

Guidance on the planning and management of station flooring to public areas



Safety Technical & Engineering Guidance



Document Identity

Guidance on the planning and management of station flooring to public areas

Performance requirement guidance

BLDG-SP80-001

Authorisation Control

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Revision Information

Version	Date	Description of changes
1	April 2014	First issue.
2	September 2014	Second issue- RAM recommendations.
3	January 2015	Safety Technology and Engineering Directorate version.

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1 Introduction

Network Rail (NR) owns over 2,500 railway stations of which 19 are “Managed Stations” under its direct management and control, with the remainder being managed on a day-to-day basis by Train Operating Companies (TOCs). The Managed Stations are not only among the most important transportation sites in the country but are also some of the most architecturally, historically and culturally significant sites in the country.

Network Rail has the very highest aspirations in respect of the quality of the stations and facilities. It is recognised that these stations and the interchange to other modes of transport are a vital part of the travelling customer’s rail experience and, that they play an important role on the culture and life of their locale.

The stations must be safe and accessible for all; operated and configured to process users smoothly, seamlessly, clearly and supportively where necessary. The station environment must be stress free, clean, comfortable and enjoyable.

Injuries to passengers resulting from slips, trips and falls are a serious issue with the potential to generate both claims and reputational damage to NR and TOCs

Whilst principally aimed at those planning to or undertaking works to railway stations, this guidance should also be of interest and value to all those responsible for their day-to-day maintenance and repair. Ultimately, the solution specified – which should be made by a competent person, will reflect the requirements for safety, the whole-life costs and the preferred means of managing the surface over its operational life.

2 Purpose

The objective of this document is to set the parameters for the design and installation of consistent, reliable, fit for purpose, low maintenance and cost effective station flooring. It aims to give simple guidance to assist decision makers and designers in the choice of suitable underfoot materials used in the three main public situations experienced within the station environment.

The critical balance between slip resistance, for which there are recognisable national standards, and cleanability has been the subject of concerns raised following installations of granite flooring at Kings Cross, London Bridge and Birmingham New Street Station. Generally, the higher the slip resistance value, the more difficult the product is to clean as the surface is inevitably rougher which has a detrimental effect on the floors operational life.

The choice of flooring finishes is a collaborative exercise that involves using a risk based assessment approach and liaising closely with stake holders, cleaning contractors and Health and Safety experts before a final decision on flooring type is made.

The report recognises NR does not have a cleaning standard or subjective ambience score for the quality of its public areas.

This guidance strongly recommends the requirement for independent testing of new floor installations to assess material strength, cleanability and resistance to abrasion. The results of this benchmarking being presented to stakeholders (particularly RAMS) for material acceptance prior to procurement.

The scope of the guidance is to enable and appreciation of;

Floor safety and the causes of slips and trips.

Ambience relating to station context and consistency of approach.

Cleanability

Design considerations and whole life costs.

3 Background

The standards and legislation on the performance of flooring are varied and unfortunately includes some anomalies on the values to be attained. Often the performance figures obtained from flooring product manufactures present only factory test and do not represent how the material would perform actually in use.

BS 8300-2009 Annex E cautions that the performance of floor finishes changes merely on installation and Asset Maintainers need an awareness of this fact.

The field testing of both recently installed and established floor finishes so they can be benchmarked for future use. However, the floor's performance is closely linked to how well it is maintained and the field test intends to capture frequency and method of floor cleaning which can be measured against an objective standard.

Slips trips and falls are a statistical measure in Safety Incident Reporting and the ORR are considering Customer Experience which may include **perceived cleanliness** of the station environment which may have a significant impact for Station Facility Operators and Train Operating Companies.

The station flooring has to consider 3 key areas (listed below) in the process of arriving, waiting and boarding at a station. Beginning with arrival and typically the transition from exterior to interior space through the gateway between the station and its surrounding environment which may be beyond the physical boundary of the station and under the management of a third party.

The orientation of the building entrance away from the prevailing wind is a key design decision which will impact on the amount of contamination in a station. The importance of suitable sized canopy and mat well should not be understated as it has a significant role in shedding contaminants from feet.

External areas of stations, including platforms where there is complete exposure to the elements and usually no cleaning regime other than removal of litter. The transition between platform zone and station facility zone is often separated by the physical barrier of ticket gates which naturally adjust the gait of pedestrian movement as people pass through them.

Internal controlled areas Increasingly concourse spaces include retail spaces which often sell food and beverages which contribute to the contamination of the floor surface these internal controlled areas require a full and constant cleaning regime. Passengers often rely on a visual connection between the station facility zone and the platform so they can gauge the time taken to travel between the two points without resorting to running which increases the likelihood of a slip or trip.

