers</td>
<td>Automated warning announcements</td>
</tr>
<tr>
<td>7</td>
<td>Aerodynamic risk warning signage</td>
<td>Educating passengers on aerodynamic risk</td>
<td>Signage to warn specifically of risk from slipstreams/ aerodynamic effects of passing trains.</td>
</tr>
<tr>
<td>8</td>
<td>Tactile paving</td>
<td>Improving passenger perception of risk</td>
<td>Tactile paving requirements in RIS-7016-INS.</td>
</tr>
<tr>
<td>ID</td>
<td>Mitigation title</td>
<td>Mitigation type</td>
<td>Mitigation description</td>
</tr>
<tr>
<td>-----</td>
<td>---------------------------------------</td>
<td>----------------------------</td>
<td>---------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>9</td>
<td>Platform yellow line</td>
<td>Improving passenger</td>
<td>Yellow Line requirements in RIS-7016-INS for trains &gt; 100 mph (160 km/h)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>perception of risk</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Yellow hatching</td>
<td>Managing crowd positions</td>
<td>Yellow hatching on platforms at pinch points</td>
</tr>
<tr>
<td>11</td>
<td>CIS position</td>
<td>Managing crowd positions</td>
<td>Optimise location of CIS panels</td>
</tr>
<tr>
<td>12</td>
<td>Train stopping position</td>
<td>Managing crowd positions</td>
<td>Optimisation of stop car position</td>
</tr>
<tr>
<td>13</td>
<td>Platform staff presence at peak times</td>
<td>Monitoring and intervention</td>
<td>Platform staff present on platform at peak times</td>
</tr>
<tr>
<td>14</td>
<td>Platform staff presence at all times</td>
<td>Monitoring and intervention</td>
<td>Platform staff present on platform at all times</td>
</tr>
<tr>
<td>15</td>
<td>CCTV monitoring</td>
<td>Monitoring and intervention</td>
<td>CCTV monitoring of passenger behaviour / positions on the platform</td>
</tr>
<tr>
<td>16</td>
<td>Crowd management plan</td>
<td>Monitoring and intervention</td>
<td>Crowd management plan, for example number of passengers on platform controlled, ushering etc</td>
</tr>
<tr>
<td>17</td>
<td>Waiting rooms/shelters</td>
<td>Physical separation</td>
<td>Provision of waiting rooms / shelters</td>
</tr>
<tr>
<td>18</td>
<td>Train horn</td>
<td>Warning passengers</td>
<td>Train horn of passing train on approach to platform</td>
</tr>
<tr>
<td>ID</td>
<td>Mitigation title</td>
<td>Mitigation type</td>
<td>Mitigation description</td>
</tr>
<tr>
<td>----</td>
<td>---------------------------</td>
<td>-----------------------</td>
<td>----------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>19</td>
<td>Platform separation</td>
<td>Physical separation</td>
<td>Physical separation of platform and train, for example via barriers or fencing</td>
</tr>
<tr>
<td>20</td>
<td>Complete platform edge barrier</td>
<td>Physical separation</td>
<td>Complete platform edge physical barrier, platform edge doors</td>
</tr>
<tr>
<td>21</td>
<td>Extend platform canopy</td>
<td>Managing crowd positions</td>
<td>Extend platform canopy (to encourage whole use of platform in poor weather)</td>
</tr>
<tr>
<td>22</td>
<td>Reduction in passenger train speed</td>
<td>Managing train traffic</td>
<td>Reduction in speed of passing passenger trains</td>
</tr>
<tr>
<td>23</td>
<td>Reduction in freight speed</td>
<td>Managing train traffic</td>
<td>Reduction in speed of passing freight trains</td>
</tr>
<tr>
<td>24</td>
<td>Off peak freight</td>
<td>Managing train traffic</td>
<td>Send freight through station at off peak times</td>
</tr>
<tr>
<td>25</td>
<td>Divert traffic</td>
<td>Managing train traffic</td>
<td>Divert traffic onto non-platform line away from waiting passengers</td>
</tr>
<tr>
<td>26</td>
<td>Existing train improvements</td>
<td>Rolling stock</td>
<td>Retrospective aerodynamic improvement of existing trains</td>
</tr>
<tr>
<td>27</td>
<td>New train design</td>
<td>Rolling stock</td>
<td>Improved aerodynamic design of new trains</td>
</tr>
</tbody>
</table>
### Table 4: Mitigation measures

