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| Issue: | 3 |
| Date: | 3 Sept 2011 |
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Level 3

Platform Components and Prefabricated Construction Systems

Endorsement and Authorisation

Endorsed by:


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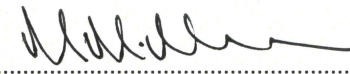
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Compliance

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 $q_k = 1,5$ kN/m horizontal load. For platforms exceeding 3m width, and adjacent to sunken areas, $q_k = 3,0$ 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

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- Be resistant to freeze thaw cyclical effects. Copers, tactiles and paving systems should be suitably sealed around joints and edges and waterproofed to prevent ingress of water, which may freeze and cause uplift and displacement.
- Be resistant to degradation by ultra-violet radiation
- Be resistant to degradation by both high and low temperatures within a range -35°C to $+40^{\circ}\text{C}$ and the resultant expansion and contraction.

Deviations from the standards may be agreed in writing where the platform has an element of protection i.e. Location under trainshed roof, underground or other developments above the platform.

Drainage of surface water from the platform surface shall normally be achieved by providing a cross fall from the rear edge of the platform coper, or platform edge if there is no separate platform coper. The fall should be at a nominal gradient of 1:40 (within the limits of 1:80 and 1:20), as specified in GI/RT 7016 Issue 4.

Any drainage channels within the platform surface shall not present a tripping hazard. Open ditched channel systems are to be avoided. Any gratings shall have maximum spacings of 6mm so as to avoid trapping risks to wearers of stiletto heels.

Further information on drainage design may be obtained from NR/L3/CIV/005 *Railway Drainage Systems Manual*.

Further information on coatings and sealants may be obtained from NR/GN/CIV/002 *The use of protective coatings and sealants*.

3.7 Slip Resistance

The platform surface should be designed as a complete system, such that all surfaces and features contribute to a consistent slip resistance throughout the life of the surfacing and copers. The purpose of this is to reduce the risk of slips, trips and falls on the platform, and particularly at the platform and train interface.

The platform copers should have a profiled surface, consisting of a slight doming not exceeding 2 mm such that they shed water.

Concrete copers should be manufactured either with a textured surface, or such that aggregate is visible after casting.

See 4.2 for more detail on concrete requirements.

Slip resistance values shall be measured both 'in the dry' and 'in the wet' for '4S' grade rubber, in accordance with the PENDULUM floor friction test as specified in BS EN 13036-4 *Method for measurement of slip/skid resistance of a surface - The pendulum test*.

The finish to the wearing surface of coping stones or platform edges shall have a minimum slip resistance value of 55.

The slip resistance of all other components of the platform surface shall have a minimum value of 45, for example bitumen or asphalt surfacing, block or brick paving, inspection chamber covers, metal drainage grills etc.

These slip resistance values shall be capable of being maintained over the life of the system, taking account of the likely wear and weathering effects both natural and due to any cleaning processes, such as chemical cleaning agents and polishing.

Effects of de-icer compounds on the slip resistance of copers should also be considered, as these may lubricate the surface to the extent that the platform becomes unsafe for passengers.

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In addition to the requirement to achieve the minimum quantitative slip resistance value quoted the surfaces shall appear non-slip to the user. In the case of concrete products, this may be achieved by roughening the surface by light acid etching, grit blasting or other approved method so as to provide a minimum surface roughness, Ra, as defined in and measured in accordance with BS 1134 of 4 µm. Materials with a reflective finish should be avoided.

3.8 Vibration Resistance

Platform components and systems shall be designed to have a fundamental frequency greater than 5 Hz to resist vibration.

3.9 Vandal Resistance

Platform components and systems shall be resistant to vandalism and shall be suitably secured in place so that they cannot readily be disassembled.

3.10 COSSH and Environmental Acceptability

Platform components and systems shall be designed such that their component parts and constituent materials comply with current COSSH and environmental regulations.

Components should be obtained from sustainable sources.

Components and systems shall also be designed such that they are acceptable for construction and use, particularly where manual handling of components may be required.

3.11 Gauge Requirements

Platform components and systems shall be designed such that the front face of the platform complies with GI/RT 7016 gauging requirements including the requirements for vertical and horizontal distance from the nearest rail running edge both for straight and curved track and shall provide for the requirement of a 300mm 'refuge' set-back below the coping edge. Manufactured systems should also be designed such that they achieve the laid down tolerances.

3.12 Provision for Disabled Passengers

The design of platform components and systems shall comply with the requirements of the DfT/TS *Accessible Train Station Design for Disabled People: A Code of Practice*, where directed.

Particular attention shall be given to the colour contrast requirements given in this document. Reference should also be made to the DfT/TS *Guidance on the Use of Tactile Paving Surfaces*.

3.13 Platform Markings

Appropriate components of manufactured platform systems shall be capable of receiving easily applied and maintained white lining to the edge and other warning markings as required in GI/RT 7016.

3.14 Services

Platform systems shall include suitable cable trays or ducting in or below the platform surface, for electrical and signal cables.

A drainage system shall be provided, to include channels on the surface or rear of the platform, and connected to suitable drains and pipework.

Any cast in or laid ducts shall be fitted with draw ropes.

Where appropriate, access panels shall be provided for inspection and maintenance of services.

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4 Standard Components

4.1 General

Components and systems should be designed in accordance with the requirements in section 3 above together with the requirements for their respective constituent materials listed within the appropriate subsequent sections and appendices. The Manufacturer will be expected to provide evidence by production and testing (both destructive and non-destructive) that the components comply with the requirements of this specification.

The components and systems listed below are not exhaustive and other forms of construction may be considered. However, the manufacturer will be required to provide evidence by production and testing (both destructive and non-destructive) that the units comply with the requirements of this specification.

4.2 Copings

Coping units manufactured from precast concrete shall be designed to comply with the requirements of section 3 above and the constituent materials, concrete mix, reinforcement, production and testing of the units shall be in accordance with BS EN 206-1, and other Standards referenced in BS EN 1992-1-1.