Internal uncontrolled areas traditional station concourses and platforms under a glazed or partially glazed roof where there is no climate control and therefore a risk of wind, condensation, rain or snow ingress as well as walked-in dirt have to be managed. These areas do not always have a good cleaning regime, which therefore will affect the choice of finish.

Exclusions

The flooring guidance will exclude the following areas.

Passenger Train Interface- platform copers, tactile paving, yellow and white lines.
Standard **NR/L3/CIV/030** Platform components & prefabricated construction systems details this.

Lift floors, escalators, carpets and raised access flooring.
Details of recommended floor finishes will be included in the Operational Property Design and Construction Handbook

4 Floor Safety- why people slip over?

Contrary to popular belief, some slippage is necessary for walking, especially for persons with restricted gaits; a truly “non-slip” surface could not be walked over.

Walking is defined by an ‘inverted pendulum’ gait in which the body vaults over the stiff limb or limbs with each step. The transition from vertical stance to swing phase where the heel strikes the ground, foot flattens and toe pushes off to provide propulsion.



Twitter image TSB Feb 2014

Slip resistance is based on the frictional force (coefficient of friction pulling force/ weight of object) necessary to keep a shoe heel or crutch tip from slipping on a walking surface. While the dynamic coefficient of friction during walking varies in a complex and non-uniform way, the static coefficient of friction, which can be measured in several ways, provides a close approximation of the slip resistance of a surface.

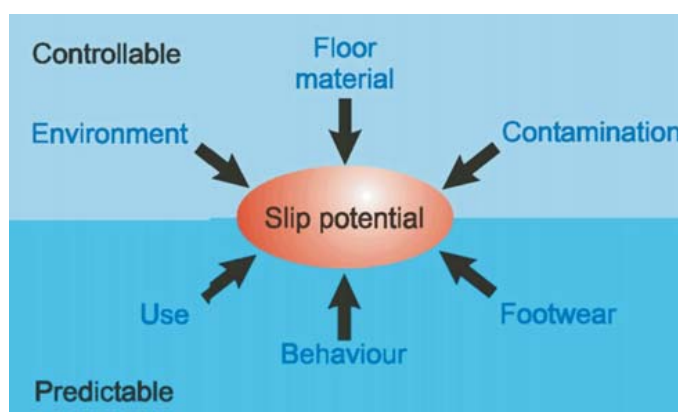
Dry, clean floors do not normally present a slip hazard. It is only when they become wet, greasy or dry materials fall onto them that a slip hazard develops. By preventing contamination of the floors you will reduce or even eliminate the slip risk in your workplace.

Contamination is anything that end up on floors and can be a by-product of cleaning or as a result of adverse weather conditions. With all contamination, the first option should be to try and eliminate the problem,

Statistically the highest incidents of slips trips and falls involve people running for trains particularly those with wheeled luggage.

It is understood that peoples behaviours change when typically pulling luggage and often the weight of what is being pulled is difficult to judge and additional force is used which can induce a fall when moving from surfaces with varying SRV.

The diagram below illustrates the factors that can contribute to slip accidents and the action to take to prevent them. It is called the **slip potential model**. One or more of these factors may play a part in any slip accident.



HSE slip potential model

5 Slip Testing

The prevention of slip accidents should be a driver to the selection of floor materials.

The choice of a material must take into account not only its properties when new but also its probable behaviour when worn or contaminated. Even the most slip resistant surface can become slippery if not correctly maintained. Testing floors in-situ can identify many factors that affect the slip performance of the flooring material such as cleaning regimes, maintenance, wear or weathering and traffic patterns all of which can affect the performance of the flooring material.

Tests should be carried out to ascertain the slip resistance and roughness of new floors before hand over but also periodically during the life of the asset.

It is also important to assess how slippery floors are in stations as there is a duty of care to make sure that floors are not slippery and put people's safety at risk. A number of suppliers provide a comprehensive on-site consultancy service regarding slip issues on any surface, and carry out slip resistance tests using equipment tested and approved by the HSE and UK Slip Resistance Group. Testers should preferably be members of the United Kingdom Accreditation Service (UKAS)

The 'Pendulum' floor friction test as developed by the British Ceramic Research Limited (CERAM), is accepted by the HSE and the UK Slip Resistance Group (UKSRG) as the most appropriate testing method for the type of floor surfaces to be found in stations. BS 7976 -1; BS 7976- 2 and BS 7976 – 3 refer to the calibration, operation and testing of the pendulum apparatus.

