

Guidance Note – Safe Management of Pushchairs and Wheelchairs on Station Platforms

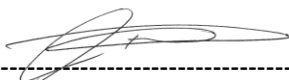
Synopsis

This Guidance Note provides advice to Station Facility Owners on identifying and mitigating the risks of wheeled vehicles, i.e. pushchairs and wheelchairs, rolling away if left unattended on platforms.

Applicability

This Guidance Note has been prepared for passenger, however, its content may also be of use to others, such as infrastructure managers and suppliers.

Authorised by



Ellie Burrows
Chair, RDG TOC Safety Forum

Issue record

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Part 1 About this document

1.1 Responsibilities

- 1.1.1 Copies of this Guidance Note should be distributed by RDG members to persons within their respective organisations for whom its content is relevant.

1.2 Explanatory note

- 1.2.1 RDG produces Guidance Notes for the information of its members. RDG is not a regulatory body and compliance with RDG Guidance Notes is not mandatory.
- 1.2.2 RDG Guidance Notes are intended to reflect good practice. RDG members are recommended to evaluate the guidance against their own arrangements in a structured and systematic way. Some or all parts of the guidance may not be appropriate to their operations. It is recommended that this process of evaluation and any subsequent decision to adopt (or not to adopt) elements of the guidance should be documented.

1.3 Guidance Note status

- 1.3.1 This document is not intended to create legally binding obligations between railway duty holders and should be binding in honour only.

1.4 Supply

- 1.4.1 Copies of this Guidance Note may be obtained from the RDG members' site.

Part 2 Purpose and Introduction

2.1 Purpose

- 2.1.1 The purpose of this Guidance Note is to assist Station Facility Owners (SFO) in their understanding of whether or not their station platform environments present risk of unplanned rolling movement of wheeled vehicles, before later suggesting what may be done to manage the risks if present. It also contributes towards compliance with recommendation 3 from the RAIB investigation into the accidents at Southend Central and Whyteleafe to publish guidance, and recommendation 2 to review the guidance following research.

2.2 Introduction

- 2.2.1 In 2013 two incidents occurred in which wheeled vehicles rolled off a station platform and onto the track. The first, at Southend Central, involved a wheelchair and the second, at Whyteleafe, a pushchair. In both cases the vehicles were temporarily left unattended by the person in charge of them without the brake having first been applied. The occupant of the wheelchair suffered serious injuries from the fall while the mother of the infant occupant of the pushchair was badly shaken. Had trains been involved, the consequences could clearly have been much more serious and in the second case the pushchair only narrowly missed coming into contact with the conductor rail. Similar incidents continue to occur such as at Nuneaton in 2017.
- 2.2.2 This Guidance Note was originally written in January 2014 following the recommendations of an RAIB joint investigation into the two incidents. A subsequent RSSB research report, T1098, was published in late 2018 which recommended a number of changes to this GN. As a consequence, the document has been restructured and completely revised to incorporate the recommendations made by the RSSB report.

2.3 Definitions

- 2.3.1 Definitions used in this Guidance Note are as follows:

Term	Definition in the context of this document
Pushchair or wheelchair	Prams, pushchairs, wheelchairs and similar unpowered vehicles used to transport young children or persons of reduced mobility.
Coper or Coping stone	That part of the platform surface adjacent to the track, when formed of a separate concrete or masonry slab.
Crossfall	The slope of a platform towards or away from the track. Both phrases relate to the slope across (not along) the platform, i.e. at right angles to the track.
Crossfall slope	
Crossfall/ gradient	Where the issue under discussion may apply to crossfalls and/ or gradients.
Gradient	Where there is a slope along the length of the track and the platform slopes in line with the track, i.e. parallel to the track.
Station Facility Owner (SFO)	The Train Operating Company holding the lease for a franchised station.

Train Operating Company (TOC)	Holder of a licence to operate train passenger services.
Underlying Cause (UC)	Potential causes for an adverse event which are contributory factors not directly related to the station specific primary causes of slope, slipstream etc see Appendix 1.
Uneven surfaces	A phrase used by some respondents, which means smooth but undulating sections or small sections with adverse camber, temporary or semi-permanent ramps.

Note that for simplicity this Guidance Note does not generally differentiate between pushchairs and wheelchairs. In broad terms the risks and many of the mitigations are common to both, however the ease with which mitigations can be implemented may differ significantly. For example, journeys involving use of wheelchairs are likely to be booked in advance, whereas pushchairs/prams users are far more likely to be present on a turn up and go basis. With suitable training, staff are thus well placed to be proactive in providing support and guidance in the case of the former but are more likely to need to be reactive in the case of the latter.

2.4 How to use the guidance note and its structure

2.4.1 The Guidance Note is written in a way to guide station management through a structured process of understanding and identifying if there is a potential risk to wheeled vehicle users (in Section 3) and then suggests methods for formally identifying and recording of the assessment and for controlling that risk which have been successfully implemented in the UK rail network (in Section 4). It does not endorse any method over another, the acceptance of risk is held by the SFO.


2.4.2 Structure of the Guidance Note is as follows

Section One covers the guidance note record, responsibilities, status and supply details.

Section Two sets out the background, purpose and definitions.

Section Three provides an understanding of unplanned movements of pushchairs and wheelchairs, including the principles of the hazard, primary and underlying causes of risk and potential mitigations.

Section Four covers the six-step process for identifying and controlling the risk (s) as follows.

Step One	Assessment Preparation	
Step Two	Preliminary Assessment of Station Platforms	
Step Three	Detailed on-site inspection	
Step Four	Risk Assessment	
Step Five	Plan and carry out priority mitigations	
Step Six	Continual improvement of risks and mitigations	

Part 3 Understanding wheeled vehicle risks on the platform.