The concrete used in the coping slabs shall have a minimum compressive strength of 45 N/mm², and maximum aggregate size of 20mm.

Aggregates should be angular with a Mohs Hardness of 6. Air entrained concrete should also be used to retain a roughly textured surface due to the effects of wear or weathering.

Renewal of units shall match pre-existing copers as closely as possible (taken from Appendix A1 drawings). For new works on complete removal of existing copings, Type A is to be specified unless otherwise agreed.

Standard pre-cast concrete coping slabs commonly used on the railway infrastructure are indicated in Appendix A1, units conforming to these type designations shall be manufactured to the dimensions and tolerances indicated in Appendix A1.

Coping unit manufacturers may propose alternative module sizes, materials or forms of construction other than concrete but will be expected to provide proof that the product will comply with section 3 of this specification. The manufacturer/supplier may be required to provide production and testing (both destructive and non-destructive) of the copings prior to the granting of permission to use the alternative material or form of construction.

Coping units shall be capable of resisting lateral forces as specified in section 3.3 above.

The finish to the wearing surface shall have a minimum slip resistance as specified in section 3.7 above.

Coping units shall be capable of receiving or inherently provide a white edging line specified in GI/RT 7016 and shall also be provided with the one of the patterns of grooving indicated on the drawings in Appendix A1.

4.3 Tactile Paving

4.3.1 General

Tactile paving shall be provided behind the concrete copings. This paving shall be in accordance with DfT/TS *Guidance on the Use of Tactile Paving Surfaces* and the DfT/TS *Accessible Train Station Design for Disabled People: A Code of Practice*.

The pattern of the raised warning surface in the case of Network Rail stations shall be of the form indicated in Appendix A1, drawing NR/CIV/SD3053 and shall be of a contrasting colour to the adjacent copings and platform surfacing. Manufacturers should consider the

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requirement for tactile surfaces to contrast with their surroundings. 'Buff' is commonly used to contrast with dark grey tarmac/concrete surfaces. However, alternative colours may be needed where surfaces are lighter but red shall not be used.

Suppliers shall provide documentation, from an independent test house, demonstrating compliance with the Department for Transport guide dimensions, slip resistance value (as section 3.7) and durability (scuffing) testing.

The durability test shall be the Scuffing Regime developed by the Transport Research Laboratory (Nicholls JC (1997), "Laboratory tests on high friction surfaces for highways". TRL Report 176. Transport Research Laboratory, Crowthorne). The test shall be carried out at a temperature of 45degC. Materials shall be conditioned in a temperature controlled room for 4 to 6 hours prior to testing. The test shall be carried out for 12 minutes (500 wheel passes with weighted cantilever arm ensuring that the applied load is between 515 and 525 N for each pass. Acceptable values shall not exceed 1mm loss from tactile domes after scuffing.

4.3.2 Concrete Paving Construction

The tactile paviers in all other respects shall be manufactured in accordance with BS EN 1339 and installed on a continuous cement/sand mortar bed in accordance with BS 7533.

4.3.3 Clay Pavior Construction

The tactile paviers in all other respects shall be formed of units manufactured in accordance with BS 7533: Part 1 and installed on a cement/sand mortar bed in accordance with BS7533.

4.3.4 Combined Coping and Tactile Paving Units

Combined units will be considered and should be constructed as pre-cast concrete coping units. The tactile section (Integral to the coping) shall be formed in agreed colour contrasting concrete or thin bonded units. Concrete tactile units shall have a minimum depth of 30 mm.

A typical unit is shown in Appendix A1, drawing NR/CIV/SD3055.

Where surface panels are used, as components of a modular design in steel or FRP, these may combine coping and tactile into single units.

4.3.5 Thin Bonded Tactile Surfaces

All surfaces & adhesive systems shall comply with section 3 "Performance Requirements" as previously set out.

No harmful emissions due to fire shall be emitted from either the tactile pavior or its adhesive.

The surface shall not present a tripping hazard and shall have a maximum thickness of 3mm (Excluding the raised "Blisters")

Manufacturers are to provide recommendations for adhesive systems. An independent and accredited research establishment is to verify that the adhesive bond is stronger than the substrata and/or material of manufacture

The manufacturers shall submit written instructions on the following

- Limitations of the system
- Installation methods
- Repair processes
- Method of renewal/removal

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4.3.6 Ceramic Tile Tactile Products

Ceramic Tile Tactile Products shall comply with the general requirements of paragraphs 2 and 3 above. Additionally the tiles shall comply with the following requirements:-

| | | |
|---|--|---------------------|
| Thickness | +/- 0.2% | BS EN 14411 |
| Straightness of Sides | +/- 0.1% | BS EN 14411 |
| Rectangularity | +/- 0.2% | BS EN 14411 |
| Surface Flatness | +/- 0.2% | BS EN 14411 |
| Water Absorption | 0.6% | BS EN ISO 10545-3 |
| Flexion Resistance | 45.1% | BS EN ISO 10545-4 |
| Mohs Hardness | 8 Mohs | BS 6431-13 (EN 101) |
| Abrasion Resistance | 139 mms | BS EN ISO 10545-6 |
| Coefficient of Linear Thermal Expansion | $\alpha=6.1 \times 10^{-6}/^{\circ}\text{C}$ | BS EN ISO 10545-8 |
| Resistance to Thermal Shock | No Damage | BS EN ISO 10545-9 |
| Chemical Resistance | No Damage | BS EN ISO 10545-13 |
| Frost Resistance | No Damage | BS EN ISO 10545-12 |

4.4 Suspended Platform Components and Construction Systems

4.4.1 General

Manufactured suspended platform components and systems shall be designed in accordance with the requirements of section 3, and the British Standard applicable to the material of construction.