6 Requirement for slip resistant floors

Network Rail has adopted the requirement that all floor surface materials achieve a minimum target rating of 40 SRV (Slip Resistance Value - defined in some standards as the PTV (pendulum test value)) on the 'Pendulum' test when the material is both wet and dry and when fitted with a '4S' rubber shoe. The cleaning and care regime is critical in respect of maintaining the slip resistance values of the surface. It has been proven that the slip resistance of floors will vary seasonally and according to patterns of wear such as desire lines of pedestrian movement.

Should surfaces degrade over time a number of remedial treatments can be considered, which range from applied coatings, inlaid carborundum strips and surface etching. Whilst acknowledging the performance enhancement that may be possible with such treatments, the effect on cleanability and appearance following treatment should be analysed carefully, particularly if there is an impact on the lifespan of the material.

In addition to the slip resistance value described above it is necessary to achieve a surface roughness Rz of 20 micron (µm) or more, as defined and measured in accordance with BS 1134: part 1 and recommended in Annex B (informative) of BS 5385-5: 2009.

Cognisance should also be made of the HSE's stance on the use of surface roughness indicators. It states that *"while Rz is a useful indicator of the slip resistance of flooring materials it is not recommended that it be used as the sole selection criteria on which to base the choice of a new floor"*. Wherever possible surface roughness should be considered in conjunction with pendulum measurements in both wet and dry conditions before specification decisions are made."

As a basic guide the HSE has published the following figure for Floor Surface Roughness for a given contaminant

Minimum Floor Surface Roughness (Rz) in Microns	Floor Contaminant
20 microns	Clean water or soft drink
45 microns	Soap solution or milk
70 microns	Motor Oil or olive oil

Table 1 Floor surface roughness (Rz)

7 Anomalies with the values required for non slip flooring

As stated previously there are anomalies with the values required for SRV.

The Health & Safety Executive paper 'Assessing the slip resistance of flooring' (2007) has a categorisation of slip potential based on Pendulum Test Vales (PTV)

High Slip Potential	0-24
Moderate Slip Potential	24-35
Low Slip Potential	36+

Table 2 HSE slip potential categories (PTV)

Incidentally a SRV >36 appears to be the trigger value for personal accident/ injury claim lawyers.

The Network Rail 'Operational Property Design & Construction Handbook' makes reference to the following; There is no minimum nationally agreed standard but Network Rail has adopted acceptable good practice and requires that all floor surface materials achieve a target of more than 40 SRV (Slip Resistant Value) on the 'Pendulum' test when the material is both wet and dry and when fitted with a '4s' rubber shoe.

For clarity NR Standard **NR/L3/CIV/030** which states a figure of 45 for platform surfaces which is outside the scope of this guidance.

DfT Accessible Train Station Design for Disabled People Code of practice

DfT Accessible Train Station Design for Disabled People Code of Practice Section I1/1 states: All floors should have some slip resistance when wet or dry. A slip resistance value of between 40 and 70 is generally safe. It is recommended that slip resistance should be a minimum of 50 in the open, but it can be as low as 40 where the platform is fully covered. The test should be conducted in both wet and dry conditions, and measured with 4S torsugar rubber on a pendulum test.

Surfaces with values outside this range are likely to be slippery or have too much grip, therefore they will be more likely to contribute to accidents. What is apparent is that there is a conflict between the two documents as one states there is no minimum nationally agreed standard but the CoP states a minimum value as low 40 where it is fully covered.

Section I1/3 states: New hard floor surfaces, such as ceramic tiles, natural stone, concrete or terrazzo which are widely used in commercial environments for their durability, should use an additive such as carborundum to make them more slip resistant. What is also apparent is that no natural flooring material would contain carborundum as it is an industrial additive.

Typically a terrazzo tile with some carborundum (Silicon carbide (SiC) content has the abrasive powder distributed through the depth of the tiles decorative surface which once ground exposes the grains which enhance the materials slip resistance.

Various trials undertaken by London Underground / Network Rail have been able to demonstrate that the SRV performance can display an improving trend over time which sets terrazzo with carborundum content apart from other flooring materials. The phenomena of improving or sustainable slip resistance is characterised as 'differential wear'

London Underground have revised the required SRV for their (predominately sub surface) station to SRV 36 in the wet which is aligned with the HSE definition of low slip potential.

In performance terms the requirement to achieve the DfT 40 SRV in the wet has compromised the perceived cleanliness of station flooring to public areas and raises the question if a figure closer to the HSE's 36 SRV is more practicable and achievable.