3.1 Hazards of platform crossfall & risks of unplanned pushchair or wheelchair movement.

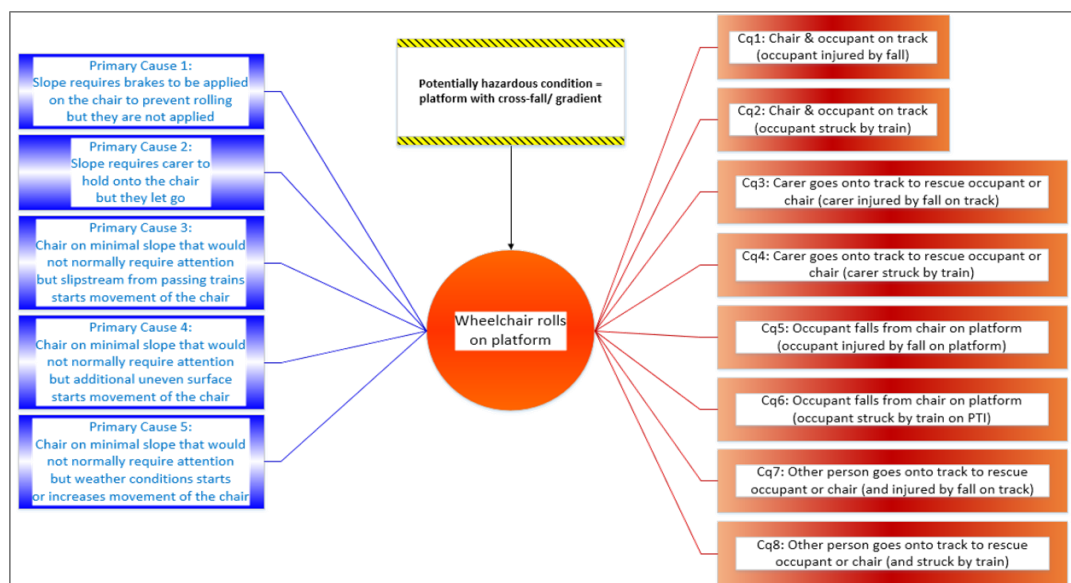
3.1.1 From the Southend Central and Whyteleafe, the RAIB Report and the other relevant incidents, the risks can be defined as:

- i) An unplanned movement (rolling) of a pushchair towards the track.
- ii) An unplanned movement (rolling) of a wheelchair towards the track.

and the hazardous condition that is considered to be the root of these risks are “Platforms with a crossfall slope towards the track that is significant and/ or a platform affected by significant factors that influence pushchair or wheelchair movement”.

3.1.2 In fact, there are a number of additional risk factors which are shown in the figure below.

Figure 1 Example of the risks and contributing factors for a wheelchair rolling on a platform



3.2 Cross fall slope

3.2.1 While significant crossfall slopes alone may be significant enough to warrant action, it is important to recognise that all slopes have the possibility of inducing or contributing to the movement of the pushchair or wheelchair, if other conditions allow it. Therefore, both the degree of slope and other influencing factors identified in section 3-7, are likely to determine whether there is a risk of the pushchair or wheelchair rolling on the platform (from Figure 1 above).

3.2.2 The RAIB investigation noted that there are different issues associated with steeper and shallower gradients:

- i) For steeper gradients the risk of rolling is high; it may be harder to stop the movement, but the slope is easier to notice.
- ii) For shallower gradients, the rolling starts more slowly and may not be noticed, so a wheelchair or pushchair could roll further and gather momentum before someone realises it is moving.

3.2.3 Methods for measuring slopes are to be found in Appendix 2.

3.3 Primary causes of risk

3.3.1 Seven Primary Causes (PC) for the risk of unplanned movement (rolling) of a wheelchair or pushchair have been identified and fall into groupings as follows:

Platform location-based causes:

PC1: **Slope requires brakes to be applied** on the pushchair or wheelchair to prevent rolling, but they are not applied by user or carer.

PC2: **Slope requires carer to hold onto the pushchair or wheelchair** to prevent rolling, but they let go (or leave the pushchair or wheelchair unattended, even momentarily).

PC3: Pushchair or wheelchair on a minimal slope, but the **slipstream** from a passing train initiates or increases movement of the pushchair or wheelchair.

PC4: Pushchair or wheelchair on a minimal slope, but additional **undulating surface** initiates or increases movement of the pushchair or wheelchair (including temporary surfaces).

PC5: Pushchair or wheelchair on a minimal slope, but **weather conditions** initiate or increase movement of the pushchair or wheelchair.

External Characteristics

PC6: Pushchair or wheelchair on a minimal slope, but **someone or something bumps into the pushchair or wheelchair** and initiates movement of the chair; the station footfall may be an indicator of probability.

PC7: Pushchair or wheelchair on a minimal slope, but the **child/occupant moves around in the pushchair or wheelchair** and initiates movement of the chair.

3.3.2 Although the factors PC5, PC6 and PC7 are outside of the SFO's direct control, they are nonetheless very important and could be managed by a general awareness campaign. In reality it is mitigation for these items that will be the easiest to implement.

3.3.3 The principle should always be that the train is operating in the highest level of supervision available - ETCS is the primary system for overlay areas and must always take priority. This is a legal requirement set out in both the Technical Specification for Interoperability (TSI) and the Railway Safety Regulations 1999.

3.4 Underlying causes

- 3.4.1 A Twenty underlying causes divided into five groups were identified by the RSSB project T1098-02 (the full list is in Appendix 1). The key causes are:

The SFO has no or little influence over

- i) Pushchair or wheelchair choice and use of chair.
- ii) Lack of awareness of the risks associated with the significant factors that may create an unplanned movement of the pushchair or wheelchair and the result in a rail environment.
- iii) Distractions that stop the person behaving appropriately, even if they are already aware of the risks, see Appendix 1: Paragraph 3 (1).

