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Level 3

Platform Components and Prefabricated Construction Systems

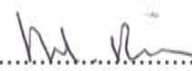
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Issue record

Issue	Date	Comments
1	07 October 2002	Published as RT/E/PS/0030
2	June 2005	Revised issue
3	Sept 2011	Revised, including adoption of Eurocodes.

Compliance

This Network Rail standard is mandatory and shall be complied with by Network Rail and its contractors if applicable from 03 December 2011.

When this standard is implemented, it is permissible for all projects that have formally completed GRIP Stage 3 (Option Selection) to continue to comply with the issue of any relevant Network Rail standards current when GRIP Stage 3 was completed and not to comply with requirements contained herein, unless stipulated otherwise in the scope of this standard.

Reference Documentation

British and European Standards

BS EN 1990 + NA	Eurocode 0 Basis of structural design
BS EN 1991 + NA	Eurocode 1 Actions on structures
BS EN 1992 + NA	Eurocode 2 Design of concrete structures
BS EN 1993 + NA	Eurocode 3 Design of steel structures
BS EN 1994 + NA	Eurocode 4 Design of composite steel and concrete structures
BS EN 1995 + NA	Eurocode 5 Design of timber structures
BS EN 1996 + NA	Eurocode 6 Design of masonry structures
BS EN 1999 + NA	Eurocode 9 Design of aluminium structures
BS EN 1097-3:1998	Tests for mechanical and physical properties of aggregates. Determination of loose bulk density and voids
BS EN 12620:2002+A1:2008	Aggregates for concrete
BS 1134: 2010	Assessment of Surface Texture. Guidance and general information
BS EN 206-1: 2000	Concrete: Specification, performance, production and conformity
BS EN 12350	Testing fresh concrete
BS EN 1008:2002	Mixing water for concrete. Specification for sampling, testing and assessing the suitability of water, including water recovered from processes in the concrete industry, as mixing water for concrete
BS EN 1339:2003	Concrete paving flags. Requirements and test methods
BS EN 1340:2003	Concrete kerb units. Requirements and test methods
BS 7533	Pavements constructed with clay, natural stone or concrete pavers
BS EN 14411:2006	Ceramic tiles. Definitions, classification, characteristics and marking
BS EN ISO 10545	Ceramic tiles
BS EN 313	Plywood classification and terminology
BS EN 314	Plywood. Bonding Quality

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BS EN 315	Plywood. Tolerances for dimensions
BS EN 635	Plywood. Classification by surface appearance
BS EN 636	Plywood specifications
BS 7502, EN 45002 : 1989	General criteria for the assessment of laboratories
BS EN 13706: 2002	Reinforced plastics composites
BS EN 13036-4	Method for measurement of slip/skid resistance of a surface - The pendulum test

Group Standards

GI/RT 7016	Interface between station platforms, tracks and trains
GC/RT 5112	Rail traffic loading requirements for the design of Railway Structures
RIS-7700-INS	Rail Industry Standard for Station Infrastructure

Network Rail Standards

NR/GN/CIV/002	The use of protective coatings and sealants
NR/L3/CIV/040	Specification for the use of protective coating systems.
NR/L3/CIV/039	Specification for assessment and certification of protective coatings and sealants
NR/L3/CIV/162	Platform Extensions
NR/L3/CIV/005	Railway Drainage Systems Manual
NR/L2/CIV/003	Engineering Assurance of Building and Civil Engineering Works
NR/L3/CIV/151	Technical Approval of Standard Designs and Details for Civil Engineering Works

Other Documents

Department for Transport / Transport Scotland (DfT/TS)	Accessible Train Station Design for Disabled People: A Code of Practice (2010)
DfT/TS	Guidance on the Use of Tactile Paving Surfaces (2005)
Eurocomp, 1996	Structural Design of Polymer Composites, Eurocomp Design Code and Handbook (J Clarke ed.)
TRL Report 176	Laboratory tests on high friction surfaces for highways

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1 Purpose

To provide specification requirements for manufactured platform components and pre-fabricated platform systems to be installed at Network Rail owned stations.

2 Scope

This Standard details requirements for all platform components, manufactured from all materials including:

- Precast and in situ concrete
- Brick and Blockwork
- Steel
- Fibre reinforced plastics (FRP)
- Timber frames

This Standard also provides performance and dimension requirements for coping units, tactiles and surfacing.

This Standard applies to new platforms (including traditional site assembled construction and pre-fabricated systems), extensions to existing platforms and components used in reconstruction / maintenance renewals.

3 Performance Requirements

3.1 General Principles

The work is to comply with National Building Regulations (2004) approved document A section A3 "Disproportionate collapse" class 2A Building.

Platform components and systems shall be designed in accordance with the relevant European (Eurocodes) and British Standards or equivalent together with the relevant Network Rail Group and Company Standards including GC/RT 5112 and GI/RT 7016.

The structure shall be designed to the permanent and variable actions identified in 3.3, in accordance with BS EN 1990 and BS EN 1991-1-1, and the relevant UK National Annexes.

Partial Factors and Combination Factors shall be applied to actions as specified in BS EN 1990.

