

Main Roads Technical Standard

MRTS74

Supply and Erection of Prestressed Concrete Deck and Kerb Units

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Supply and Erection of Prestressed Concrete Deck and Kerb Units

1 INTRODUCTION

This Standard applies to the supply and/or transport and erection of precast prestressed concrete deck and kerb units and transverse stressing units for a bridge superstructure.

This Technical Standard shall be read in conjunction with MRTS01 *Introduction to Technical Standards*, MRTS50 *Specific Quality System Requirements* and other Technical Standards as appropriate.

This Technical Standard forms part of the Main Roads Specifications and Technical Standards Manual.

The requirements for the supply and erection of prestressed concrete deck and kerb units include the use of suppliers and products for the items listed in Table 1 that are registered by Transport and Main Roads.

Table 1 – Items Requiring Use of Registered Suppliers and Products

Clause	Category of Work
11.1	Paint – Epoxy coating
11.2	Filling Anchorage Recesses – Wet-to-Dry Epoxy

Registered suppliers and products for the above items are listed in the relevant clauses in Annexure MRTS74.1

For further information regarding registered suppliers and products for the above items refer to –
Director (Bridge Design)
Structures Division
Queensland Department of Transport and Main Roads
GPO Box 1412
Brisbane Qld 4001

2 DEFINITION OF TERMS

The terms used in this Standard shall be as defined in Clause 2 of MRTS01 *Introduction to Technical Standards*.

3 REFERENCED DOCUMENTS

Table 3 lists documents referenced in this Technical Standard

Table 3 – Referenced Documents

Reference	Title
AS 1214	<i>Hot-dip galvanized coatings on threaded fasteners (ISO metric coarse thread series)</i>
AS 1627.2	<i>Metal finishing – Preparation and pretreatment of surfaces – Power tool cleaning</i>
ISO8403-3	<i>Hand and power tool cleaning</i>
AS 3972	<i>Portland and blended cements</i>
AS/NZS 4680	<i>Hot-dip galvanized (zinc) coatings on fabricated ferrous articles</i>
	<i>Transport Operations (Road Use Management) Act and Regulations 1995</i>

4 QUALITY SYSTEM REQUIREMENTS

4.1 Hold Points, Witness Points and Milestones

General requirements for Hold Points, Witness Points and Milestones are specified in Clause 5.2 of MRTS01 *Introduction to Technical Standards*.

The Hold Points, Witness Points and Milestones applicable to this Standard are summarised in Table 4.1.

Table 4.1 – Hold Points, Witness Points and Milestones

Clause	Hold Point	Witness Point	Milestone
5.3.1.1	1. Approval of procedure for handling transport and storage of units.		Submit handling, transport and storage procedure (14 days)
7.1	2. Approval of erection procedure.	Erection of units	Submit erection procedure (21 days)
8.2	3. Completed joints.		
8.4	4. Transverse prestressing.		

4.2 Construction Procedures

The Contractor shall prepare documented procedures for all construction processes in accordance with the quality system requirements of the Contract.

Construction procedures for those activities listed in Table 4.2 shall be submitted to the Administrator in accordance with the quality system requirements of the Contract.

Table 4.2 – Construction Procedures

Clause	Procedure
5.3.1.1	Handling, transport and storage of prestressed concrete units.
7.1	Erection of prestressed concrete units.

4.3 Conformance Requirements

The conformance requirements which apply to lots of work covered by this Standard are summarised in Table 4.3.

Table 4.3 – Conformance Requirements

Clause	Conformance Requirement
7.3.9	Tolerance for erection of kerb units
8.4	Transverse prestressing.

4.4 Testing Frequency

The minimum testing frequency for work covered by this Standard is each span.

5 PRESTRESSED CONCRETE DECK AND KERB UNITS AND TRANSVERSE STRESSING UNITS

5.1 Manufacture of Prestressed Concrete Units and Stressing Units

Prestressed concrete deck and kerb units and transverse stressing units shall be of the lengths and dimensions shown in the Drawings and shall be manufactured in accordance with the requirements of MRTS73 *Manufacture of Prestressed Concrete Members and Stressing Units*.