The SFO is able to influence

- iv) Certain distractions that stop the person behaving appropriately, even if they are already aware of the risks, see Appendix 1: Paragraph 3 (2).
 - a) UC12: The carer is distracted by something related to the rail environment (for example ticket machine) and they do not take precautions (for example apply brakes) to prevent an unplanned movement of the pushchair or wheelchair.
 - b) UC13: The wheelchair user is distracted by something related to the rail environment and they do not take precautions to prevent an unplanned movement of the wheelchair.
 - c) UC14: The carer is distracted by something related to the rail environment and they leave the pushchair or wheelchair unattended.

The SFO is able to manage

- v) Circumstances that put the carer or user into a more 'risky' situation, such as where there are more people who could bump into them. (Appendix 1: Paragraph 4) It may be possible that they do not see an alternative route, or it may appear to be too much hassle to avoid the restriction. Examples are a platform that is crowded in the location where the nominated stopping location for the wheelchair accessible carriage is located, or the user/carers makes their own choice to stand in a width restricted area, rather than in a wider part of the platform. The two UCs are defined as:
 - a) UC18: The carer is restricted by circumstances to being in a more 'risky' location, (such as platform crowding, being in a location they know their carriage will stop, etc.).
 - b) UC19: The wheelchair user is restricted by circumstances to being in a more 'risky' location, (such as platform crowding, being in a location they know their carriage will stop, etc.).

Platform conditions and layout that create an environment with increased risk

- vi) Examples of this are: station works with temporary ramps, less used areas of platform, or a waiting area that is raised with a ramp towards the track out of the shelter. Risk may also be increased where there is some form of restriction that places a carer or user closer to the platform edge. (Appendix 1 : Paragraph 5). This concern has been stated as a single UC:

- a) UC20: Platform conditions and layout that increase how easy it is for a pushchair or wheelchair to roll.

Rolling stock may have restricted access for the use of access ramps, i.e. deployment is only possible at certain doors. The position the train stops in may result in the doors being at an area of higher cross fall risk, this should be taken into consideration when identifying stopping locations.

The platform may be staffed or unstaffed, staffing increases the possibility of providing advice regarding safer locations to wait in addition to signage.

3.5 Potential consequences

- 3.5.1 The Southend Central case caused serious injuries to a wheelchair user and the Whyteleafe incident left the mother of the child in the pushchair badly shaken. The RSSB Project T1098-02 identified the following potential consequences:

- i) Property damage or loss only:
 - a) Pushchair or wheelchair falls onto the track without an occupant and there is damage/loss to pushchair or wheelchair and/ or possessions; as was seen in the Nuneaton incident in 2017.
 - b) Chair is struck by a train and there is damage/loss to pushchair or wheelchair and/or possessions.
- ii) Minor or major injuries:
 - a) Occupant falls from the pushchair or wheelchair on the platform and injured on the platform.
 - b) Pushchair or wheelchair and occupant fall onto the track and occupant injured by the fall; as was seen in the Southend Central incident in 2013.
 - c) Carer, or another member of the public, goes onto the track to rescue pushchair or wheelchair /occupant and they are injured by the fall (or otherwise harmed or affected); as was seen in the Whyteleafe incident in 2013.
 - d) Staff member goes onto the track to rescue pushchair or wheelchair /occupant and the member of staff is injured by the fall (or otherwise harmed or affected).
- iii) Major injury or death:
 - a) Occupant falls from the pushchair or wheelchair on the platform and is struck by a train at the platform-train interface.
 - b) Pushchair or wheelchair and occupant fall onto the track and occupant struck by a train.
 - c) Pushchair or wheelchair and occupant fall onto the track and are electrocuted.
 - d) Carer or other member of the public goes onto the track to rescue pushchair or wheelchair /occupant and they are struck by a train.
 - e) Carer, or another member of the public, goes onto the track to rescue pushchair or wheelchair/occupant and they are electrocuted.
 - f) Staff member goes onto the track to rescue pushchair or wheelchair /occupant and they are struck by a train.
 - g) Staff member goes onto the track to rescue pushchair or wheelchair /occupant and they are electrocuted.

Part 4 A stepwise process for identifying risk and providing mitigation

4.1 Introduction

- 4.1.1 The following stepwise process is a suggested comprehensive systematic approach for SFOs to use when identifying mitigations for the risk of unplanned movement of wheelchairs and pushchairs on station platform (RSSB 2387-T1098-02).

4.2 Step one – assessment preparation

- 4.2.1 This is an investigation and search type activity, for each station platform in order to have the correct inputs for the actual assessment:
- i) Prepare a survey/risk review document which is used throughout the process and added to/ amended as more information is obtained.
 - ii) Determine if data is already available on crossfall slopes from previous studies (or if the platform is recorded as compliant, sloping away from the track). Network Rail may have data on the station platform which could be used for initial screening.
 - iii) Identify the Station Category (A, B, C1, C2, D, E, F1, F2 – **Table 1 Crossfall categories** applicable for footfall (noting if there is a difference between different platforms for the Category) (any footfall measure that this applicable, e.g. as used for PTI assessment is acceptable, the Station Category is just an example of how to differentiate between stations and platforms).
 - iv) Identify if there have been incidents recorded, or there have been complaints or report by TOC or passengers.
 - v) Identify if the station/platform is in the '**Access for All**' project, as this may increase the frequency of users of wheeled vehicles.
 - vi) Identify if the station is close to hospitals, care homes or schools that may have higher numbers of wheelchair or push chair usage.
 - vii) See <https://www.networkrail.co.uk/communities/passengers/station-improvements/access-for-all/>
 - viii) Identify if there are any notices or information associated with slipstreams and train speeds passing which platforms, and in which direction. Undertake slipstream assessment if not already completed, check outputs of assessment, if one has been completed, to ensure that they have been actioned.