8 Mitigations to maintain floor safety

Entrance Matting

Provision must be made for mat-wells at station entrances to remove the significant amount of contaminants entering the building on the soles of people's shoes and also to reduce the likelihood of slipping on floors during inclement weather.

BS 7953 gives recommendations on the selection, installation and maintenance of entrance flooring systems, although the advice given does not specifically relate to the ability of the matting system to remove wet contaminants from footwear.

Doormats should be fixed so that they are flush with the floor finishes around them to avoid a trip hazard. Soft mats and coir mats should be avoided, as they are difficult for people in manual wheelchairs to travel over. Preferably mat wells should be drained and provision made for the inspection of drainage gullies and traps.

For some mats the slip resistance varies with the direction in which it is being traversed. In many cases this is not a problem as the mats are generally only traversed in one direction. However, in a significant minority of locations where there are multiple entry points the matting has caused slip problems.

Entrance matting can be divided into two zones:

Exterior entrance Matting (Immediately outside the building)

- Scrapes off dirt, mud and initial moisture before entering the building
- It should provide for easy maintenance
- It should provide excellent appearance retention

Primary entrance Matting (Immediately inside the building)

- Removes and collects dirt immediately inside the building
- Required to absorb water from wet footwear
- Needs to be of sufficient depth to be effective.

9 Managing Slips and Trips

Any regime to minimise slips and trips accidents associated with the floor finishes in stations should involve a coordinated approach between different stakeholder departments involved in the operations of stations.

Management measures for the control of contaminants should include the provision of suitable entrance matting, spill stations, clear signage, and public information system.

Communicating problems to passengers through public information announcements and visible zoning of soiled or contaminated sections of flooring although necessary does not make a stress free, clean, comfortable and enjoyable environment. Furthermore this approach is inadequate for visually impaired passengers who are presented with further barriers. Clear prompt procedures should be established by station operations.



10 Compliance

Requirements and Legislation

European Standards

Persons with Reduced Mobility (PRM TSI)

These standards will apply where new trains or stations are introduced, or where trains or stations undergo major work, on a part of Great Britain's rail network that constitutes the Trans-European Network (TEN).

PRM TSI: 4.1.2.5 states:

“Within the station buildings, there shall be no irregularities in excess of 5 mm at any given point in floor walking surface areas, except for tactile guiding paths, drainage channels and tactile warning indicators”.

PRM TSI: 4.1.2.5 states:

“The floor surfaces of obstacle-free routes shall have anti-reflecting properties”.

National Standards

BS 8300:2009+A1:2010 – Design of buildings and their approaches to meet the needs of disabled people – Code of practice

All floors should have some slip resistance when wet or dry. A slip resistance value of between 40 and 70 is generally safe. It is recommended that slip resistance should be a minimum of 50 in the open, but it can be as low as 40 where the platform is fully covered. The test should be conducted in both wet and dry conditions, and measured with 4S torsugar rubber on a pendulum test. Surfaces with values outside this range are likely to be slippery or have too much grip, therefore they will be more likely to contribute to accidents.

If necessary, existing floor surfaces should be treated to improve their slip resistance.

Where two materials abut each other, they should have a similar level of slip resistance, otherwise the foot, walking frame or wheel will be abruptly stopped or caused to slip.

Any matting should either have its surface level with the adjacent floor finish. If in exceptional circumstances other types of surface laid mats are used, they should be fixed to the floor at their edges and at any joints.

Large, repeating patterns that incorporate bold contrasting colours or simulate steps should not be used for any floor surface.

Code of Practice – Accessible Train Stations, Design for Disabled People, Version 03 (2011) Note document to be revised & re issued in 2015 as *Inclusive Design Standards for Accessible Railway Stations*

New hard floor surfaces, such as ceramic tiles, natural stone, concrete or terrazzo, which are widely used for their durability, should use an additive such as carborundum to make them more slip resistant.

Floor surfaces should be firm, even, easily cleaned and slip-resistant when wet or dry. Where necessary, floors should be treated with a slip-resistant finish in accordance with point B2 above.

Main thoroughfares within buildings should have consistent floor surfaces. It is recommended that changes in colour and texture are used to mark the edge of the thoroughfares and any impending hazards, such as projecting obstacles and stairways.

Department for Transport (DfT) – **Guidance on the Use of Tactile Paving Surfaces** (2005)

Chapter 3 - Platform Edge (Off-Street) Warning Surface states:

“the purpose of this surface is to warn visually impaired people of the edge of all off-street railway platforms”. The surface can be any colour other than red, but should provide a good contrast with the surrounding area to assist partially sighted people.