5.2 Not Used

5.3 Handling, Transport and Storage

5.3.1 Prestressed Concrete Deck and Kerb Units

5.3.1.1 General

Prestressed concrete deck and kerb units shall at all times during handling, transport and storage, be kept in such a position that the lifting loops are uppermost.

The method of handling and storage shall be such as to avoid the danger of fracture by impact, undue bending, twisting and whipping. Units shall be moved only while fully suspended. In no case shall they be moved by dragging across the terrain.

The Contractor shall submit its procedure for the handling, transport and storage of units not less than 14 days prior to commencement of any such activities. **Milestone**

Handling, transport and/or storage of units shall not proceed until the procedure has been approved by the Administrator. **Hold Point 1**

5.3.1.2 Lifting

Prestressed concrete units are provided with lifting loops in the top face of each unit. Units shall be lifted only by these lifting loops and no other means of lifting shall be used at any stage during handling unless details have been submitted and released in accordance with Clause 5.3.1.1 **[Refer Hold Point 1]**.

Cranes shall work within their rated capacity. If requested by the Administrator, the Contractor shall make available for inspection the crane manufacturer's load chart for the crane which is proposed for handling and/or erection with details of counterweight, jib length and rigging.

5.3.1.3 Transport

5.3.1.3.1 General

The Contractor shall assess the route from the place of manufacture to the Site and, in its submission to the Administrator in accordance with Clause 5.3.1.1, shall include full details of the transport arrangements, including means of limiting torsional forces on the units during transport to prevent torsional cracking. The Contractor shall also supply details of anticipated arrival time of the units on the Site and the planned rate of delivery.

Units shall be transported only after all inspections required by the Administrator have been satisfactorily completed.

5.3.1.3.2 Certification of Equipment

Prime movers shall display a current Certificate of Inspection issued by the Queensland Department of Transport.

Prime movers and trailing equipment shall display a current Licence to Hire issued by the Queensland Department of Transport.

5.3.1.3.3 Mass of Loads

All road transport shall comply with the vehicle limits prescribed by the *Transport Operations (Road Use Management) Act and Regulations 1995*.

5.3.1.3.4 Escorts and Pilots

All road transport shall comply with the relevant clauses of the Traffic Regulations pertaining to provision of pilot vehicles and/or police escorts.

5.3.1.3.5 Support of Units During Transport

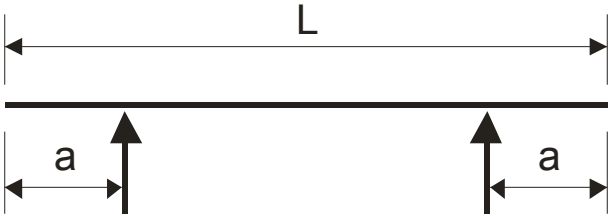
Units shall be supported in such a manner that no damage shall be incurred by the units. Units shall be supported on two level timber bearers placed near the ends at locations shown in Table 5.3.1.3.5.

Where units are transported in more than one layer, the timber supports for each layer carried on top of another layer shall be placed directly above the previous supports and never more than the distance from the end shown in Table 5.3.1.3.5. Units shall not rest on any support at locations between the specified support points.

In addition, timber packing pieces shall be placed between the sides of adjacent units for their full depth to prevent contact between the units during transport. The packing pieces shall be secured in such a manner that they shall not drop out during transport. Units shall be kept firmly secured by independent chains at each end of the units with suitable packing placed between the units and chains to prevent spalling of the concrete.

Table 5.3.1.3.5 – Maximum Overhang Beyond Supports During Transport

Unit Type	Nominal Length † (L) (metres)	Maximum Overhang † (a) (metres)
596 mm wide deck units	≤ 13	L/8
	14	1.3
	≥ 15 ≤ 16	1.2
	≥ 17	1.0
350 mm wide kerb units	10 to 13	L/8



The diagram shows a horizontal line representing a unit of length L. Two vertical arrows point upwards from the line, representing supports. The distance from the left end of the unit to the first support is labeled 'a'. The distance from the second support to the right end of the unit is also labeled 'a'. The total length L is indicated by a double-headed arrow above the unit.

† Measured along centreline of unit.

5.3.1.4 Support of Units During Storage

Units shall be supported in such a manner that no damage shall be incurred by the units. Units shall be supported on two level bearers, placed between 200 mm and 500 mm from each end. Where units are stacked in more than one layer, the supports for each layer shall be placed directly above the lower supports. Units shall not be stacked more than three high unless approved otherwise by the Administrator.