4.3 Step two - preliminary assessment of station platforms

- 4.3.1 The same documentation should be used throughout the process, using the information gathered in Step 1, complete the information for:
- i) The Station Category, if part of 'Access for All' for the Station information. <https://www.networkrail.co.uk/communities/passengers/station-improvements/access-for-all/>, good access increases the probability of wheeled vehicles.
- 4.3.2 If previous data is already available, for example, a slip stream assessment, this can be used to identify:
- i) If there is a crossfall, and where it is.
 - ii) Any additional risk-affecting factors (for distractions and platform conditions).
- 4.3.3 If there are gaps in the data, plan and carry out a preliminary survey on site using an App, beam measure or roll-test with a free-wheeling device to determine if there is a gradient, (methods are given in Appendix 3). Do not use visual inspection only, as this can be affected by perception.
- 4.3.4 Once the documentation for preliminary information is complete, use this to determine if there is a requirement for a detailed survey.
- If there is no need for detailed survey, go to the risk assessment in Step 4.
 - If there is a need for detailed survey, go to Step 3.

4.4 Step Three – Detailed on-site inspection

- 4.4.1 The detailed on-site inspection should be undertaken on the ground, at the platform (s).
- 4.4.2 Measurement methods are detailed in Appendix 2.
- 4.4.3 Key points to note are that the slope can vary not just along the platform, but also across it (see RAIB 17/2014, para 45).
- 4.4.4 Platform width can vary. Where the width is restricted reduce the spacing of measurements across the platform, i.e. instead of every 1 metre across change to 50 cm, making a note of this variation to your standard method.
- 4.4.5 Identify if any platform repairs or works, e.g. removal or addition of a feature, have resulted in an uneven surface affecting the slope. Additional measurements may be required around such areas.
- 4.4.6 Are there any distractions, e.g. vending machines, on the platform?
- 4.4.7 It may be helpful to mark up measurements using the station map obtained from Stations Made Easy at:
http://www.nationalrail.co.uk/stations_destinations/default.aspx

4.5 Step four – risk assessment

- 4.5.1 The template in Appendix 3 can be used as a starting point to undertake a risk assessment using the following codes and weightings

NOTE the weightings are to provide comparisons and have not be qualified in detail

Table 1 Crossfall Categories

RA Ref	Crossfall in SIN/140	Score
CF0	Slope away from Coper Edge 1:80 to 1:40 (-0.71 degrees to -1.43 degrees), -1.25% to -2,5%	-0.5
CF1	Platform is approximately level	0
CF2	Slope away from Coper Edge greater than 1:40 (-1.43 degrees), -2,5% (i.e. also non-compliant with DfT guidance)	1
CF3	Slope towards Coper Edge from Level to 1:80 (0 degrees to +0.71 degrees), 0% to 1.25%	2
CF4	Slope towards Coper Edge 1:80 to 1:40 (+0.71 degrees to +1.43 degrees), 1.25% to 2,5%	3
CF5	Slope towards Coper Edge 1:40 to 1:20 (+1.43 degrees to +2.86 degrees), 2.5% to 5%	4
CF6	Slope towards Coper Edge >1:20 (greater than +2.86 degrees), >5%	5

Note that for open areas of island platforms a negative slope towards the centre may also pose risks if the platforms are at different heights.

Table 2: Possible rating scale for Local Platform Conditions (P) in a new platform RA

Local Platform Conditions (P)		Score
Notes: This should be filled out if there are known local conditions that should be taken into account. These may be transitory (e.g. during station works). The baseline RA can be re-used as the basis of a snapshot to create a RA specific to the station works. The items below are provided as an example only at this time.		
P0	No known local platform conditions other than “normal” weather.	0
P1	There minor conditions or concerns associated with the platform in this location, such as uneven surfaces that may be awkward for a wheelchair or pushchair.	1
P2	There are known local conditions that make this part of the platform more hazardous, such as slippery surfaces or the wind funnelled by buildings (but not due to train slipstreams), high leaf fall which has resulted in recorded incidents, etc.	2
P3	There are known local conditions which are very hazardous and care should be taken most of the time (e.g. overflow water from	4

Local Platform Conditions (P)		Score
	fields, unmade platform surface), OR there is a temporary surface in place that increases the gradient of a ramp or introduces other concerns about wheelchair or pushchair movements (even if only temporarily).	

Table 3: Possible rating scale for Distractions (D) in a new format platform risk assessment

Distractions (D)		Score
<p>Notes: This should be seen in context of the platform location. All aspects of distraction that can be managed by the SFO should be considered including (but not limited to): ticket and vending machines, help points, gates and doorways, customer information screens, posters, rail infrastructure installations such as DOO screens, catering outlets, timetable information, commercial posters).</p> <p>Note that distractions (D) are classed as those items that may somehow distract the user or carer and result in them not applying the brakes or letting go of the pushchair or wheelchair.</p> <p>Note that constraints from 'risky locations' ©, as shown in the table below, are classed as those items that may mean the user or carer is constrained by the layout to be closer to the platform edge or roll over a slope.</p> <p>The items below are provided as an example only at this time.</p>		
D0	There are no distractions in this direct platform area for the carer or user.	0
D1	Distractions in this area are limited to access (doorways, escalators, lifts) or 'handsfree' interaction such as posters and other visual information.	1
D2	There are installations in this area that are likely to require interaction and 'hands on activities (such as machines, help points) and are installed taking into consideration Human Factors (for example there is a barrier towards the platform, the area is flat or lower than the platform, etc.)	2
D3	There are installations in this area that are likely to require interaction and 'hands on' activities (such as machines, help points) and there are no known Human Factors design considerations in place yet.	4

Table 4: Possible rating scale for Constraints © in a new format platform risk assessment