Requirements for slip-resistant floor finishes under the **Workplace (Health, Safety and Welfare) Regulations 1992**

Regulation 12 states:

Every floor in a workplace and the surface of every traffic route in a workplace shall be of a construction such that the floor or surface of the traffic route is suitable for the purpose for which it is used.

Without prejudice to the generality of paragraph (1), the requirements in that paragraph shall include requirements that -

The floor, or surface of the traffic route, shall have no hole or slope, or be uneven or slippery so as, in each case, to expose any person to a risk to his health or safety and every such floor shall have effective means of drainage where necessary.

So far as is reasonably practicable, every floor in a workplace and the surface of every traffic route in a workplace shall be kept free from obstructions and from any article or substance which may cause a person to slip, trip or fall.

In considering whether for the purposes of paragraph (2) (a) a hole or slope exposes any person to a risk to his health or safety -

No account shall be taken of a hole where adequate measures have been taken to prevent a person falling; and account shall be taken of any handrail provided in connection with any slope.

Suitable and sufficient handrails and, if appropriate, guards shall be provided on all traffic routes which are staircases except in circumstances in which a handrail can not be provided without obstructing the traffic route.

Under Regulation 12 employers must, in a particular workplace under their control, ensure certain requirements in connection with floors or the surfaces of traffic routes. Regulation 12(1) is a general duty involving strict liability, and is concerned with the suitable construction of a workplace floor for use, while regulation 12(3) is a specific duty, qualified by SFAIRP (so far as is reasonably practicable), directed at obstructions and substances which might cause slips, trips or falls.

Requirements for slip-resistant floor finishes under the HSE **HM Railway Inspectorate Railway Safety Principles and Guidance Part 2, Section B**

Item 30f (Factors to consider about the layout of other public areas):

All floors, steps, treads etc should be designed taking into account environmental conditions, contamination and cleaning to minimise the risks of slipping and tripping.

The Health and Safety Executive (HSE, 1999) has advice in relation to the required slip resistance and the preferred method for measurement

NR Standard **NR/L3/CIV/030** Platform Components and Prefabricated Constructions details the platform surface as a 'complete system' which incorporates the platform copers.

Further reading: **CIRIA** 2010 "**Safer surfaces to walk on**"

11 Building Context

Station ambience

NR has six different categories of station that have been ranked according to their foot fall. All of them are civic spaces which embody the character of their built environment and communicate the values of both landlord and tenant.

There are no minimum standards at present but a requirement that stations be 'Clean Safe and Aesthetically Pleasing' (*Better Rail Stations Review 2009*)

Requirements for heritage buildings

Most ground level floors in stations have been either rebuilt or recovered during their lifetimes. However, original flooring materials, such as encaustic tiles and wood blocks, do exist in some buildings. Where these remain and could continue in service as a suitable contemporary floor, they should be authentically repaired where possible. It should be noted that in some wood block floors the bitumen bedding also a new flooring material or considering the continued use of an existing surface, thought should be given to both durability and slip resistance. **Testing is required where a slip-resistant treatment is to be applied to an existing floor.**

Skirting's and mouldings are often an important element in the character of a floor and should be retained if original. Victorian skirting's are generally of more generous proportions than readily available replacements and will require specialist manufacture. The Railway Heritage Trust should be consulted when alterations are made to Listed Buildings



The generously sized aggregate in the green terrazzo of Euston Station concourse or the crisp limestone under Brunel's sheds at Paddington give these spaces a particular character.

Requirements for visually impaired people

There are approximately 1 million blind and partially sighted adults in the United Kingdom. Approximately 5% of these people have no sight at all. The remainder have varying degrees of residual sight which may enable them to function visually to different degrees.

Floorings should be plain without optically confusing patterns, and not gloss finished to produce glare or dazzle. The floor finish should contrast with the walls.

Floor coverings should be of a matt finish, which will not cause reflections from windows or light fittings. Shiny floor surfaces create reflections of any objects or fittings in the area. This creates additional visual confusion and makes it more difficult for visually impaired people to safely negotiate the space. High gloss floors feel slippery, even if they are not. They also reflect the movement of other people, which is particularly disturbing to visually impaired people.

Floor finishes should contrast with the walls so that the boundary of the floor is clearly visible. Where the floor finishes are of a similar hue to wall finishes, it is important that a skirting band is introduced and picked out in a dark colour to ensure that it is easy for the visually impaired person to locate where the floor ends and the wall begins. The Light Reflectance Value to be achieved at wall floor junction is a 30 point contrast.