During storage, units shall not rest on any support at locations between the specified support points.

Where units shall be placed on the ground, either temporarily, e.g. when unloading from rail or road transport, or when units are to be stored for some time, the storage area shall be cleared of rocks, tree stumps, etc, and brought to an even grade to ensure that units are supported as described above.

The supports shall be of such a size to provide sufficient bearing capacity and clearance to the lower units for all ground conditions likely to occur during storage. End supports shall be level at all times to ensure that units do not develop a twist during storage.

5.3.2 Transverse Stressing Units

Transverse stressing units shall be lifted, handled, transported and stored in such a manner that no damage is incurred by them. Threads on the ends of units shall be covered and protected during transport, handling and storage.

Transverse stressing units, consisting of stressing bars, nuts, washers, anchor plates and couplers, shall be stored in such a place that they shall not be subject to damage by welding, weld splatter, accidental heating by adjacent oxy welding/cutting operations or by passage of stray electric currents. Stressing bars shall not be nicked during storage.

Transverse stressing units shall be supported well clear of the ground on timber supports and shall be protected from mud splatter and the corrosive effects of dust and chemicals.

6 MATERIALS

6.1 Cement Mortar and Grout

6.1.1 Cement

Cement shall be Type GP or Type HE complying with the requirements of AS 3972.

6.1.2 Sand

Sand shall consist of sharp, coarse, clean siliceous sand, free from dust, clay, organic matter or other deleterious substances. Grading and fineness shall be such that the mortar and/or grout produced shall be impervious to moisture. Sand for grout shall be sufficiently fine having regard to the space into which the grout has to be injected.

6.1.3 Water

Water shall be free from matter injurious to concrete, mortar and grout, reinforcing bars, prestressing bars and strands and other embedded items.

6.1.4 Mortar Proportions

Mortar shall consist of a mixture of 1 part of Type GP cement to 3 parts of sand uniformly mixed so that no segregation occurs.

The water/cement ratio shall be the minimum required, to allow placement as specified for the particular application.

6.1.5 Grout Proportions

Grout shall consist of a mixture of 1 part of Type GP cement to 2 parts of sand uniformly mixed so that no segregation occurs.

The water/cement ratio for the grout shall be the minimum required, to allow pouring or pumping as specified.

6.1.6 Additives

An additive designed to produce increased fluidity and/or expansion may be used in grout, subject to the Administrator's approval. Any such additives shall not reduce the strength of the grout. Additives containing aluminium powder, chlorides or nitrates shall not be used.

6.2 Epoxy Putty

Epoxy putty shall consist of a proprietary two-part epoxy product capable of gap filling between the bearing and the precast unit soffit.

A certificate from the manufacturer shall be provided to verify the suitability of the product for the intended purpose.

6.3 Bearings

Elastomeric bearings shall comply with the requirements of MRTS81 *Bridge Bearings*.

6.4 Holding-Down Bolts

Holding-down bolts, nuts and washers for deck and kerb units shall be fabricated in accordance with the details shown in the Drawings and in accordance with the requirements of MRTS78 *Fabrication of Structural Steelwork*. Holding-down bolts, nuts and washers shall be hot-dipped galvanized after fabrication in accordance with AS 1214.

6.5 Dowel Bars

Dowel bars shall be grade 500N conforming to the requirements of MRTS71 *Reinforcing Steel*. Dowel bars shall be hot-dipped galvanized in accordance with the requirements of AS/NZS 4680.

7 ERECTION OF PRESTRESSED CONCRETE UNITS

7.1 General

Prestressed concrete units shall not be placed on reinforced concrete headstocks until the concrete in the headstock and bearing pedestals has attained a compressive strength of 70% of the characteristic strength.

Before releasing the load from the lifting gear, the deck and kerb units shall be supported such that they cannot accidentally overturn. Methods to prevent overturning include installation of the holding down bolts, washers and nuts; installation of dowel bars or independent bracing. Consideration shall also be given to overturning moments from formwork and other items attached to the deck and kerb units.

