

Main Roads Technical Standard

MRTS84

Deck Wearing Surface

June 09

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Deck Wearing Surface

1 INTRODUCTION

This Standard applies to the construction of an asphalt deck wearing surface on bridges.

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 construction of asphalt deck wearing surfaces shall 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
5.2	Hot applied bitumen based crack sealant
6.4	Concrete Surface Primer

Registered suppliers and products for the above items are listed in the relevant clauses in Annexure MRTS84.1.

For information regarding registered suppliers and products for the above items refer to –

Department of Transport and Main Roads
 PMG Division
 35 Butterfield Street
 Herston Qld 4006

2 DEFINITION OF TERMS

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

3 REFERENCED DOCUMENTS

There are no Australian Standards referenced in this document.

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 and Witness Points applicable to this Standard are summarised in Table 4.1. There are no Milestones defined.

Table 4.1 – Hold Points and Witness Points

Clause	Hold Point	Witness Point
6.4	1. Application of primer	
7.2	2. Acceptance of Equipment Operational Plan	
7.5		Laying of asphalt
7.6	3. Adjustment of surface levels of deck wearing surface	

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 Clause 1 of Annexure MRTS84.1 shall be submitted to the Administrator for approval in accordance with the quality system requirements of the Contract.

5 PREPARATION OF DECK SURFACE

5.1 General

The bridge deck shall be thoroughly broomed to remove all loose material. Any deposits of cement mortar, grout or concrete adhering to the surface shall be removed. Any patches of oil or other material which might degrade the adhesion of the primer shall be removed using a suitable solvent.

The gap in the deck surface at any expansion joints shall be temporarily sealed. The concrete surface directly under the future expansion joint and surrounding bedding material shall be covered to prevent bituminous products adhering to the concrete.

5.2 Joint Sealing

For deck unit bridges, all fixed transverse joints at abutments and piers shall be sealed with a hot applied bitumen based crack sealant.

For bridges without an in-situ deck all mortar joints between prestressed concrete deck units in the deck surface shall be sealed with a registered hot applied bitumen based crack sealant (refer Clause 1).

The sealant shall be bitumen based. It shall have superior adhesion to concrete surfaces and have good extension characteristics to operate at pavement and deck temperatures between - 15°C and 75°C without damage. It shall form a soft rubber at these temperatures and have an extension characteristic of at least 300% at 25°C. The sealant shall have a melting point of at least 80°C.

Approved products are listed in Clause 2.4 of Annexure MRTS84.1. Alternative products may be submitted to the Administrator for approval but shall not be used unless approved by the Administrator.

Dimensions of the finished sealant shall be in accordance with the manufacturer's recommendations. Hot applied bitumen based crack sealant shall be mixed, heated and applied strictly in accordance with the manufacturer's recommendations.

6 BITUMINOUS WATERPROOF MEMBRANE

6.1 General

Prior to construction of the deck wearing surface, a waterproofing membrane, in the form of a sprayed bituminous seal, shall be applied to the surface of the concrete deck.

The waterproofing membrane shall consist of one of the following types as stated in Clause 2.1 of Annexure MRTS84.1 –

- a) Type A crack sealing followed by a seal with bitumen binder in accordance with the requirements of Clause 6.2; or
- b) Type B a seal with polymer modified binder in accordance with the requirements of Clause 6.3.

6.2 Type A Waterproof Membrane

Type A waterproof membrane shall consist of crack sealing followed by a single application of binder and cover aggregate.

The binder shall consist of Class 170 bitumen in accordance with the requirements of MRTS17 *Bitumen*. The binder shall be applied in accordance with the requirements of Clause 6.5.

The cover aggregate shall be precoated aggregate conforming to the requirements of MRTS22 *Supply of Cover Aggregate* for aggregate quality category A of nominal size as stated in Clause 2.2 of Annexure MRTS84.1 or, where not so stated, of nominal size 10 mm. Cover aggregate shall be spread in accordance with the requirements of Clause 6.6.

6.3 Type B Waterproof Membrane

Type B waterproof membrane shall consist of a prime and a single application of binder and cover aggregate.

The concrete surface shall be primed in accordance with the requirements of Clause 6.4.

The binder shall consist of a polymer modified bituminous binder conforming to PMB Class S0.3B or Class S0.25S in accordance with the requirements of MRTS18 *Polymer Modified Binder*. The binder shall be applied in accordance with the requirements of Clause 6.5.

Cover aggregate shall be precoated aggregate conforming to the requirements of MRTS22 *Supply of Cover Aggregate*, for aggregate quality Category A of nominal size as stated in Clause 2.3 of Annexure MRTS84.1, or where not so stated, of nominal size 14 mm. The cover aggregate shall be spread in accordance with the requirements of Clause 6.6.

6.4 Priming Concrete Surface

The primer shall be a registered product suitable for use as a bituminous primer for concrete surfaces (refer Clause 1). The primer shall consist of bitumen and one or more substances in a mixture which performs as a rapid curing prime.