Limitations and constraints from ‘risky locations’ ©		Score
<p>Notes: This should be seen in the context of the platform location. All aspects of distraction that can be managed by the SFO should be considered including (but not limited to): installations, buildings and platform designs that have narrow or restricted widths next to the platform, plus access to help points, lifts, seating, timetable and customer information screens).</p> <p>Note that distractions (D), as shown in the table above, are classed as those items that may somehow distract the user or carer and result in them not applying the brakes or letting go of the pushchair or wheelchair.</p> <p>Note that constraints from ‘risky locations’ © here are classed as those items that may mean the user or carer is constrained by the layout to be closer to the platform edge or roll over a slope.</p> <p>The items below are provided as an example only at this time.</p>		
L0	There are no constraints in this direct platform area for the carer or user.	0
L1	Constraints are limited to short sections of less than 1 metre (for example poles/ posts, minor walkway restrictions).	0.5
L2	The constraints in this area of the platform would restrict a wheelchair or pushchair and would potentially force them closer to the platform edge or steeper gradient. This would include locations for ramp access to board trains (either by fixed raised platform, or where mobile ramps are deployed).	2
L3	There is a major constraint in this area of the platform (for example narrow width platform for more than 2 metres, known congestion pinch point).	4

Table 5 Possible rating scale for Other Station Specific Factors (O) in a new format platform risk assessment

Other Station Specific Factors				Score
<p>Notes: This should be seen in context of the station size and footfall, including peaks and troughs. All aspects of operations that can be managed by the SFO should be considered including Access for All, accidents/ incidents involving wheeled vehicles,</p> <p>The items below are provided as an example only at this time.</p>				
	Category	Description	Trips per annum	
O1	A	National hub	over 2 million	1
O2	B	Regional interchange	over 2 million	1
O3	C	Important feeder	0.5–2 million	2
O4	D	Medium staffed	0.25–0.5 million	2
O5	E	Small staffed	under 0.25 million	3

Other Station Specific Factors				Score
O6	F	Small unstaffed	under 0.25 million	3
O7	Access	The station is fully accessible either through Access for All or a pre-existing situation		3
O8	Inaccessible	The station is extremely difficult to access with wheeled vehicles		0.5
O9	Sport	The station is periodically well used due to nearby sporting fixtures		0.5
O10	Events	The station is periodically well used due to nearby events eg festivals		0.5
O11	Facilities	The station is close to school, hospital, care centre etc which may result in increased use by persons with restricted mobility		2

Note: Category C stations are sub-divided into C1 (city or busy junction) and C2 (other busy railheads). Category F stations are sub-divided into F1 (basic) and F2 (below 100,000 journeys per annum).

Source: Department for Transport and Network Rail

Table 6: Possible rating scale for Slipstream (S) in a new format platform risk assessment

Slipstream (S)			Score
Notes: This should be applied to the whole platform unless specific areas of the platform are known to be different. Please refer to RSSB documentation and Railway Standards for more information on slipstream effects. The items below are provided as an example only at this time.			
S0	This platform has no passing trains, all trains stop at this platform (e.g. it is a terminus).		0
S1	This platform does not have any known/ noticeable slipstream from passing trains.		0.5
S2	There are minor effects of slipstreams at this platform/ location.		1
S2	There are major effects of slipstreams at this platform/ location.		3

Note for Slipstream use figures obtained by slipstream risk assessment to evaluate the score, otherwise use the suggested ones provided here.

The score by platform is added up to identify higher risk potential platforms. The individual higher scoring factors indicate where actions should be directed; the lookup table below may be useful to determine priorities.

Table 7 Possible Risk Index look-up table (R)

Rating given to above factors P, D, L, S, O	Awareness measures	Design measures	Risk Index for each Non-compliant crossfall area		
			CF1 or 2	CF 3 or 4	CF5 or 6
All other factors are rated at 0	Provided	N/A	0	0	1
	Not provided	N/A	0	1	2
Only one other factor has a rating of 1.	Provided	N/A	0	0	1
	Not provided	N/A	0	1	2
Only two other factors have a rating of 1.	Provided	N/A	1	1	2
	Not provided	N/A	3	3	4
More than two other factors have a rating of 1.	Provided	Provided	2	2	3
	Provided	Not provided	4	5	6
	Not provided	Not provided	5	6	7
Any factor has a rating of 2 or more.	Provided	Provided	3	3	4
	Provided	Not provided	5	6	7
	Not provided	Not provided	6	7	8

Note: “Awareness measures” are items that do not change the infrastructure in any way, (such as staff training, audible announcements, online campaigns etc.).

“Design measures” are those that require some form of physical engineering design activity, (which include formal signage, platform markings, moving items or installing barriers, etc.).

4.6 Step five – plan and implement priority

- 4.6.1 Plan and carry out the mitigations that have been prioritised (higher scores) as part of Step 4.

Table 8 Possible Action Plan

Risk Factor	Action Plan
0-1	Provide warning signs- see Appendix 4 for examples Record cross fall for future renewals
2-3	Provide warning signs, public announcements Consider relocating ticket/vending machines Record cross fall for future renewals
4	Provide warning signs, public announcements

	Consider relocating ticket/vending machines Consider resurfacing or rebuilding of platform, where possible
5 or greater	Consider relocating ticket/vending machines Consider resurfacing or rebuilding of platform, where possible

Note: It may not be possible to rebuild platforms due to:

- Existing track gradient.
- Different track gradients on either sides of island platforms.
- Other existing infrastructure

4.7 Step six – continual improvement of risks and mitigations

- 4.7.1 As stations, platform (s) and customer characteristics change over time and best practice is continually being identified, this process should be seen as the start of a continual cycle of improvement with the regular monitoring of risks, including new emerging ones and more best practice emerges.