<table>
<thead>
<tr>
<th>ID</th>
<th>Mitigation title</th>
<th>Mitigation type</th>
<th>Mitigation description</th>
</tr>
</thead>
<tbody>
<tr>
<td>28</td>
<td>Other</td>
<td>Other</td>
<td>To be used by assessor as necessary</td>
</tr>
</tbody>
</table>

B.2.5 For each potential mitigation measure selected it is recorded whether:

a) It is already implemented.
b) It is considered for implementation, or
c) It is considered unsuitable, with justification for not implementing.

#### Platform aerodynamic risk assessment tool

B.2.6 The Excel spreadsheet also generates mitigation measure review sheets indicating which measures would normally be considered depending on the assessed platform risk category. The tool can be used to carry out the risk assessment and record the unmitigated risk due to the aerodynamic risk of passing trains, along with recording the decision-taking process on which mitigation measures are to be implemented.
Appendix C  Comparison of Requirements for Platform Lighting in the RGS GIRT7016 issue 5 and PRM TSI / EN 12464

C.1  Comparison of requirements for platform lighting in the RGS GIRT7016 issue 5 and PRM TSI / EN 12464

C.1.1  The PRM TSI (2014) calls up EN 12464-1 which covers ‘indoor work places’ and EN 12464-2 which covers ‘outdoor work places’ to provide the requirements for horizontal illuminance and uniformity for lighting of station platforms.

C.1.2  These ENs consider three types of platform:
   a) Fully enclosed platforms (in EN 12464-1).
   b) Covered platforms (in EN 12464-2).
   c) Open platforms (in EN 12464-2).

C.1.3  And three levels of passenger use:
   a) Small number.
   b) Medium number.
   c) Large number.

C.1.4  Not all the potential clauses are called up in the PRM TSI. The following table sets out the illuminance and uniformity requirements for those that are called up in bold text; those that are not called up are in normal text.

<table>
<thead>
<tr>
<th>Passengers</th>
<th>Open platform</th>
<th>Covered platform</th>
<th>Fully enclosed platform</th>
</tr>
</thead>
<tbody>
<tr>
<td>Small number</td>
<td>5 lux ($u_0 = 0.2$)</td>
<td>50 lux ($u_0 = 0.4$)</td>
<td>100 lux ($u_0 = 0.4$)</td>
</tr>
<tr>
<td>Medium number</td>
<td>20 lux ($u_0 = 0.3$)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Large number</td>
<td>50 lux ($u_0 = 0.4$)</td>
<td>100 lux ($u_0 = 0.4$)</td>
<td>200 lux ($u_0 = 0.5$)</td>
</tr>
</tbody>
</table>

C.1.5  For comparison, GIRT7016 specified horizontal illuminance of 10 lux (20 lux where DOO is used for all platforms) and a uniformity of at least 0.4 (0.5 for the platform edge area at more heavily used stations).

C.1.6  The TSI values for illuminance are higher than the RGS requirements in most cases and considerably higher in some cases. There is no evidence, as far as we know, of the RGS requirements being unsafe, so there is concern that the TSI requirements may lead to increased light pollution, and complaints from neighbours, even if power consumption can be kept down by the use of modern installations.
Appendix D  Platform Gap Fillers

D.1 Platform gap fillers

D.1.1 On the GB mainline mixed traffic network, there is always a horizontal gap and/or a vertical step between the platform and the train footstep. This gap and step are required to achieve appropriate gauge clearance for the range of vehicles passing the platform but can present challenges for passengers boarding or alighting from trains.

D.1.2 Various forms of gap fillers exist, either passive or active, which may assist in reducing the horizontal gap. These gap fillers have a range of different characteristics as set out below.

D.1.3 Gap fillers may be installed on either the platform or the train and may be:
   a) Either fixed/passive (permanently part of the platform/train) or moving/deployable.
   b) Either rigid or deformable.
   c) Designed to be either stepped on or not stepped on.
   d) Either level with the platform/train vestibule or at a different height.
   e) Either designed to be contacted by the other part of the system (platform contact for train-mounted systems or train contact for platform-mounted systems) during normal operation or designed not to be contacted.