With regard to stiffness, deflection and pre-camber, in addition to the values stipulated in the appropriate standard, consideration shall be given to a value suitable to the applied surfacing, other finishes and their method of application. This is required, so that in the fully loaded state, the structure does not deflect so as to pond water.

Maximum deflection shall not exceed Span/300 under serviceability loading.

The method of assembly of the system shall be such that in the case of the need to replace an individual part this shall be readily achievable. To assist with this process, components should be marked in such a way as to make them clearly identifiable to maintainers.

A current list of Standard Platform designs is available in NR/L3/CIV/151 *Technical Approval of Standard Designs and Details for Civil Engineering Works*.

Systems not currently available as a Standard Design shall follow the approval process in NR/L2/CIV/003 *Engineering Assurance of Building and Civil Engineering Works*. These systems may be added to the Standard Design Library following the process defined in NR/L3/CIV/151.

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4.4.2 Precast Concrete

Precast concrete components used within proprietary systems may be manufactured in either reinforced or pre-stressed concrete. They may consist solely of precast concrete planks laid on a substructure of different construction or the whole platform may be constructed from precast elements connected together.

They shall generally be designed in accordance with BS EN 1992-1-1 to the live loadings and serviceability conditions listed in section 3.

The materials, concrete mix, reinforcement, production and testing of the units shall be in accordance with BS EN 206-1 and other Standards referenced in BS EN 1992-1-1.

The concrete used for all precast components shall have a minimum compressive strength of 45 N/mm², and maximum aggregate size of 20mm.

They shall also be designed with a crossfall away from the track in accordance with paragraph 5.6 to prevent rainwater ponding and is to discharge to a drainage system, unless agreed otherwise.

Precast units shall be marked with their lifting weights and shall be provided with suitable attachments to ensure safe lifting.

Precast concrete systems may incorporate a coping in accordance with the specification above.

Allowance shall be made for differential expansion of the components forming the platform surface, particularly copers where provided.

4.4.3 Pre-coated Timber anti-slip Decking and Timber Trestle Systems

Timber trestle systems shall be designed to take account of the design loadings in section 3 above, and detailed in accordance with BS EN 1995-1-1 using preservative treated timber species and grades suitable for the application. The timber shall be sourced from certificated sustainable forests.

Timber systems shall be treated with protective coatings in accordance with NR/L3/CIV/039, NR/L3/CIV/040 and NR/GN/CIV/002.

For permanent structures the design shall be suitable for a design life to first maintenance of 25 years. For temporary structures the design life shall be as stated in the contract documentation.

Panels shall be designed to take account of the design loadings in section 3.

Panels shall be made to order under factory-controlled conditions, and shall be made from birch plywood conforming to the requirements of BS EN 1995-1-1, of certified quality and manufactured in conformity to BS EN 313, 314, 315, 635 and 636 with solid face veneers not lower than ISO Grade III.

Panels shall be cut to size, drilled, shaped and edge detailed prior to the application of an anti-slip surface coating.

Solvent free, high solids epoxy resin coating of minimum cured coating thickness of 2.5 mm shall be applied to the panels' upper surfaces.

Pigmented epoxy resin coating shall be applied in 2 coats to all edges with a WFT of 300 microns and undersides with a WFT of 100 microns.

Suitable aggregate such as silicon carbide or aluminium oxide shall be applied to the upper (wearing) surface of the panels while the resin is still suitable to form an anti-slip resistant surface and shall be epoxy-overcoated following application of the aggregate.

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The anti-slip aggregate shall meet the following criteria when tested in accordance with the requirements of BS EN 1097-3:

- a) minimum particle size – 0.8 mm;
- b) minimum hardness value – 8;
- c) maximum aggregate abrasion value – 5;
- d) minimum polished stone value – 70.

Panels shall be supplied complete with:

- a) all necessary pigmented flexible joint sealant to seal abutting panel edges;
- b) all necessary fixings;
- c) resin and aggregate colour matched to the surrounding panel surface texture to seal fixing holes on completion to prevent moisture penetration.

When timber panels are used for surfacing platforms these may be used in place of coping slabs.

4.4.4 Metallic Decking and Trestle Systems

Metallic Decking and Trestle Systems shall be designed to take account of the design considerations in section 5 above. Steel/aluminium decking systems shall be designed in accordance with BS EN 1993-1-1 (Steel) or BS EN 1999-1-1 (Aluminium), as appropriate, to the loadings and serviceability conditions specified in section 3.

However, thermal effects and the consequent expansion and contraction shall be calculated in accordance with the principles given in BS EN 1991-1-5 and due allowance made for the thermal movements.

Allowance shall also be made for the dead load deflection of any finishing materials that are proposed to prevent ponding of rainwater. Additionally any deck-plates shall be of sufficient thickness and adequately stiffened such that any distortion due to welding or other fabrication methods does not cause rainwater ponding.

Metallic systems shall be provided with a corrosion protection system in accordance with NR/L3/CIV/039, NR/L3/CIV/040 and NR/GN/CIV/002 suitable for life to first maintenance of the structure of 25 years.

They shall be designed such that rainwater is discharged to a drainage system. The deck itself shall be designed such that corrosion of the substructure due to percolation or leakage is prevented.

The wearing surface shall be provided with a slip resistant finish in accordance with the requirements listed above.

4.4.5 Fibre Reinforced Polymer (FRP) Decking and Trestle Systems

FRP Decking and Trestle Systems shall be designed to take account of the design considerations in section 3 above.

FRP pultruded elements shall be classified according to BS EN 13706, and designed in accordance with Eurocomp 1996 Structural Design of Polymer Composites.

The fibres to be used shall be glass or aramid. Electrically conductive (carbon) fibres shall not be used.

Deck-plates shall be of sufficient thickness and adequately stiffened such that any distortion due to fabrication methods does not cause rainwater ponding.

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Fixings including bolts, nuts and washers used to connect the FRP components together and also to the foundations shall be Stainless steel. All fixings shall incorporate design features to prevent loosening by vibration.