Part 5 Other sources of information and advice

5.1 Rail industry documents

- 5.1.1 The following rail industry documents are of relevance to the subject matter covered in this Guidance Note:

- i) Railway Industry Standard RIS7016 – Interface between Station Platforms, Track and Trains, and buffer stops. Available from:
<https://www.rssb.co.uk/rqs/standards/RIS-7016-INS%20Iss%201.pdf>
- ii) RSSB Research report T1098 Identifying mitigations for the risk of unplanned movement of wheelchairs and pushchairs on station platforms, accessed via <https://www.rssb.co.uk/research-development-and-innovation/research-project-catalogue/t1098>, the report is hosted on SPARK (username and password required)

- 5.1.2 Further relevant information may also be found in the following external documents:

- i) RAIB Rail Accident Report 17/2014 - Accidents involving a wheelchair rolling onto the track at Southend Central, 28 August 2013; and a pushchair rolling onto the track at Whyteleafe, 18 September 2013, published August 2014 and available at:
http://www.raib.gov.uk/publications/investigation_reports/reports_2014/report172014.cfm
- ii) The Sydney Trains (Australia) website provides advice to those travelling with 'prams and strollers', including a safety video. It can be accessed via:
http://www.sydneytrains.info/travelling_with/safety_and_education/children
- iii) The City of Edmonton (Canada) also includes comprehensive advice for users with strollers using the Edmonton Transit System, available at:
http://www.edmonton.ca/transportation/ets/riding_ets/strollers-on-ets.aspx

APPENDIX 1

Underlying causes

RSSB identified twenty underlying causes, which were then put into five groups. The five groups were as follows:

1. **Pushchair or wheelchair choice and use of chair** – in the main, these cannot be managed by the SFO. Some of these causes were identified during the surveys and interviews. These causes are:

UC1: The pushchair or wheelchair does not have a brake, or it is difficult to apply

UC2: The pushchair or wheelchair is overladen and more difficult to control

UC3: The pushchair or wheelchair occupant is not strapped in, or otherwise is allowed to move around

2. **Lack of awareness of the risks** associated with the significant factors that may create an unplanned movement of the pushchair or wheelchair and the result in a rail environment. Each type of awareness has to be applied to both the carer and the wheelchair user because their experiences will be different for each of the factors and the way that they gain awareness:

UC4: The carer is not aware of/does not realise there is a significant gradient

UC5: The wheelchair user is not aware of/does not realise there is a significant gradient

UC6: The carer is not aware of the influence of slipstreams from passing trains

UC7: The wheelchair user is not aware of the influence of slipstreams from passing trains

UC8: The carer is not aware of the influence of undulating platform surfaces

UC9: The wheelchair user is not aware of the influence of undulating platform surfaces

UC10: The carer is not aware of the influence of the weather in this location

UC11: The wheelchair is not aware of the influence of the weather in this location

3. **Distractions that stop the person behaving appropriately**, even if they are already aware of the risks. There are a lot of potential distractions when travelling and when using a pushchair or wheelchair. We have separated these causes into ones that can be influenced by the SFO directly and those which come from a wider influence:

UC12: The carer is distracted by something related to the rail environment (for example ticket machine) and they do not take precautions (for example apply brakes) to prevent an unplanned movement of the pushchair or wheelchair

UC13: The wheelchair user is distracted by something related to the rail environment and they do not take precautions to prevent an unplanned movement of the wheelchair

UC14: The carer is distracted by something related to the rail environment and they leave the pushchair or wheelchair unattended

UC15: The carer is distracted by another reason related to their personal situation (for example use of phone, other children) and they do not take precautions (for example apply brakes) to prevent an unplanned movement of the pushchair or wheelchair

UC16: The wheelchair user is distracted by another reason related to their personal situation (for example use of phone, talking to someone) and they do not take precautions to prevent an unplanned movement of the wheelchair

UC17: The carer is distracted by another reason related to their personal situation (for example use of phone, other children) and they leave the pushchair or wheelchair unattended

4. **Circumstances that put the carer or user into a more ‘risky’ situation**, such as where there are more people who could bump into them. It may be possible that they do not see an alternative route, or it may appear to be too much hassle to avoid the restriction. One example is a platform that is crowded in the location where the nominated stopping location for the wheelchair accessible carriage is located, or the user/ carer making their own choice to stand in a width restricted area rather than a wider part of the platform. The two UCs are defined as:

UC18: The carer is restricted by circumstances to being in a more ‘risky’ location (such as platform crowding, being in a location they know their carriage will stop, etc.)

UC19: The wheelchair user is restricted by circumstances to being in a more ‘risky’ location (such as platform crowding, being in a location they know their carriage will stop, etc.)

5. **Platform conditions and layout that create a more ‘risky’ environment**. These are aspects that are normally managed by the SFO; examples of this are station works with temporary ramps, less used areas of platform, or a waiting area that is raised with a ramp towards the track out of the shelter. It may also apply where there is some form of restriction that places a carer or user closer to the platform edge. This concern has been stated as a single UC:

UC20: Platform conditions and layout that increase how easy it is for a pushchair or wheelchair to roll

APPENDIX 2:

How to measure a cross fall slope: Working Instructions

Before undertaking any measurements check that the information doesn't already exist in Network Rail's survey data on the station!

Where increased risk platforms are identified or suspected and there is a clear need for further detailed investigation, carry out a detail survey using the test method below.

Obvious changes of cross fall should be recorded:

- a) where platforms have been extended;
- b) where platforms have been partially renewed/resurfaced; or
- c) where new ticket or vending machines have been installed.

Note: Platforms often have the coper level, and cross fall on the rear surface

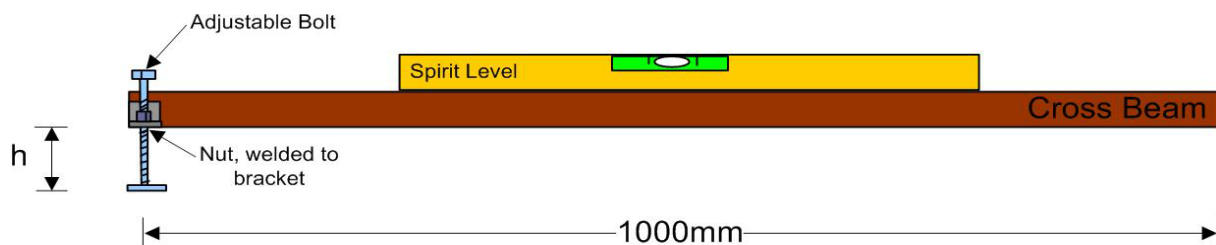
Fall along the length of platform should also be recorded

Method

A suitable risk assessment should be undertaken prior to commencing the task, e.g. PPE consideration, tripping hazard etc

Accurate values may be obtained by using Total Station, Engineers Level, Laser Level Survey or the apparatus shown below.