The Contractor shall submit its procedure for the erection of units not less than 21 days prior to commencement of such erection. **Milestone**

Erection of units shall not proceed until the procedure has been approved by the Administrator. **Hold Point 2**

Erection of units shall be a Witness Point. **Witness Point**

The Administrator shall have the right at all times to stop any handling deemed injurious to the prestressed concrete units.

7.2 Installation of Bearings

Bearing seats shall be thoroughly cleaned prior to installation of bearings. If a curing compound has been applied to the bearing seat, it shall be removed by grinding or sandblasting then cleaned of dust and laitance with clean water.

Elastomeric bearings shall be placed within ± 3 mm of the correct plan position on the bearing seat.

7.3 Installation of Prestressed Concrete Units

7.3.1 Removal of Advertising Labels

Any advertising labels on the units shall be removed before assembly to permit adhesion of grout to units.

7.3.2 Seating Units on Mortar Bed

Where the Drawings show that the prestressed concrete unit is to be bedded on cement mortar, a cement mortar seating strip shall be placed on the substructure. A suitable bonding agent shall be added to the mortar which shall have the consistency of mortar used in bricklaying. The quantity of mortar placed shall be sufficient to provide, after erection, the widths and thicknesses shown in the Drawings and to provide an even seating for the end of the unit.

Immediately following the placement of the cement mortar seating strip and before the mortar sets, the prestressed concrete unit shall be seated on the substructure in the position shown in the Drawings. Any excess mortar shall be struck off.

Where one end of the unit is placed on elastomeric bearings, that end shall be seated first before placing the opposite end onto the mortar seating.

7.3.3 Seating Units on Single Layer Elastomeric Bearings

Deck Units shall be pre-positioned on non-compressible temporary packers on top of the headstock to ensure that the soffit of the deck units will clear the top of bearings by 1 mm at the closest point, and that a maximum thickness due to the effects of deck unit hogs and any grades/VC's does not exceed 15 mm.

Once the above clearances have been established, the deck unit shall be removed and the top surface of the bearing shall be coated with an approved epoxy/mortar with a compressive strength of not less than 60 MPa.

The prestressed concrete unit shall then be lowered into position and supported on temporary packers maintaining a minimum epoxy/mortar thickness of 1 mm. The periphery of the bearing shall be checked to ensure that the entire interface between the prestressed concrete unit and bearing is filled with epoxy putty/mortar. Any excess epoxy putty/mortar squeezed out shall be removed before it has set.

If the epoxy putty/mortar sets before completion of this operation, the prestressed concrete unit shall be lifted and all contact surfaces cleaned before repeating the process.

After the epoxy putty/mortar has fully cured over a period of not less than 48 hours, the temporary packers shall be removed without dislodging the deck unit.

7.3.4 Seating Units on Laminated Elastomeric Bearings

Deck Units shall be pre-positioned on non-compressible temporary packers on top of the headstock to ensure that the soffit of the deck units will clear the top of bearings by 1 mm at the closest point, and that a maximum thickness due to the effects of deck unit hogs and any grades/VC's does not exceed 15 mm.

Once the above clearances have been established, the deck unit shall be removed and the top surface of the bearing shall be coated with an approved epoxy/mortar with a compressive strength of not less than 60 MPa.

The prestressed concrete unit shall then be lowered into position and supported on temporary packers maintaining a minimum epoxy/mortar thickness of 1 mm. The periphery of the bearing shall be checked to ensure that the entire interface between the prestressed concrete unit and bearing is filled with epoxy putty/mortar. Surplus epoxy putty/mortar squeezed out shall be removed before it has set.

If the epoxy putty/mortar sets before completion of this operation, the prestressed concrete unit shall be lifted and all contact surfaces cleaned before repeating the process.

After the epoxy putty/mortar has fully cured over a period of not less than 48 hours, the temporary packers shall be removed without dislodging the deck unit.

7.3.5 End Alignment of Units

Deck and kerb units with cast-in sockets for expansion joints shall be carefully placed such that the sockets form a straight line which shall allow placement of the deck joint.

7.3.6 Spacing between Units

The actual gap between units may vary slightly, plus or minus, from the nominal gap shown in the Drawings, to accommodate the manufacturer's tolerances. A minimum gap of 10 mm shall be maintained by wedging, where necessary.