For FRP and other materials, advice should be obtained from Network Rail on current best practice.

4.5 Wall Units (front and transverse wall types)

Prefabricated wall units shall be designed to resist the applied loadings and effects listed above (including thermal effects) and shall additionally be designed such that they have a factor of safety against overturning of 2.0 and a factor of safety against sliding of 1.5 as appropriate. Passive resistance pressure of ballast material between track and front wall to a depth of 600mm below rail level shall be ignored, as tamping activity may reduce this resistance.

If it is proposed to construct these units from precast concrete, the units shall be designed in accordance with BS EN 1992-1-1 using appropriate factors to reflect the conditions in which the units are to be utilised.

If concrete blocks are to be used these shall be dense concrete blocks of minimum compressive strength 7 N/mm² in accordance with BS EN 206-1 and shall be laid to an established bond and in accordance with BS EN 1996-1-1.

They may be either solid or hollow blocks. If the latter, the voids shall be filled with well compacted in-situ concrete in accordance with BS EN 206-1 of minimum strength 10 N/mm² with maximum aggregate size 10mm.

Passive provision for ducts and cable supports should be provided under front and transverse walls.

Other materials or forms of construction may be considered. However, the contractor will need to submit evidence by production and testing (destructive and non-destructive) that the units comply with Network Rail's Specification & Plans. Following submission due consideration will be given and the contractor informed of the outcome.

4.6 Oversail Blocks

These blocks shall be dimensioned in accordance with figure NR/CIV/SD3054 in appendix A1 and in all other respects shall be in accordance with BS EN 206-1. They shall be of minimum compressive strength 7 N/mm². Alternative materials may be accepted subject to the provision of satisfactory evidence in the form of testing, as above, as to the adequacy of the proposed material.

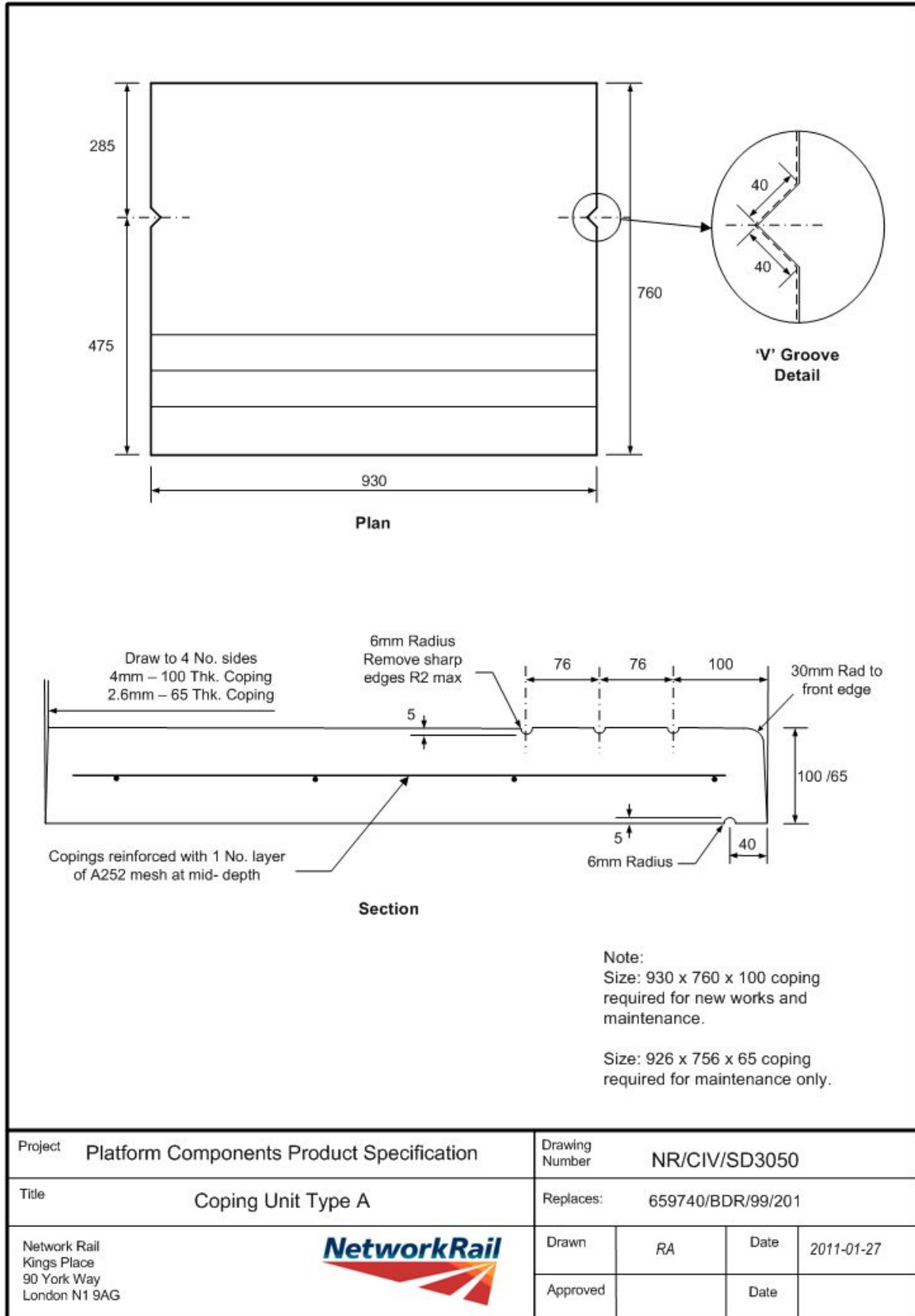
4.7 Fascia Panels

Where manufactured platform systems are such that a void exists beneath the platform decking, fascia panels shall be provided to prevent the build up of litter and other waste materials beneath the platform. If of steel mesh construction the mesh shall be a galvanised welded mesh of maximum 50 mm spacing and made up of wire minimum 3 mm diameter. Alternative forms of panel may be proposed to suit particular requirements, for example, the need to match the appearance of adjacent construction. Provision shall be made for entry to the voided areas for maintenance and inspection purposes. These accesses shall be lockable.