They shall additionally be capable of resisting the horizontal forces and moments transmitted to them due to any balustrades or other significant items attached to the platform system. (e.g. lighting and CCTV columns)

The requirements for fire safety of materials that are used in the construction of Stations and associated structures shall comply with the Fire Safety requirements of RSSB Standard RIS-7700-INS *Rail Industry Standard for Station Infrastructure*.

3.2 Design Working Life

Components forming the structure of a manufactured platform construction shall have a minimum design working life (years) as follows:

Platform Support and Deck	
Concrete (In-situ and Pre-cast)	80
Brick	100
Timber	40

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Steel	100
Fibre Reinforced Plastic (FRP)	40
Copings	
Concrete (In-situ and Pre-cast) and Stone	80
Tactile Pavers	
Ceramic	30
Concrete	80
Thin bonded tactile pavers, and rubber or plastic tactile inserts.	15
Surfaces	
Brick or precast block paving	35
Asphalt	20

3.3 Loading

3.3.1 Self Weight

The self weight of structural and non-structural members shall be considered as a permanent action in accordance with BS EN 1991-1-1. This shall include surfacing materials where applied.

3.3.2 Passenger Loading

Pedestrian loading shall be designed to BS EN 1991-1-1 Category C5, comprising a $q_k = 5$ kN/m² load or a $Q_k = 5$ kN concentrated load applied over a 300mm square anywhere on its surface, whichever produces the maximum effect upon the element under consideration.

3.3.3 Vehicle Loading

Where vehicular access is permitted the platforms systems and components shall be designed for the maximum anticipated loadings as follows:

Where parcels trolleys are used or are likely, the platform shall be designed to carry a nominal (un-factored) imposed load of 7,5 kN/m² or a nominal single 10 kN load applied to a 300mm square anywhere on its surface.

For traffic restricted to light delivery vehicles (up to gross vehicle weight of 30 kN), loading according to BS EN 1991-1-1 Category F, comprising $q_k = 2,5$ kN/m² or $Q_k = 10$ kN concentrated load applied over a 100mm square. (BS EN 1991-1-1 NA 6.3.3)

For platforms accessible to larger delivery vehicles, and emergency vehicles (Up to a gross vehicle weight of 160 kN), the loading shall be applied according to BS EN 1991-1-1 Category G comprising $q_k = 5$ kN/m² or $Q_k = 40$ to 90 kN (NA Determined by specific use) concentrated load applied over a 200mm square. (BS EN 1991-1-1 6.3.3)

Where commercial or operating considerations require a higher loading this shall be determined by a pattern of wheel loads. (BS EN 1991-1-1 6.3.2.4.)

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For platforms located under trainshed roofs, loading due to maintenance access vehicles and scaffolding systems shall be applied.

For platforms that are not designed for vehicle loading, appropriate warning signs and physical barriers such as bollards, shall be installed to prevent vehicle access. Barriers shall be designed to minimize obstruction to passenger access.

3.3.4 Horizontal Loading

Manufactured platform systems shall be designed such that they are resistant to lateral destabilising forces as specified in BS EN 1991-1-1, BS EN 1991-1-4 and BS EN 1991-2.

The gauged platform edge shall be provided with a means to prevent lateral displacement capable of resisting a horizontal force of 2.5kN applied to a single coping stone.

Where walls or fences to the rear of a platform width of less than 3m wide are provided, these shall be designed for a $q_k = 1,5 \text{ kN/m}$ horizontal load. For platforms exceeding 3m width, and adjacent to sunken areas, $q_k = 3,0 \text{ kN/m}$. This load shall be applied at 1.2m above platform level. (BS EN 1991-1-1 NA Table 8 for Category C5).

Wind loads shall be applied to the platform and the rear of platform walls or fencing in accordance with BS EN 1991-1-4 NA.

Aerodynamic loads shall be applied as specified in GC/RT 5112 and BS EN 1991-2 NA 6.6.

Platforms may be required to provide protection to structures within the 4.5m Hazard Zone due to derailment or accident loads.

Platforms shall be designed to resist horizontal forces and moments transmitted by platform furniture such as lighting columns.

For suspended systems, it may be necessary to design fences, walls or lighting columns on separate foundations to the rear of the platform. Lighting column foundations may also be located below the platform, with the column passing through the platform surface, where practicable.

Note: This also may include other posts and furniture such as bike stands, DOO posts for mirrors and cameras, sign posts etc.

The designer should seek clarification from Network Rail prior to commencement of the design, where conflicts are identified between the requirements set out in this document and those set out in Eurocodes.

3.4 Serviceability

Components shall be robust and capable of resisting a degree of misuse such as is likely to occur in a railway environment. At a minimum, components shall be designed to withstand a solid object of weight 1kN dropped from a height of 1 metre impacting on a 300mm square. Systems shall be so designed that they will not be damaged by accidental events (for example vandalism), to an extent disproportionate to the original cause.

3.5 Resistance to Salts and Cleaning Agents

Due to the use of salt in de-icing platforms during winter, manufactured systems, components and any protective coatings, shall be resistant to corrosion by commonly used de-icing salts. They shall also be resistant to commonly used chemical cleaning agents.

3.6 Weather Resistance

Manufactured systems and components shall be designed to be weather resistant in that they should:

- Readily shed water