7.3.7 Holding Down Bolts and Dowels

Holes for holding down bolt holes and/or deck unit dowel bars shall be carefully aligned during placing of the units. Each holding down bolt and/or deck unit dowel bar shall be inserted into a formed hole as erection proceeds to reduce the possibility of difficulty later in the construction sequence.

7.3.8 Holes for Transverse Prestressing Bars

Where the prestressed concrete units are to be transversely prestressed after erection, transverse prestressing holes shall be carefully aligned during placing of the units. The alignment of these holes shall be checked by inserting trial mandrels into the holes as erection proceeds.

7.3.9 Tolerance for Erection of Kerb Units

350 mm wide kerb units shall be placed or aligned by the Contractor by wedging or pulling to attain the following tolerances –

- | | |
|---|------------------------------|
| a) lateral bow of unit | 1 in 1000 of nominal length; |
| b) alignment of height of top faces of adjacent units | maximum step 5 mm; |
| c) alignment of inside faces of adjacent units | maximum step 10 mm. |

Tolerances (b) and (c) shall also apply where kerb units meet cast in place wingwalls at abutments.

8 TRANSVERSE PRESTRESSING AND GROUTING

8.1 General

Where transverse prestressing of the deck is required, the provisions of Clauses 8 and 11 shall apply.

8.2 Mortar Joint between Units before Transverse Prestressing

All aspects of the process by which the mortar joints are to be made shall be included in the Contractors procedure for erection of units. [Refer Hold Point 2]

Before making the mortar joint, the Contractor shall form, with compressible packing, cells at least 75 mm wide which enclose each of the cored holes for stressing bars and extend to the unit surface.

During mortar placement, care shall be taken to ensure that mortar is not forced into these cored holes and that the gaps directly above these holes are maintained. Packing shall be selected such that it is easily removed after the mortar has hardened.

Not less than 48 hours before the transverse prestressing force is to be applied, the longitudinal joints between the prestressed concrete units shall be sealed with leak-proof formwork or seal on the lower surface and the space filled with mortar to form a dense waterproof joint.

Where a compressible seal is used to seal the base of the longitudinal gap and where such seal is pre-attached to one of the units prior to assembly, it shall be thoroughly glued, or otherwise firmly attached so as to prevent dislodgment or rolling-up the gap when deck units are lowered into place.

Before any mortar is placed, the position of the seal at the base of the joint shall be checked and, where necessary, it shall be adjusted using a flat, spade-like tool to the required depth. The tool shall have a stop attached to prevent pushing the seal further than required.

The required depth to the seal is the depth of the unit less the depth of the seal plus any fillet on the unit.

Joints shall be cleared free of debris prior to placing mortar. The water/cement ratio of the mortar shall be such as to produce a consistency that allows the mortar to be puddled into the joint without being free flowing.

The completed joints shall be filled with sound mortar throughout, and any porous, honeycombed or defective areas shall be cleaned out and made good to the satisfaction of the Administrator before transverse prestressing is carried out. **Hold Point 3**

8.3 Transverse Prestressing Units

8.3.1 Cleaning and Straightening of Prestressing Bars

Before inserting transverse stressing bars into the units, any grease or protective coating film shall be removed with a solvent such as petrol. Kerosene or diesel fuel shall not be used.

Transverse stressing bars which require straightening shall be used only with the approval of the Administrator. Under no circumstances shall heat be used to straighten a bar.

Straightening shall be done cold, ensuring that no nicking or notching of the bar takes place in the process.

8.3.2 Care of Transverse Stressing Bars and Nuts

Bars are supplied with a rolled thread and no further threading by lathe or die is permitted. Minor damage to bar threads may be repaired by careful filing with a saw file or a thread file. More extensive damage can be repaired by using dies supplied by the stressing bar manufacturer. Nuts shall be checked for free running on the thread before commencing prestressing. No welding shall be permitted on stressing bars, nuts, washers, anchor plates or couplers.

8.3.3 Installation of Stressing Bars

Transverse stressing bars shall be carefully threaded through the holes in the deck and kerb units taking care not to damage the threads on the end of the bars. Nuts, washers and anchor plates shall be assembled as shown in the Drawings. Where stressing bars require extending, couplers shall be screwed onto the bar threads for the entire length of the socket in the coupler and the joint nipped up firmly.