D.1.4 RSSB Research Project T1054, evaluated platform gap fillers to reduce the risk at the platform/train interface and is a useful reference document.

D.1.5 Existing infrastructure-mounted examples include Heathrow Express fixed gap fillers fixed to the platform edge which are:
   a) Fixed.
   b) Deformable.
   c) Not intended to be stepped on.
   d) Slightly lower than both the platform and the train footstep.
   e) Not designed to contact the vehicle.

D.1.6 Existing vehicle mounted examples include, steps on
   a) Eurostar (Class 373 and Class 374) (deployable, rigid and intended to be stepped on).
   b) West Coast Pendolinos (Class 390) (deployable, rigid and intended to be stepped on).
   c) None of these systems are designed to contact the platform.

D.1.7 There are two areas where the platform edge datum position and the vehicle footstep datum position require definition:
   a) Assessment of gauge clearance between train and infrastructure (including the platform).
   b) Assessment of stepping distance between train footstep and platform.

D.1.8 Where gap fillers are considered for use, it is important that assessment of both gauge clearances and stepping distances uses agreed datum positions.
D.1.9 It is important to recognise that the datum position used for assessment of gauge clearance may not be the same as the datum position used for assessment of stepping distance.

D.1.10 The decision matrix and flowcharts below provide a consistent set of decision criteria for determining the relevant datum positions.

D.1.11 The following design combinations are feasible and guidance is given on issues to consider for the various options:

a) Is the gap filler mounted on the vehicle or the infrastructure?
b) Is the gap filler fixed (passive) or moveable (active)?
   • If active, then consideration of failure modes and controls will be needed.
c) Is the gap filler rigid or deformable?
   • It is assumed that a deformable gap filler will not be intended as a step.
d) Is the gap filler intended to be stepped on?
   • If so, then it will need to be level with the footstep/platform to which it is attached.
   • A suggested tolerance for level in this context is +/- 10 mm.
e) Is the gap filler intended to be contacted in normal operation?
   • If on platform, then contacted by vehicle or vehicle footstep.
   • If on vehicle, then contact with platform edge.
f) What failure modes need to be considered?
   • This may include failure modes of the deployable gap filler.
   • This may include other failure modes, for example, vehicle suspension conditions.
g) Are there any specific inspection/maintenance requirements for the other party to undertake?
   • If so, has the other party accepted the implications?

D.1.12 Figure 7 and Figure 8 below describe a decision-making process to determine datum positions for gauge clearance and stepping distance, using the points listed above. A wide range of other issues will also need to be considered for any potential gap filler installation.

D.1.13 To use the table in Figure 7 for a given design of installation, select the appropriate column from the upper part of this table, the lower parts then indicate the datum positions.
### Figure 7: Decision process for Gap Fillers – datum position for Gauging, datum position for Stepping

<table>
<thead>
<tr>
<th>Platform/Vehicle?</th>
<th>Platform mounted</th>
<th>Vehicle mounted</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Fixed deployed?</td>
<td>Fixed</td>
</tr>
<tr>
<td>Rigid/Deformable?</td>
<td>Rigid</td>
<td>Deformable</td>
</tr>
<tr>
<td>Intended as step?</td>
<td>Step</td>
<td>No step</td>
</tr>
<tr>
<td>Designed to contact?</td>
<td>Y</td>
<td>N</td>
</tr>
<tr>
<td>Gauging datum:</td>
<td>Coper / 5th edge</td>
<td>Y</td>
</tr>
<tr>
<td></td>
<td>Gap filler edge</td>
<td>Y</td>
</tr>
<tr>
<td>Stepping datum:</td>
<td>Coper / 5th edge</td>
<td>Y</td>
</tr>
<tr>
<td></td>
<td>Gap filler edge</td>
<td>Y</td>
</tr>
</tbody>
</table>

**Gap fillers – datum point for assessing Gauge clearance**

**Figure 8: Flowchart for gauge clearance, stepping and gauging considerations**
**Interface between Station Platforms, Track, Trains and Buffer Stops**