Floor patterning that could be mistaken for steps- BS 8300-2009

Where changes in level occur within an area, such as a step or steps along a corridor, the leading edge of these steps should be clearly marked with a contrasting line or the nosing to the step.

Requirements of way finding and advertising

Floor displays should not interfere with essential way finding needs and should not be located so as to cause confusion to station users. There is a basic objection to this form of advertising from disabled people because of visual confusion for partially sighted persons. In addressing this requirement, similar considerations to those made in addressing the needs of visually impaired people should be adopted.

Floor markings and painting, whilst not likely to do structural damage may nonetheless have unpredictable consequences. Glues and paints may impregnate surfaces and may make them difficult to remove or eradicate traces later. Approvals must be sought in advance and removal techniques appropriately demonstrated.

12 Concept and Technical Design Considerations

Design and Whole-life costs considerations

Selection criteria to be applied for floor finish.

Installation Cost per square metre. Indicative costs of floor finish material are to be included in the Operational Property Design and Construction Handbook. The installation cost also need to factor in the floor substrate (proprietary screed) and void former should it be required.

Buildability.

For a floor finish to succeed it will need an appropriate substrate. The coordination of structural movement joints and movement joints in the floor finishes needs careful consideration. Access to buried or concealed services is inevitable and needs to be agreed at an early stage. The laying of a traditional terrazzo floor is a longer process when compared to the installation of a tiled floor or granite sets as to achieve the best results there is a requirement to grind and polish the installed floor to expose its constituent aggregates. Flood grouting is also the most effective way of ensuring the grout is applied to the full depth of the tile. The laying of terrazzo does require a reasonably high level of skill and site supervision if the best results are to be achieved

Programme. Should a development be phased over a period of months or years it is imperative that the supplied flooring is batched to ensure consistency of appearance. Are there any guarantees the adjacent flooring can be matched or will tide markings be evident?

Safety Slip resistance Value. The required SRV performance is stated in Department for Transport Accessible Train Station Design for Disabled People Code of Practice. A distinction is made between covered and non covered areas.

Changes in floor level and ramps will require special attention to ensure the transition from one surface to another does not induce a slip or trip hazard.

Design Life Durability, the assumed design life for the flooring material is in excess of 30 years which is in accordance with most whole life cycle costing models.

Precedents are useful in establishing feel and tone of a space, however, innovation should not be stifled as new low carbon flooring solutions emerge on the market. Provided a floor finish can be objectively assessed for its performance on strength, SRV and cleanability it should be considered.

Whole Life Cycle Cost. WLCC analyses the total cost of owning an asset over its entire life. Whole life cost include all costs such as design and building costs, operating costs, associated financing costs, depreciation, and disposal costs. Whole-life cost also takes certain costs that are usually overlooked into account, such as environmental impact and social costs.

Reflectance. The Light Reflectance Value to be achieved at wall floor junction is a 30 point contrast. Glare is to be avoided to be in accordance with requirements documented in BS 8300.

Remedial repair timescale for traffic. In the event a remedial repair to an area of laid flooring how long will it take to replace a square metre of flooring and have it brought into use for foot traffic? Is it achievable during engineering hours? Will spares be available and if so what quantities and where will they be stored?

Cleanability- NR currently does not have a specific cleaning standard. AMS with assistance from S&SD proposes to introduce an objective cleaning measure during CP5 with.

BRE Green Guide Rating system is an environmental industry benchmark which considers energy use in manufacture of materials but does not consider materials independently only as material assemblies that are approximations which may not match the projects intended usage.

Embodied Carbon. Both granite and terrazzo have been assigned a similar green guide rating but it is remarkable that granite has five times the embodied carbon when compared to terrazzo when using the University of Bath Inventory of Carbon Energy (ICE) database. So it is ironic that what is a 'natural' product has in reality a detrimental environment effect when compared to a manufactured composite material.

Service Access Covers inevitably there will be services running beneath the floor finish and the integration of floor access covers that are sufficiently strong and capable of being integrated into the floor finish without detracting from its overall appearance. The inclusion should be included as part of a wider 'system approach'

13 Maintenance

Cleanability

Improper cleaning with a traditional mop and bucket can make a floor more slippery than anticipated, as a mop head becomes soiled and spreads contaminants including bacteria. This build up can result in a slippery residue which reduces the floors coefficient of friction and increases the potential for a fall to occur.