Approved products are listed in Clause 2.5 of Annexure MRTS84.1. Alternative products may be submitted to the Administrator for approval but shall not be used unless approved by the Administrator.

The primer shall be applied to the surface of the concrete deck using a certified bitumen sprayer in a safe manner having regard to the material safety data sheet for the product, a copy of which shall be provided to the Administrator prior to application of the primer. **Hold Point 1**

The rate of application of the primer shall be as stated in Clause 2.6 of Annexure MRTS84.1 or where not stated, the rate of application shall be 0.5 L/m² or as recommended by the manufacturer.

6.5 Application of Binder

The binder shall be applied in accordance with the requirements of MRTS11 *Sprayed Bituminous Surfacing (Excluding Emulsion)*. The application spray rate for the polymer modified binder, measured at 15°C shall be as stated in Clause 2.7 of Annexure MRTS84.1. Where not stated in Annexure MRTS84.1, the application rate for the binder shall be 1.6 L/m² for bitumen (Type A) and 1.8 L/m² for polymer modified binder (Type B).

6.6 Spreading of Cover Aggregate

Cover aggregate shall be spread in accordance with the requirements of MRTS11 *Sprayed Bituminous Surfacing (Excluding Emulsion)* using a self-propelled mechanical spreader to achieve the spread rate specified below.

The cover aggregate spread rate shall be calculated from the equation –

$$\text{Spread Rate} = \frac{1000}{\text{ALD}} \text{ m}^2/\text{m}^3$$

where –

ALD = average least dimension of cover aggregate in mm.

6.7 Protection of Kerbs, Parapets, Scuppers and Rails

Kerbs, parapets, scuppers and rails shall be protected during the spraying of primer and binder to prevent adherence of any overspray.

7 ASPHALT SURFACING

7.1 General

All works shall be supplied and constructed in accordance with the relevant Technical Standards and the Drawings.

7.2 Vehicle Equipment and Plant Induced Loads on Bridge

For each bridge, the Contractor shall prepare and submit an Equipment Operational Plan that details the proposed Vehicles, Plant and Equipment that will load the bridge. The Equipment Operational Plan shall include –

- a) a list of all Vehicles, Plant and Equipment that will load the bridge;
- b) gross mass of all individual Vehicles, Plant and Equipment in tonnes including any incidental mass, fuel and any attachments on Vehicles, Plant and Equipment;
- c) vibrating frequency (Hz) and nominal amplitude (mm) of vibrating rollers. Preference shall be given to oscillating drum rollers;
- d) rotational speed (rpm) and milling depth range and number of teeth on the cutter drum of cold milling machine drum;
- e) combinations of Vehicles, Plant and Equipment for the purpose of evaluating the load distribution on the bridge during bridge work; and
- f) any additional details requested by the Administrator.

In addition, the Contractor shall submit the proposed program of works including the proposed times for placing asphalt and other bituminous products.

The Contractor shall submit the Equipment Operational Plan to the Administrator at least 20 days prior to the commencement of any bridge work. The Administrator will confirm the suitability of the Equipment Operational Plan **Hold Point 2**

7.3 Tack Coat

A tack coat is required prior to laying of the corrector course and/or the surfacing layer, irrespective of whether a bituminous waterproofing membrane has been specified or not. The tack coat shall consist of a Cationic Rapid Setting Emulsion supplied and applied in accordance with the requirements of MRTS21 *Bituminous Emulsion* and MRTS30 *Dense Graded and Open Graded Asphalt*.

The application rate for the tack coat shall be 0.2 litres/m² residual bitumen.

7.4 Corrector Courses

A dense graded asphalt corrector course shall be placed on the waterproof membrane to correct the profile caused by the hog and/or crossfall of the prestressed concrete units and/or the reinforced concrete deck.

The corrector course shall be dense graded asphalt constructed in accordance with MRTS30 *Dense Graded and Open Graded Asphalt*.

The profile and depth of the corrector course shall be the depth necessary to provide for the layers of asphalt of the nominal thickness specified in the design documentation at all points on the bridge deck.

7.5 Asphalt Surfacing

Asphalt layers as specified in the drawings shall be placed over the waterproof membrane and/or the corrector course, as applicable.

The laying of asphalt shall be a witness point. **Witness Point** Particular attention shall be paid to the maximum layer thickness provisions of MRTS30 *Dense Graded and Open Graded Asphalt*. For dense graded asphalt, several layers may be required.

7.6 Excessive Hog

In cases of excessive hog, adjustment of the deck wearing surface levels in order to preserve the minimum thickness of the dense graded asphalt surfacing layer over prestressed units may be necessary. Adjustment of the deck surface levels shall not be carried out unless prior approval has been given by the Administrator.

Hold Point 3

8 ADDITIONAL REQUIREMENTS

The requirements of MRTS84 *Deck Wearing Surface* are varied by the Supplementary requirements given in Clause 3 of Annexure MRTS84.1.