**Rail Industry Standard**
*RIS-7016-INS*
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**Date:** June 2019

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**Gap fillers – datum point for assessing stepping distance**

- **Deformable**
  - Is the gap filler rigid or deformable?
  - **Rigid**
    - Is the gap filler intended as a step?
    - Yes
      - Datum for assessing stepping distance is edge of gap filler
    - No
      - Datum for assessing stepping distance is Coper Edge or vehicle structure (not edge of gap filler)

---

**Gap fillers – gauging considerations**

- Yes
  - Datum for assessing gauge clearance is edge of gap filler
  - Are normal clearances achieved?
    - Yes
      - Must include normal operation and any relevant failure modes of vehicle or gap filler (for active systems)
    - No
      - Are reduced or special reduced clearances achieved?
        - No
          - No further action
        - Yes
          - May wish to consider improved track design to achieve greater clearances
  - Will have implications for inspection and maintenance regime

- No
  - Contact with gap filler predicted in some circumstances
  - Deviation application supported by risk assessment
### Definitions

<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>accident</td>
<td>An unwanted or unintended sudden event or a specific chain of such events which have harmful consequences; accidents are divided into the following categories: collisions, derailments, level-crossing accidents, accidents to persons caused by rolling stock in motion, fires and others. Source: <em>Railway Safety Directive</em></td>
</tr>
<tr>
<td>adaptation</td>
<td>The process that takes place as the eye adjusts to the brightness or the colour of the visual field.</td>
</tr>
<tr>
<td>alteration [of a platform or other requirement]</td>
<td>The substantial lengthening or rebuilding of all or part of an existing platform and/or an associated structure, or renewal of station equipment or platform furniture, which provides a reasonable opportunity to bring the items concerned into conformity with the requirements of this document.</td>
</tr>
<tr>
<td>colour contrasting marking</td>
<td>A marking on a structure which breaks up the surface of the structure, or part of the structure, so that it can be seen by visually impaired station users.</td>
</tr>
<tr>
<td>coper platform</td>
<td>That part of the platform surface adjacent to the track, when formed of a separate concrete or masonry slab. Also known as the ‘platform coping’ or ‘coping stone’.</td>
</tr>
<tr>
<td>Disused platform</td>
<td>A platform that already exists but is not in operational use.</td>
</tr>
<tr>
<td>Double face platform (island platform)</td>
<td>A platform with operational track adjacent to both sides of the platform.</td>
</tr>
<tr>
<td>End impact wall</td>
<td>A structure or other arrangement located behind a buffer stop, designed to contain a train that has run through the buffer stop, so preventing harm to people or damage to critical structures that would otherwise have been in the path of the train.</td>
</tr>
<tr>
<td>Energy absorbing buffer stop</td>
<td>A buffer stop designed to bring a train to a controlled halt from a pre-determined maximum design speed by providing a means of progressively absorbing the kinetic energy of the train.</td>
</tr>
<tr>
<td>Freight line</td>
<td>A line normally only used by non-passerenger carrying trains or empty passenger stock.</td>
</tr>
<tr>
<td>Glare</td>
<td>The discomfort or impairment of vision experienced when parts of the visual field are excessively bright in relation to the general surroundings.</td>
</tr>
<tr>
<td>Horizontal illuminance</td>
<td>The illuminance falling on a horizontal plane.</td>
</tr>
<tr>
<td>Illuminance</td>
<td>The luminous flux density at a surface in a defined plane. The SI unit of illuminance is the lux, which is equal to one lumen per square metre (lm/m²).</td>
</tr>
<tr>
<td>Term</td>
<td>Definition</td>
</tr>
<tr>
<td>----------------------------------</td>
<td>---------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Illuminance towards observer</td>
<td>The illuminance falling on a plane perpendicular to the observer.</td>
</tr>
<tr>
<td>Incident</td>
<td>An unplanned, uncontrolled or unintended event which under different circumstances could have resulted in an accident.</td>
</tr>
<tr>
<td>Legacy Rolling Stock</td>
<td>Class 155 and 153 rolling stock including all sub-classes.</td>
</tr>
<tr>
<td>Luminaire</td>
<td>An apparatus which controls the distribution of light given by a lamp or lamps and which includes all the components necessary for fixing and protecting the lamps and connecting them to the supply circuit. ‘Luminaire’ has superseded the term ‘lighting fitting’.</td>
</tr>
<tr>
<td>Luminous flux</td>
<td>The term used to describe the quantity of light emitted by a source, or received by a surface. The SI unit of luminous flux is the lumen (lm).</td>
</tr>
<tr>
<td>Maintained illuminance</td>
<td>The average illuminance over the reference surface at the worst condition of maintenance.</td>
</tr>
<tr>
<td>New platform</td>
<td>A platform other than a platform that already exists. The term excludes a disused platform that is brought back into use without alteration.</td>
</tr>
<tr>
<td>Overrun</td>
<td>The movement of a train or vehicle beyond the designed end limit of a track.</td>
</tr>
<tr>
<td>Overrun risk zone</td>
<td>A zone extending 20 m behind the face of the buffer stop and 5 m either side of the projected centre line of the track approaching the buffer stop.</td>
</tr>
<tr>
<td>Platform</td>
<td>The structure forming the part of a station that provides access for passengers to or from a train. Walkways used for staff only are not considered to be platforms.</td>
</tr>
<tr>
<td>Platform extension</td>
<td>Increasing the usable length of an existing platform.</td>
</tr>
<tr>
<td>Platform height</td>
<td>The height of the edge of the platform relative to the track, measured at right angles to the plane of the rails of the track adjacent to the platform.</td>
</tr>
<tr>
<td>Platform offset</td>
<td>The distance between the upper surface of the platform edge and the running edge of the nearest rail on the track adjacent to the platform, measured parallel to the plane of the rails.</td>
</tr>
<tr>
<td>Sign</td>
<td>Any surface (usually in one plane) that presents a fixed image or text, in order to convey specific information to the viewer.</td>
</tr>
<tr>
<td>Single face platform</td>
<td>A platform with operational track adjacent to one side of the platform only.</td>
</tr>
</tbody>
</table>
Specific case