The introduction of more technical cleaning techniques will have consequences for station designers as additional electrical socket outlets, drainage and hot water points are required. Consideration also needs to be given to the manual handling of cleaning equipment and whether it is capable of being transported in a lift.

24 Hour supermarkets rely on modern scrubbing and drying machines which apply a chemical into the floor and a squeegee / vacuum removes the moisture from the floor simultaneously. The operation of such machinery requires a more skilled workforce which may impact on the terms of cleaning contracts.

Hospital environments with their infection control regimes have deployed pre wetted micro fibre mop pads which generate waste but are effective in reducing contamination.

The introduction of seasonal mat wells to address the additional moisture wicking required between September and March and the dirt and dust generated in the dryer months April to August is to be trialled for its effectiveness.

Network Rail does not currently have a cleaning standard for its internal controlled environments or test requirements for specified floor finishes but is in process of developing a performance metric.

London Underground has historically used a 'station ambience' score and have developed specific test requirements for the following in their **design and maintenance standard E3406** which stipulates that all specified flooring products are capable of withstanding the following

Test Requirements for food stains

Simulated test for greasy foods and fizzy drinks are applied to the floor surfaces for a prolonged period to gauge if there is any noticeable staining.

Test Requirements for graffiti

Simulated test for felt tip pens and aerosol paint.

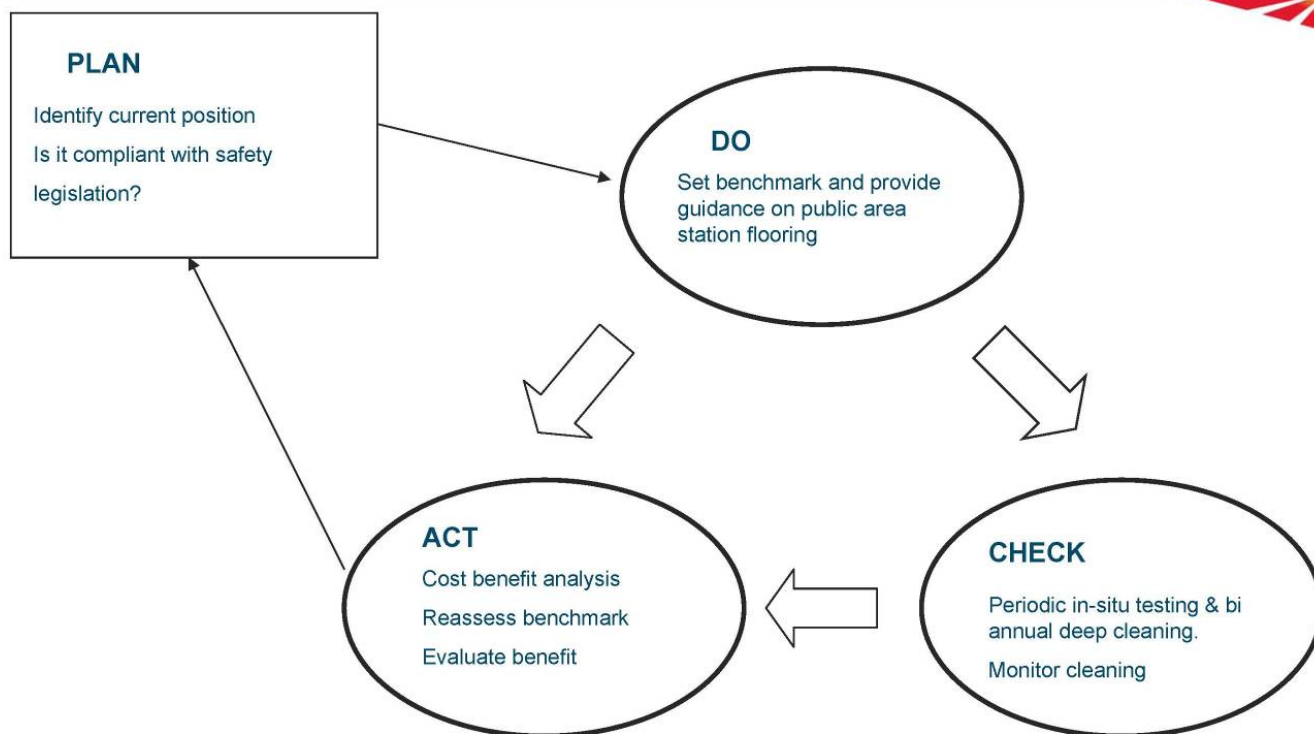
Test Requirements for abrasion

Taber abrasion testing is undertaken to assess wear rate of tiles using rotating wheels in a 500 and 2500 revolution cycle.