Mobile device Apps with inclinometers are also available and could be used with a non-metallic metre straight edge for initial screening.



Crossfall:

1:20	$h = 50\text{mm}$
1:40	$h = 25\text{mm}$
1:80	$h = 12.5\text{mm}$

Equipment Required:

- Inclinometer
- 1m non-metallic true straight edge such as a nylon spirit level
- Measuring wheel

Beware that the slope can vary across the width of the platform as shown by the RAIB measurements below (taken from their report) see the next page.

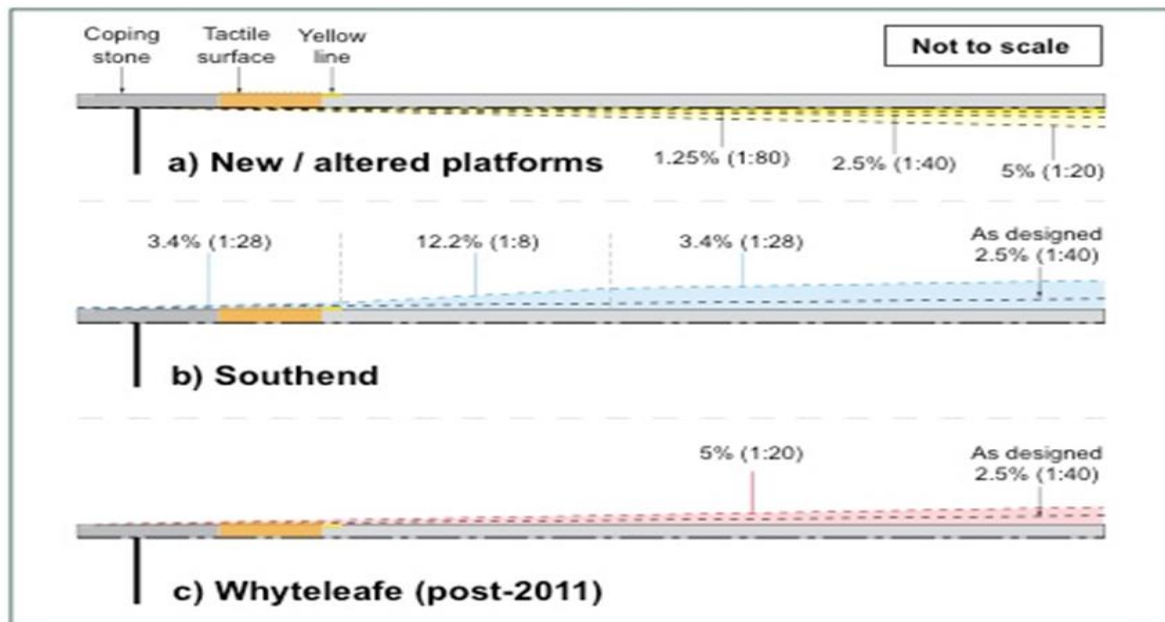


Figure 8: Diagrams showing standard gradient against gradients at Southend Central and Whyteleafe stations

Crown Copyright, extract from RAIB report 17/2014

2. Readings are to be taken at 10m intervals, intervals to be determined by use of the measuring wheel.
3. Start at the top of the ramp at the London end. If this is not known, use the most northerly end. Refer to the start point as 0m.
4. Readings are to be taken perpendicularly to the tracks starting at the inside edge of the copier/yellow line. Where a copier does not exist, take readings from the inside of the platform edge/yellow line. Never extend the straight edge over the edge of the copier/edge of the platform/yellow line.
5. The requirement is to record the fall direction and steepness over the first 3m of platform. If the platform is an island platform and less than 6m wide, record to the half-way point. Make a note of this in the comments column of the record form.
6. Where obstructions prevent 3m width readings or 10m length readings, take the nearest accessible reading and make a note of this in the comments column of the record form.
7. To record the inclination, lay down the straight edge perpendicular to the track and slide it over the three metres to determine the most representative inclination then lay the inclinometer on the edge.
8. Record the inclination at each 10m interval noting its % fall and whether it falls towards or away from the track. Enter any other comments you feel necessary into the comments column (e.g. snow covering, material type, irregular/rough surfacing, etc.).

Safety Notes

- Be wary when using or carrying the 1m straight edge, its length could make handling cumbersome. Be aware of people and equipment around you.
- Taking upwards of 50 readings per station (for stations with 2 or more platforms) will involve repetitive bending, the risks of which will be similar to manual handling. Please refer to your manual handling training, bend and lift correctly.
- No surveyors or measuring equipment should be within 1.25m of the platform edge whilst undertaking this work.
- No person or equipment should be within 2.75m of live OHLE, including feeds and returns.
- Secure the measuring wheel and other equipment safely while working on the platform (particularly avoid the measuring wheel being blown away by the wind)

Platform Cross Fall Survey Record Form				
Station name:			Date:	
Surveyor:				
PL01 00 01 Platform No	Inclinati on %	TOWARDS TRACK (Code)	AWAY FROM TRACK OR LEVEL (Code)	Comments
0m				London end
10m				
20m				
30m				
40m				
50m				
60m				
70m				
80m				
90m				
100m				
110m				
120m				
130m				
140m				
150m				
160m				
170m				
180m				
190m				
200m				
210m				
220m				
230m				
240m				
250m				