Any part of the rail system which needs special provisions in the TSIs, either temporary or definitive, because of geographical, topographical or urban environment constraints or those affecting compatibility with the existing system. This may include, in particular, railway lines and networks isolated from the rest of the European Community, the loading gauge, the track gauge or space between the tracks and vehicles strictly intended for local, regional or historical use, as well as vehicles originating from or destined for third countries. Source: Article 2 (I) of Directive 2008/57/EC

Station categories

<table>
<thead>
<tr>
<th>Station category</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>A - National hub</td>
<td>Birmingham New Street, Glasgow Central, London Waterloo</td>
</tr>
<tr>
<td>B - Regional hub</td>
<td>Brighton, Darlington, Watford Junction</td>
</tr>
<tr>
<td>C - Important feeder</td>
<td>Manchester Oxford Road, Motherwell, Southend Victoria</td>
</tr>
<tr>
<td>D - Medium, staffed</td>
<td>Caerphilly, Lichfield Trent Valley, Sydenham</td>
</tr>
<tr>
<td>E - Small, staffed</td>
<td>Gospel Oak, Llandudno Junction, Lockerbie</td>
</tr>
<tr>
<td>F - Small, unstaffed</td>
<td>Bishop Auckland, Cromer, Tywyn</td>
</tr>
</tbody>
</table>

Terminal track

A dead end or terminating track in a station or at the end of a freight line or siding.

Uniformity

The ratio of the minimum illuminance to the average illuminance over a specified surface.

Usable platform edge area

The area enclosed between the platform edge and a line 1.0 m back from the platform edge, over the usable platform length.

Usable platform length

The length of that part of the platform that can be used by passengers for egress from and access to trains, measured along the platform edge.

Usable platform width

The width of the platform that can be used by passengers for egress from and access to trains, or for waiting, taking into account the width of any items on the platform (for example, furniture,
Vertical illuminance

The illuminance falling on a vertical plane.
References

The Catalogue of Railway Group Standards gives the current issue number and status of documents published by RSSB. This information is also available from http://www.rssb.co.uk/railway-group-standards.