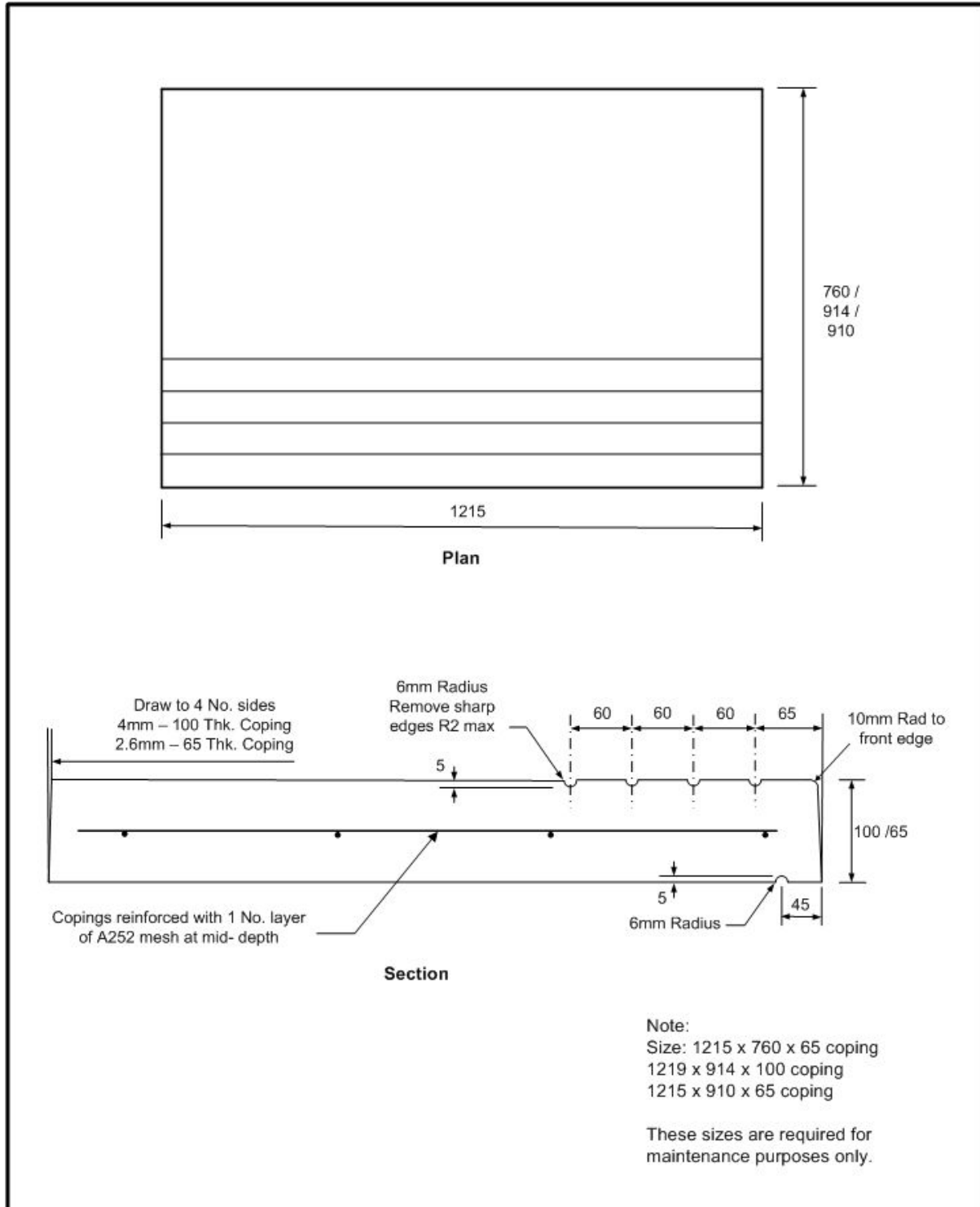
Steel mesh panels shall not be used on platforms in 3rd rail electrified areas.


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APPENDIX A1: Components Drawings