Element	Standard of Cleanliness	
	Acceptable	Unacceptable
Summary Indicator	Acceptable	Unacceptable
General Cleanliness	Not more than 2 light mop smears, very minor swirls or wheel marks	Numerous mop smears, swirls or wheel marks
Edges corners risers & skirting's	Clean with not more than 3 minor faults	Not clean with more than 3 faults
Litter, rubbish & bird droppings	A few small instances but no build up. No large items such as fast food wrapping, newspapers, bottles or cans.	Beginning to build up large items of litter.
Chewing gum	Not more than 6 gum rings in 20m sq area	Gum or rings clearly evident.
Broken glass, needles	None	Any
Bodily fluids, spillages	None	Any
Slipperiness	Floor is dry before pedestrian use	Floor is not dry before pedestrian use.

Table 3 Sample objective cleaning metric

14 Recommendations & Appendix



STATION FLOORING IMPROVEMENT CYCLE

Figure 1 Station flooring improvement cycle

For existing station flooring assets we recommend the Station Flooring Improvement Cycle (figure 1) is used to assess compliance with floor safety legislation particularly following the incidence of a slip trip or fall.

Assessment of Slip/Trip Risk		
<p>Relevant statutory provision</p> <p>Health & Safety at Work Act 1974 Section 2 + 3</p> <p>Management of Health & Safety at Work Regulations 1999 Regulation 3</p>	<p>A suitable and sufficient assessment of slip/ trip risk is undertaken to identify measures that need to be taken to ensure Health & Safety so far as reasonably practicable.</p>	<ul style="list-style-type: none"> Assess the risk of injury to people from slips and trips and identify who is at risk. Assess and record locations of where people have slip and tripped historically Review quality of station cleaning to ensure likelihood of slip trip is not increased as a consequence of poor cleaning. Consider and consult on mitigations to maintain optimal floor performance

Table 4 Flooring slip trip assessment considerations

- Managed Stations are to routinely assess slip resistance of public flooring to evaluate performance against Health and Safety Executive minimum slip resistance of 36 SRV in the wet.
- Public flooring and mat wells are to be deep cleaned bi annually
Where minimum standards for SRV are not met interventions are to be put in place to improve the floors performance.
- The requirements for maintenance cleaning are to be established and a system of cleanliness measurement put in place.
- It should be noted cleaning operations impose a significant cost on the business. The inappropriate cleaning practices may do more harm than good and may lead to damage and hence a shorter life time of assets. Slip resistance and the safety of flooring surfaces may be altered by the cleaning activity.

Network Rail is developing a design decision support tool for flooring which is aligned to the wider NR Buildings Asset Policy.

Should an enhancement project or significant renewal propose a floor surfacing material to a public area NR would stipulate there is a requirement to **independently** assess the material for its operational and safety performance.

- Design teams can use the tool to evaluate the suitability of the chosen flooring material once a percentage weighting is given to the following headings.
 - **PRECEDENT & LOCATION** 5%
 - **WHOLE LIFE COST** 25%
 - **MAINTENANCE WEAR & REPAIR** 25%
 - **SUSTAINABILITY** 25%
 - **APPERANCE & AESTHETICS** 20%

Network Rail Station Policy Tool v1

Whole Life Cycle Costing

ACQUISITION CRITERIA

Project / Acquisition

FLOOR OR GROUND SURFACES

Standard Criteria

Insert 'X' in the appropriate box.

BRE Green Guide Rating	x	Maintenance reqmts*	
Toxicity		Install Cost sq metre	
Treatment & Coatings		SRV / PTV in wet	x
Accredited responsible sourcing	x	WLC	x
Embodied carbon		Cleanability	
Waste generated		Remedial repair timescale	
Design Life	x	Recyclability	

Additional Criteria

Please enter any additional criteria you consider important. Suggestions are listed on Data tab

Alternative transport modes		Carborundum content	x
Point load capacity	x		
Reflectance	x		
Future procurement	x		
Supplier ISO 14001 management system	x		
BS 6001 Responsible sourcing	x		
Recycled Content	x		

Performance Specification / User Requirements.

Insert description and appropriate technical measurement for equipment functions which will demonstrate how the various options (manufacturer/models) compare with each other. There is no need to include items where the specification of all options under consideration is identical.

E.g. SRV on flat surface in wet

>36

Differential wear characteristic
Templated Asset Information Requirement for OPAS

max 8 characters

Table 5 Sample floor acquisition criteria for illustrative purposes