Appendix 3

Potential template for under taking Risk Assessments

Rating Scale	Allocated Weighting		Weighting by category	Cause of accident in last 3 years? Y/N
Cross fall Slope (CF) – For each applicable area of the platform. Data already available can be used, or a new survey undertaken				
Compliant with GI/RT7016				
CF0	0	Slope away from Coper Edge 1:80 to 1:40		
Non-compliant with GI/RT7016				
CF1	1	Platform is approximately level		
CF2	2	Slope away from Coper Edge greater than 1:40 (i.e. also non-compliant with DfT guidance)		
CF3	3	Slope towards Coper Edge from Level to 1:80		
CF4	4	Slope towards Coper Edge 1:80 to 1:40		
Local Platform Conditions – These maybe transitory e.g. during station works. The baseline RA can be re-used as the basis of a snapshot to create a RA specific to the station works.				
P0	0	No known local platform conditions other than “normal” weather.		
P1	1	There minor conditions or concerns associated with the platform in this location, such as uneven surfaces that may be awkward for a wheelchair or pushchair.		
P2	2	There are known local conditions that make this part of the platform more hazardous, such as slippery surfaces or the wind funnelled by buildings (but not train slipstreams), high leaf fall which has resulted in recorded incidents, etc.		
P3	3	There are known local conditions which are very hazardous, and care should be taken most of the time (e.g. overflow water from fields, unmade platform surface) OR there is a temporary surface in place that increases the gradient of a ramp or introduce other concerns about wheelchair or pushchair movements (even if only temporarily).		
Distractions – In the context of the platform location, items that may distract the user or carer resulting in them not applying the brakes or letting go of the pushchair or wheelchair. All aspects of distraction manageable by the SFO should be considered.				
D0	0	There are no distractions in this direct platform area for the carer or user.		
D1	1	Distractions in this area are limited to access (doorways, escalators, lifts) or ‘handsfree’		

		interaction such as posters and other visual information.		
D2	2	There are installations in this area that are likely to require interaction and 'hands on activities (such as machines, help points) and are installed taking into consideration Human Factors (for example there is a barrier towards the platform, the area is flat or lower than the platform, etc.)		
D3	3	There are installations in this area that are likely to require interaction and 'hands on' activities (such as machines, help points) and there are no known Human Factors design considerations in place yet.		
<i>Limitations and constraints from 'risky locations' - Known local conditions, these may be transitory (e.g. during station works). The baseline RA can be re-used as the basis of a snapshot to create a RA specific to the station works.</i>				
L0	0	There are no constraints in this direct platform area for the carer or user.		
L1	1	Constraints are limited to short sections of less than 1 metre (for example poles/ posts, minor walkway restrictions).		
L2	2	The constraints in this area of the platform would restrict a wheelchair or pushchair and would potentially force them closer to the platform edge or steeper gradient.		
L3	3	There is a major constraint in this area of the platform (for example narrow width platform for more than 2 metres, known congestion pinch point)		
<i>Slipstream (S) - This should be applied to the whole platform unless specific areas of the platform are known to be different.</i>				
S0	0	This platform has no passing trains, all trains stop at this platform (e.g. it is a terminus).		
S1	1	This platform does not have any known/ noticeable slipstream from passing trains.		
S2	2	There are minor effects of slipstreams at this platform/ location.		
Total weighting score and number of accidents in last three years				
Level of risk based on weighting guide score + accident in last three years				
Low risk		Score between 0- 5 and no accident in last three years		
Medium risk		Score between 0- 10 and none or one accident in last three years		
High Risk		Score between 0 -15 and at least one accident in last three years		

Appendix 4

Examples of signage, posters, etc.

Example 1 – General advice on need to apply brakes on wheeled vehicles

Example 1A - Sign providing such generic advice being used by ScotRail in station entrance areas (and reproduced here courtesy of ScotRail):

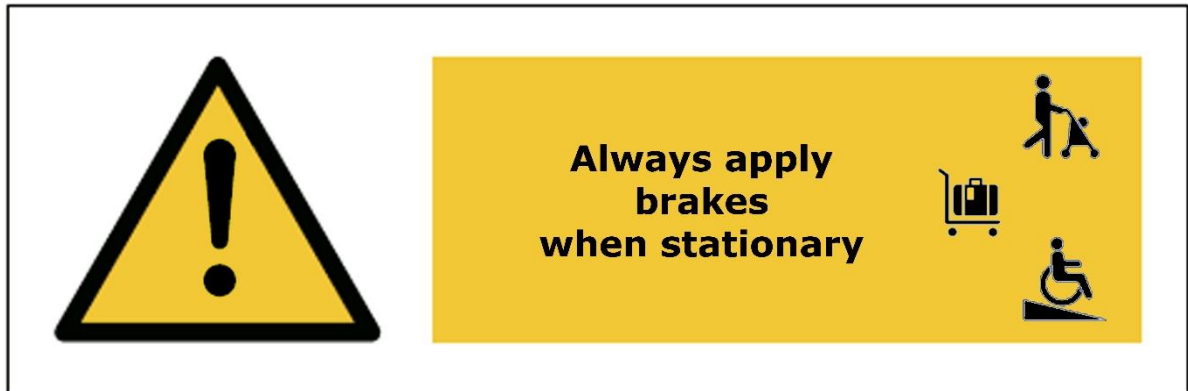


Example 1B - Poster encouraging safe behaviour by those in charge of pushchairs (courtesy of Southern):



Example 2 – Platform signage

Example 2A – Sign encouraging use of brakes on wheeled vehicles being used by ScotRail on platforms (and reproduced here courtesy of ScotRail):



Variant below courtesy of SouthEastern



Example 2B - Signage highlighting a platform slope hazard (courtesy of ScotRail):



Example 2C – Sign indicating ‘safer area’ for parking of pushchairs and wheelchairs (courtesy of c2c):



Example 3 – Platform markings

Example 3A – Platform marking indicating ‘safer area’ for parking of pushchairs and wheelchairs (courtesy of c2c):