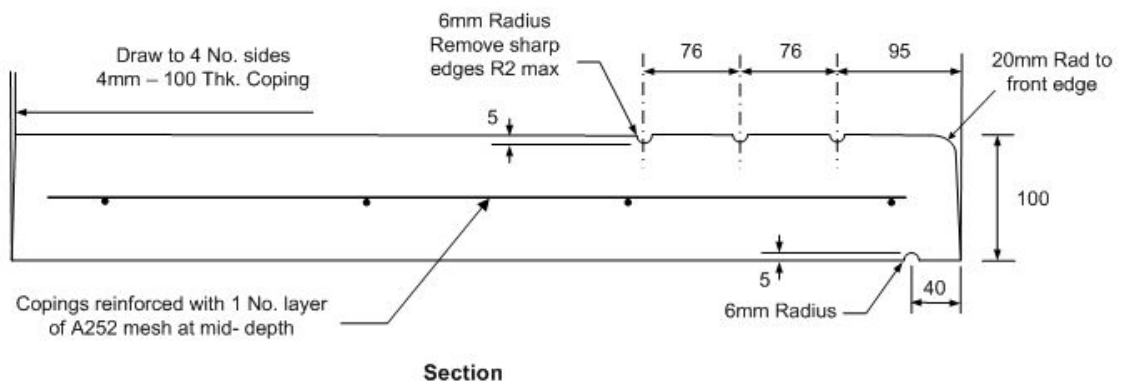
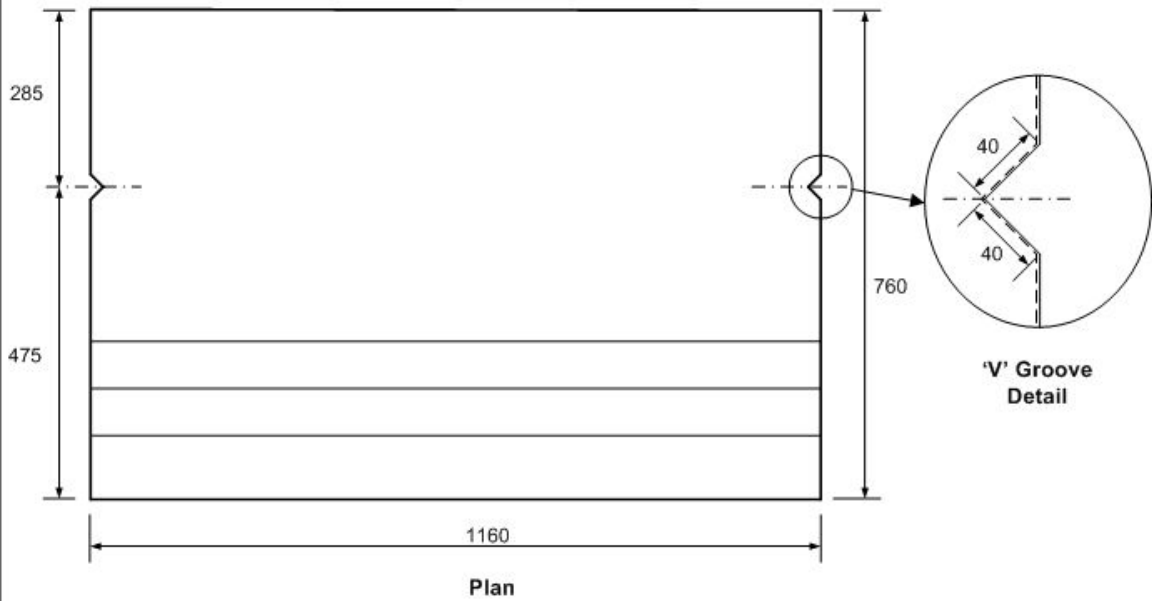


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|---|---|----------------|-------------------|------|------------|
| Project | Platform Components Product Specification | Drawing Number | NR/CIV/SD3051 | | |
| Title | Coping Unit Type B | Replaces: | 659740/BDR/99/202 | | |
| Network Rail Kings Place 90 York Way London N1 9AG |  | Drawn | RA | Date | 2011-01-27 |
| | | Approved | | Date | |

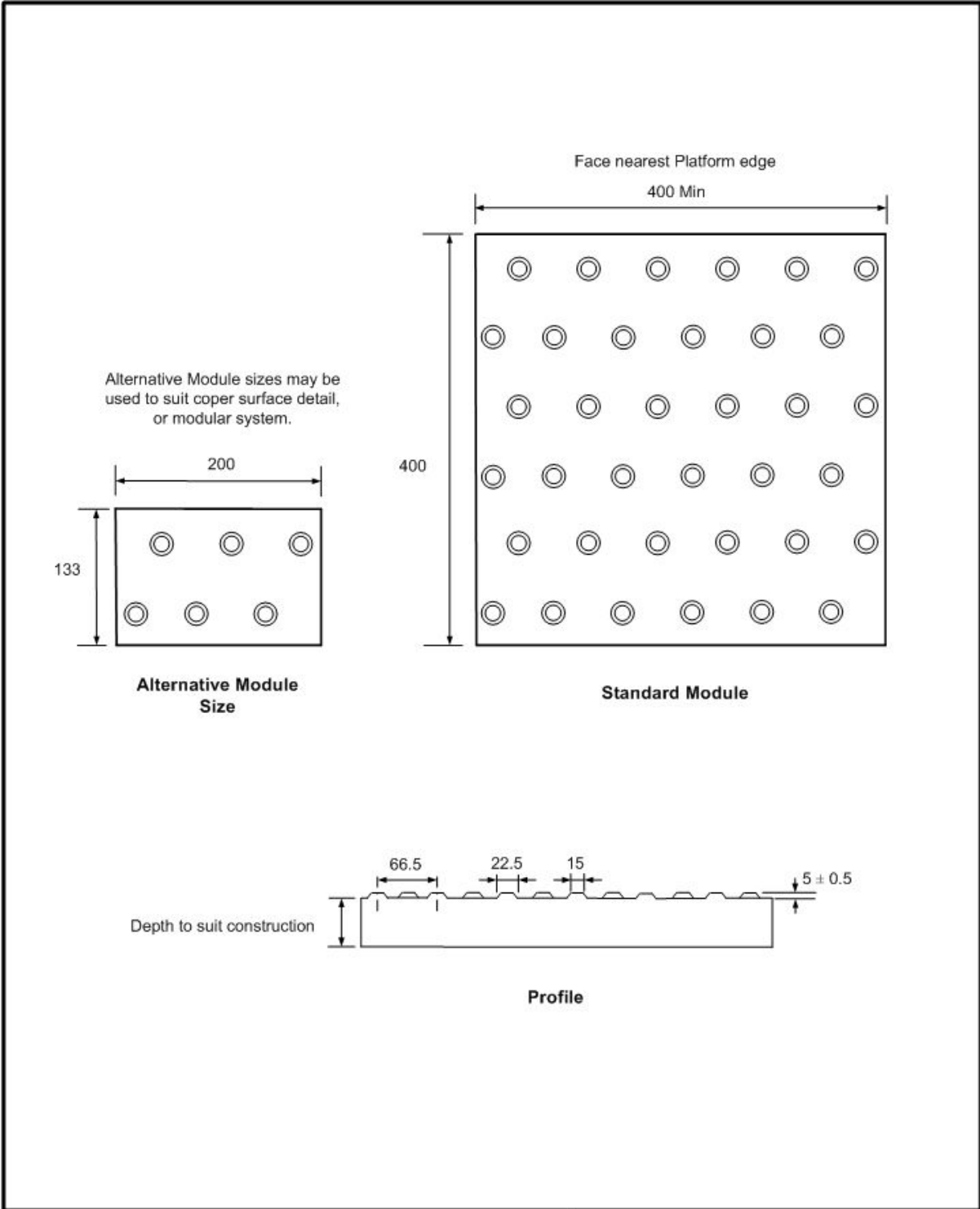
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| Ref: | NR/L3/CIV/030 |
| Issue: | 3 |
| Date: | 3 Sept 2011 |
| Compliance date: | 3 Dec 2011 |




Note:
Size: 1160 x 760 x 100 coping
required for maintenance only.