The actual diameter of the unthreaded portion of the transverse stressing bars shall be measured prior to their insertion in the units to determine their actual cross-sectional area.

8.4 Transverse Prestressing

Each span shall be transversely prestressed by applying a transverse prestressing force to each of the transverse stressing bars. The transverse prestressing force shall be applied in the presence of the Administrator. **Hold Point 4**

8.5 Measurement of Transverse Prestressing Force

Each transverse stressing bar shall be tensioned to a force at lock-off of 350 kN in the bar unless shown otherwise in the Drawings.

The magnitude of the transverse prestressing force shall be measured by means of a pressure gauge (or gauges) and by the extension of the transverse stressing bar caused by the prestressing force.

The extension, in millimetres, shall be calculated by using the formula –

$$\text{Extension} = \frac{PL}{AE}$$

where –

- P = total prestressing force in kN;
A = full area of the transverse stressing bar, in mm², based on the actual diameter;
L = length, in mm, of the transverse stressing bar between the far anchorage and the point of attachment to the jack; and
E = the modulus of elasticity of the transverse stressing bar which shall be taken as 170 kN/mm² unless determined otherwise.

The expected extension for a 29 mm diameter bar stressed to 350 kN is 3.1 mm per metre length of the bar.

The extension shall be measured by means of the Vernier scale fixed to the jack. Should there be more than 10% variation between the calculated and measured extension, transverse prestressing shall be discontinued until the reason for such difference has been ascertained. **Nonconformance**

Care shall be taken to ensure that the ram of the jack does not reach the limit of its travel during the prestressing operation.

8.6 Calibration of Gauges

The Contractor shall provide a current calibration certificate (less than 12 months old) for the jack.

8.7 Grouting Transverse Stressing Bars

After prestressing, the transverse stressing bars shall be grouted in the cored holes. Grout shall be poured down one or more of the gaps in the mortar above the transverse stressing bars until the grout is forced up all the remaining gaps and until it emerges from the drilled hole in the bearing plates on the outside of the kerb units.

When grouting the transverse stressing bars on super-elevated bridges, the grouting shall commence at the lowest end of the bars, thus forcing the grout to flow up to the highest end, expelling the air from the cored hole. The grout shall not segregate prior to setting and shall be used within 30 minutes of mixing. The Contractor may employ alternative means of placing the grout, eg by pumping. Proposals for such alternative methods shall be submitted to the Administrator for approval.

9 GROUTING OF HOLDING DOWN BOLTS AND DOWEL BARS

9.1 Holding-Down Bolts

9.1.1 Fixed End (Mortar Bearing Seat)

Each holding-down bolt shall be raised to about 150 mm above its final position.

Cement grout having a thick creamy consistency shall be poured around the bolt so that, when the holding-down bolt is pushed firmly to its final position, the formed holes in the substructure and prestressed units shall be completely filled. Any excess grout shall be struck off level with the top of the deck units.

9.1.2 Expansion End (Elastomeric Bearing Seat)

The procedure for grouting and fixing holding-down bolts in positions shall be as specified in Clause 9.1.1 except that the amount of cement grout used shall be such that, when the bolt is placed in its final position, the top of the grout in the hole is level with the top of the headstock. Any surplus grout remaining near the bearings shall be removed.

9.1.3 Tightening of Nuts on Holding-Down Bolts at Expansion End

Nuts on holding-down bolts shall be screwed down finger tight only. Where the nut is tight on the thread, the nut shall be screwed down using a short spanner to just nip the washer. The recess in the top of the unit shall be covered with a galvanized cover plate.

9.2 Deck Unit Dowel Bars

9.2.1 Fixed End (Mortar Bearing Seat)

Each dowel bar shall be raised to about 150 mm above its final position.

Cement grout having a thick creamy consistency shall be poured around the dowel bar, so that, when the dowel bar is pushed firmly to its final position, the formed holes in the substructure and prestressed units shall be completely filled. Any excess grout shall be struck off level with the top of the deck units.

9.2.2 Expansion End (Elastomeric Bearing Seat)

The procedure for grouting and fixing dowel bars in positions shall be as specified in Clause 9.2.1 except that the amount of cement grout used shall be such that, when the dowel bar is placed in its final position, the top of the grout in the hole shall be level with the top of the headstock. Any surplus grout remaining near the bearings shall be removed.