RGSC 01 Railway Group Standards Code
RGSC 02 Standards Manual

Documents referenced in the text

Railway Group Standards

GCRT5021 Track System Requirements
GIRT7016 Interface between Station Platforms, Track and Trains
GIRT7020 GB Requirements for Platform Height, Platform Offset and Platform Width
GIRT7033 Lineside Signs
GIRT7073 Requirements for the Position of Infrastructure and for Defining and Maintaining Clearances
GLRT1210 AC Energy Subsystem and Interfaces to Rolling Stock Subsystem
GLRT1212 DC Conductor Rail Energy Subsystem and Interfaces to Rolling Stock Subsystem
GMRT2111 Rolling Stock Subsystem and Interfaces to AC Energy Subsystem
GMRT2173 Requirements for the Size of Vehicles and Position of Equipment

RSSB documents

GIGN5633 Recommendations for the Risk Assessment of Buffer Stops and End Impact Walls
GIGN7608 Guidance on the Infrastructure Technical Specification for Interoperability
GLGN1620 Guidance on the Application of the Control of Electromagnetic Fields at Work Regulations
RIS-0737-CCS Rail Industry Standard for Signal Sighting Assessment Requirements
RIS-2703-RST Rail Industry Standard for Driver Only Operated On-train Camera/Monitoring Systems
RIS-2747-RST Functioning and Control of Exterior Doors on Passenger Vehicles
RIS-7700-INS Rail Industry Standard for Station Infrastructure
RIS-7702-INS Rail Industry Standard for Lighting at Stations
## Interface between Station Platforms, Track, Trains and Buffer Stops

<table>
<thead>
<tr>
<th>Reference</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>RIS-8060-CCS</td>
<td>Engineering Requirements for Dispatch of Trains from Platforms</td>
</tr>
<tr>
<td>RIS-8270-RST</td>
<td>Route Level Assessment of Technical Compatibility between Vehicles and Infrastructure</td>
</tr>
<tr>
<td>T158</td>
<td>The use of tactile surfaces at rail stations</td>
</tr>
<tr>
<td>T248</td>
<td>Review of train slipstream effects on platforms</td>
</tr>
<tr>
<td>T321</td>
<td>Good practice guide: Wayfinding at Stations</td>
</tr>
<tr>
<td>T726</td>
<td>Investigation into the feasibility of increasing existing platform radii where the platform is located on a curve radius less than 200m</td>
</tr>
<tr>
<td>T749</td>
<td>Guidance on protecting people from the aerodynamic effects of passing trains</td>
</tr>
<tr>
<td>T815</td>
<td>Limits on vertical track alignment through station platforms</td>
</tr>
<tr>
<td>T1054</td>
<td>Evaluating platform gap fillers to reduce risk at the platform/train interface</td>
</tr>
<tr>
<td>T1062</td>
<td>Platform recess - review of requirements</td>
</tr>
</tbody>
</table>

### Other references

- **DfT document**
  - Accessible Train and Station Design for Disabled People: A Code of Practice
- **DfT document**
  - Inclusive Mobility
- **DfT document**
  - Design Standards for Accessible Railway Stations
- **DFT report**
  - Rail Vehicle Accessibility Research: Significant Steps
- **EN 12464-1**
  - Euronorm - Light and Lighting - Lighting of work places - Part 1: Indoor work places
- **EN 14067-2:2003**
  - Euronorm - Railway applications - Aerodynamics - Part 2: Aerodynamics on open track
- **EN 1991-1-1**
  - Euronorm - Actions on Structures: General Actions: Densities, self-weight, imposed loads for buildings
- **EN 1991-1-7**
  - Euronorm - Actions on Structures: General Actions: Accidental Actions
- **EN 12464-2**
  - Euronorm - Light and Lighting - Lighting of work places - Part 2: Outdoor work places
- **ERA/GUI/02-2013/INT**
  - TSI Application Guide PRM TSI
- **INF TSI**
  - Infrastructure Technical Specifications for Interoperability
- **ORR policy**
  - Electrical clearances to standing surfaces for 25kV overhead electrification
- **PRM TSI**
  - Persons with Reduced Mobility Technical Specifications for Interoperability

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**Date:** June 2019

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<table>
<thead>
<tr>
<th>PTI Strategy</th>
<th>Platform-train interface strategy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sign Design Society and RNIB document</td>
<td>Sign Design Guide</td>
</tr>
</tbody>
</table>