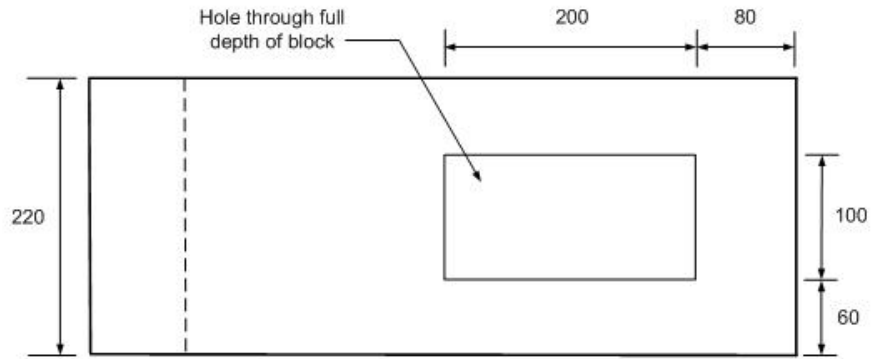
| | | | | | |
|---|---|----------------|-------------------|------|------------|
| Project | Platform Components Product Specification | Drawing Number | NR/CIV/SD3052 | | |
| Title | Coping Unit Type C | Replaces: | 659740/BDR/99/203 | | |
| Network Rail Kings Place 90 York Way London N1 9AG |  | Drawn | RA | Date | 2011-01-27 |
| | | Approved | | Date | |

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| Ref: | NR/L3/CIV/030 |
| Issue: | 3 |
| Date: | 3 Sept 2011 |
| Compliance date: | 3 Dec 2011 |

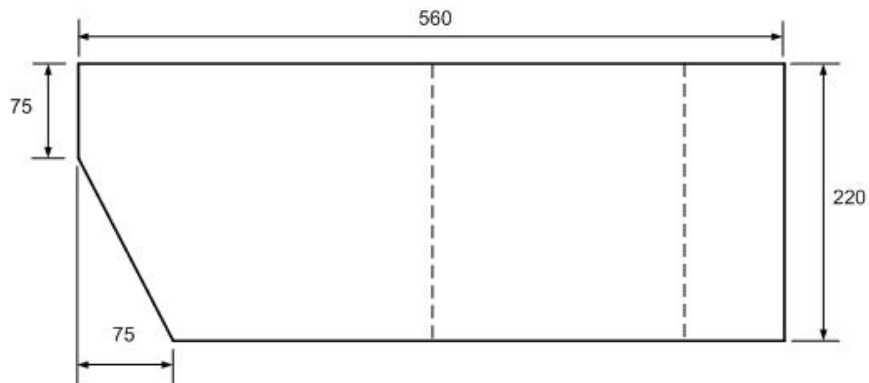


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|---|---|----------------|-------------------|------|------------|
| Project | Platform Components Product Specification | Drawing Number | NR/CIV/SD3053 | | |
| Title | Platform Edge Tactile Geometry | Replaces: | 659740/BDR/99/205 | | |
| Network Rail Kings Place 90 York Way London N1 9AG |  | Drawn | RA | Date | 2011-01-27 |
| | | Approved | | Date | |


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| Ref: | NR/L3/CIV/030 |
| Issue: | 3 |
| Date: | 3 Sept 2011 |
| Compliance date: | 3 Dec 2011 |