10 ACTIVITIES TO COMPLETE INSTALLATION

10.1 Unused Cored Holes in Units

Any unused cored holes in deck units shall be filled with sand and the top 50 mm capped with cement mortar.

10.2 Mortar Joints at Ends of Units

The gaps between ends of deck and kerb units and/or the ballast wall at fixed joints shall be filled with dry cement mortar packed tightly into the joint.

10.3 Cutting of Lifting Loops from Units

The lifting loops shall be cut off flush with the top surface of the deck unit, or kerb unit recess. If gas cutting is used, the operation shall be carried out by a competent operator who shall ensure that the cutting is performed quickly to reduce to a minimum the heat transfer into the unit along the lifting loop.

After cutting of deck unit loops, a liberal coating of bitumen shall be applied over the exposed steel to prevent corrosion. After cutting the kerb unit loops, the recesses shall be filled with a dense, sand-epoxy mixture. This mixture shall be tinted to match as closely as possible the colour of the parent concrete.

11 ANCHORAGE PROTECTION

11.1 Painting

All exposed anchorages shall be degreased, rinsed with potable water and hand or power tool cleaned. Galvanised surfaces shall be prepared in accordance with ISO 8504-3 St2 surface preparation. Two coats of a grey coloured, high build epoxy coating shall be applied. The epoxy coating shall be a registered product (refer Clause 1). Each coating shall have a minimum dry film thickness of 125 microns.

Approved products are listed in Clause 1 of Annexure MRTS74.1. Alternative products, including full technical details of the alternative formulation, may be submitted to the Administrator for approval.

Flame cleaning shall not be permitted.

11.2 Filling Anchorage Recesses

Where the Drawings require anchorage recesses to be filled, any projecting bar shall be cut off using a metal cutting disc to give the cover shown in the Drawings.

Immediately before the recess is filled, the surface of the recess shall be painted with wet-to-dry epoxy. A cement mortar shall be prepared to a firm consistency and hammered into the recess. The mortar surface shall be finished flush with the unit surface with a steel trowel.

The wet-to-dry epoxy shall be a registered product (refer Clause 1). Approved products are listed in Clause 2 of Annexure MRTS74.1. Alternative products, including full technical details of the alternative formulation, may be submitted to the Administrator for approval.

12 MISCELLANEOUS

12.1 Scuppers

Scuppers shall be kept clear of foreign matter during construction.

Where the bridge is constructed over a railway or another roadway, scuppers (if these have been cast into the kerb units) shall be permanently plugged with cement mortar.

12.2 Provision for Future Widening

Where provision is required for future widening, special instructions for stressing, grouting, etc, shall be detailed in the Drawings.

12.3 Provision for Attachment of Services

Where it is required that services such as pipe lines or cables are to be supported from the superstructure, special fitments may have been cast into the deck and/or kerb units.

Such fitments shall not be used for construction purposes without the approval of the Administrator and shall be restored to a satisfactory condition if damaged in any way during construction.

12.4 Cast-In Sockets for Expansion Joints

Where cast-in sockets have been provided in units, the sockets shall be kept covered by plastic caps to prevent ingress of mortar, water or foreign matter.

12.5 Kerb and Parapet Formwork Support Fitments

Where kerbs and/or parapets are to be cast in situ, special fitments may have been cast into the deck units to provide support points to which formwork can be bolted.

Unless the construction of the kerbs and/or parapets is to proceed immediately, fitments shall be cleaned and protected against accidental damage and from the elements.

12.6 Kerb and Parapet Steel Reinforcing Starter Bars

Where kerbs and/or parapets are to be cast in situ, steel reinforcing bars may protrude from the kerb units or outer deck units.

Unless the construction of the kerbs and/or parapets is to proceed immediately, steel reinforcing shall be cleaned and protected against accidental damage and from the elements.

13 SUPPLEMENTARY REQUIREMENTS

The requirements of MRTS74 *Supply and Erection of Prestressed Concrete Deck and Kerb Units* are varied by the Supplementary requirements given in Clause 3 of Annexure MRTS74.1.

No Construction Plant or vehicles shall be placed on assembled deck units before completion of transverse post tensioning and until the grout in transverse stressing bar ducts attains a minimum age of two (2) days.