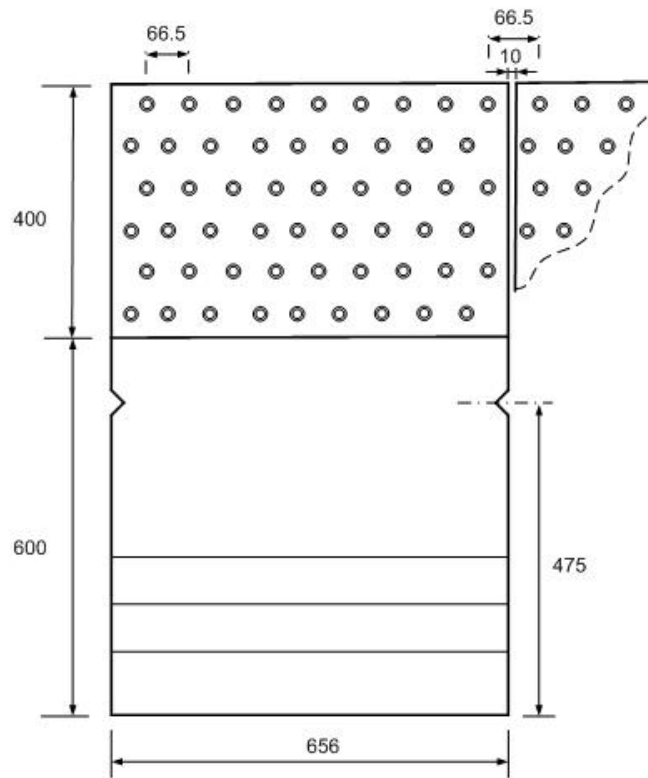
Plan



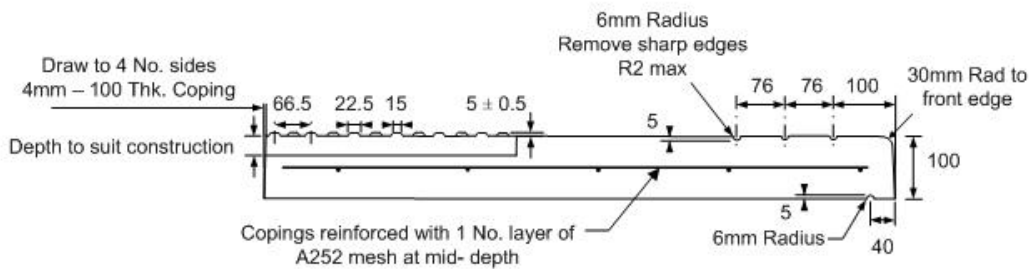
Side Elevation

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|---|---|----------------|-------------------|------|------------|
| Project | Platform Components Product Specification | Drawing Number | NR/CIV/SD3054 | | |
| Title | Oversail Blocks | Replaces: | 659740/BDR/99/206 | | |
| Network Rail Kings Place 90 York Way London N1 9AG |  | Drawn | RA | Date | 2011-01-28 |
| | | Approved | | Date | |

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| Ref: | NR/L3/CIV/030 |
| Issue: | 3 |
| Date: | 3 Sept 2011 |
| Compliance date: | 3 Dec 2011 |



Plan



Section

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|---|---|----------------|-------------------|------|------------|
| Project | Platform Components Product Specification | Drawing Number | NR/CIV/SD3055 | | |
| Title | Combined Coping and Tactile | Replaces: | 659740/BDR/99/207 | | |
| Network Rail Kings Place 90 York Way London N1 9AG |  | Drawn | RA | Date | 2011-05-23 |
| | | Approved | | Date | |

Standards Briefing Note

| | | | | | | | |
|---|--------------------------|---|---------------------------|------------------|---------------|-----------------------|------------|
| Ref: NR/L3/CIV/030 | | Issue: 3 | | | | | |
| Title: Platform Components and Prefabricated Construction Systems | | | | | | | |
| Publication Date: 03/09/2011 | | Compliance Date: 03/12/2011 | | | | | |
| Standard Owner: Professional Head (Buildings & Civils) | | | | | | | |
| Non-Compliance rep (NRNC): Senior Policy Development Specialist (Buildings & Civils), Rob Anderson | | | | | | | |
| Further information contact: Rob Anderson | | Tel: 020 7557 9219 | | | | | |
| <p>Purpose: To provide specification requirements for manufactured platform components and pre-fabricated platform systems to be installed at Network Rail owned stations.</p> | | <p>Scope: This Standard details requirements for all platform components, manufactured from all materials including:</p> <ul style="list-style-type: none"> • Precast and in situ concrete • Brick and Blockwork • Steel • Fibre reinforced plastics (FRP) • Timber frames <p>This Standard also provides performance and dimension requirements for coping units, tactiles and surfacing.</p> <p>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.</p> | | | | | |
| <p>What's New/ What's Changed and Why: Standards references updated - European, British, RSSB Group Standards and Network Rail Standards Design loading to Eurocodes adopted –</p> <ul style="list-style-type: none"> - Passenger Loading 5 kN/m² and 5 kN point load applied to a 300mm Square – these remain unchanged. - Horizontal loading on walls may require strengthened sections, or walls on separate foundations to rear. - More detail loading for vehicles. <p>Added requirement for Vibration Resistance – Components to be designed with a fundamental frequency greater than 5 Hz Max Deflection of Platforms specified as Span/300 Fire Resistance of components and systems updated, to comply with RSSB Standard RIS-7700-INS Rail Industry Standard for Station Infrastructure. Slip resistance on Copers increased from 45 to 55. Other surface to remain at 45. Expand “acid etching” to include “grit blasting” FRP Section added. Steel Mesh panels not to be used in 3rd Rail areas Services updated to include provision of drainage Design Life updated to align with values in OPAS and used in reporting to ORR Appendix A1 Drawings details remain unchanged – combined Coper/Tactile units retained as required Appendix A2 Precast concrete materials detailed specification – removed, as these specifications are covered in Eurocodes and referenced Standards.</p> | | | | | | | |
| <p>Affected documents:</p> <table style="width: 100%; border: none;"> <tr> <td style="width: 60%;"><i>Reference</i></td> <td style="width: 40%;"><i>Impact</i></td> </tr> <tr> <td>RT/E/PS/00030 ISSUE 2</td> <td>Superseded</td> </tr> </table> | | | | <i>Reference</i> | <i>Impact</i> | RT/E/PS/00030 ISSUE 2 | Superseded |
| <i>Reference</i> | <i>Impact</i> | | | | | | |
| RT/E/PS/00030 ISSUE 2 | Superseded | | | | | | |
| <p>Briefing requirements: Where Technical briefing (T) is required, the specific Post title is indicated. These posts have specific responsibilities within this standard and receive briefing as part of the Implementation Programme. For Awareness briefing (A) the Post title is not mandatory. Please see http://ccms2.hiav.networkrail.co.uk/webtop/drl/objectId/09013b5b804504da for guidance.</p> | | | | | | | |
| Briefing <small>(A-Awareness/ T-Technical)</small> | Post | Team | Function | | | | |
| T | Route Building Engineers | Building and Civils | Asset Management | | | | |
| T | Senior Project Engineers | IP, Thameslink, Crossrail | Infrastructure Investment | | | | |

| | | | |
|---|--------------------------------------|---------------------------------|----------------------------|
| T | All | Building and Civils | Engineering |
| T | Principal Structures Design Engineer | Crossrail | Investment Projects |
| T | Programme Engineering Managers | Buildings & Civils Design Group | Investment Projects |
| T | Senior Design Engineers | Buildings & Civils Design Group | Investment Projects |
| A | All | National Programmes Team | Infrastructure Maintenance |
| | | | |

**NOTE: Contractors are responsible for arranging and undertaking their own Technical and Awareness Briefings in accordance with their own processes and procedure*