

Main Roads Technical Standard

MRTS84A

Cold Milling Bridge Deck Wearing Surface

June 09

 **Queensland** Government

IMPORTANT INFORMATION

The requirements of this document represent Technical Policy of the department and contain Technical Standards. Compliance with the department's Technical Standards is mandatory for all applications for the design, construction, maintenance and operation of road transport infrastructure in Queensland by or on behalf of the State of Queensland.

This document will be reviewed from time to time as the need arises and in response to improvement suggestions by users. Please send your comments and suggestions to the feedback email given below.

FEEDBACK

Your feedback is welcomed. Please send to mr.techdocs@tmr.qld.gov.au.

COPYRIGHT

© State of Queensland (Department of Transport and Main Roads) 2009

Copyright protects this publication. Except for the purposes permitted by and subject to the conditions prescribed under the Copyright Act, reproduction by any means (including electronic, mechanical, photocopying, microcopying or otherwise) is prohibited without the prior written permission of the department. Enquiries regarding such permission should be directed to the Road & Delivery Performance Division, Queensland Department of Transport and Main Roads.

DISCLAIMER

This publication has been created for use in the design, construction, maintenance and operation of road transport infrastructure in Queensland by or on behalf of the State of Queensland.

Where the publication is used in other than the department's infrastructure projects, the State of Queensland and the department gives no warranties as to the completeness, accuracy or adequacy of the publication or any parts of it and accepts no responsibility or liability upon any basis whatever for anything contained in or omitted from the publication or for the consequences of the use or misuse of the publication or any parts of it.

If the publication or any part of it forms part of a written contract between the State of Queensland and a contractor, this disclaimer applies subject to the express terms of that contract.

June 09

Table of Contents

	Page
1 INTRODUCTION.....	1
2 DEFINITION OF TERMS	1
3 REFERENCED DOCUMENTS	1
4 QUALITY SYSTEM REQUIREMENTS.....	1
4.1 Hold Points, Witness Points and Milestones	1
4.2 Construction Procedures	1
5 SURVEY.....	2
6 COLD MILLING OPERATION.....	2
6.1 General	2
6.2 Vehicle Equipment and Plant Induced Loads on Bridge	2
6.3 Milling to Profile.....	2
6.4 Construction	3
6.5 Barriers and Expansion Joints within the Milling Area	3
6.6 Floor of the Milled Surface	3
6.7 Clean Up and Disposal of Milled Material.....	4
6.8 Unsuitable Material	4
6.9 Trafficking Milled Surfaces.....	4

Cold Milling Bridge Deck Wearing Surface

1 INTRODUCTION

This Standard applies to the cold milling of asphalt deck wearing surface (DWS) on bridges and the removal of the resultant rubble to allow resurfacing.

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.

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

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

Table 4.1 – Hold Points, Witness Points and Milestones

Clause	Hold Points
5	1. Survey of existing asphalt.
6.2	2. Acceptance of Equipment Operational Plan.
6.4	3. Repair procedure for damage.
6.6	4. Removal of cold milling and cleaning plant.

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 cold milling shall be submitted to the Administrator in accordance with the quality system requirements of the Contract. The procedure shall include, as a minimum, the following details –

- a) the cold milling equipment to be used on the work;
- b) the width of single run cut, the position of the loading conveyor and the proposed method of handling and transporting the milled material;
- c) the method of level control proposed;
- d) the proposed method of carrying out the work, including sequencing of milling runs and planned daily outputs;
- e) the haulage fleet required to optimise the milling output and minimise public inconvenience;
- f) steps proposed to minimise dust nuisance, excessive noise, excessive windrows, loose material or excessive roughness of the cold milled surface;

- g) methods and equipment to be used to identify hidden metal objects (tramlines, grating, candybar brackets, loop detectors etc) and hidden public utilities; and
- h) any other factors affecting performance of the work, public safety and public convenience.

5 SURVEY

The approximate thickness of DWS is shown in the Drawings.

Prior to commencing work, the Contractor shall undertake an investigation into the exact thickness and the variation in thickness of DWS on the bridge deck.

The Contractor shall set out the area to be cold milled as shown in the Drawings.

The Contractor shall determine the exact thickness of the existing asphalt over the area to be milled using a locating device or pilot holes. Thicknesses determined by this testing shall be located using survey. The Contractor shall complete a sufficient number/quantity of tests to determine the existing asphalt exact thickness over the area to be milled

The Contractor shall report the test results for survey and existing DWS asphalt thickness to the Administrator.

The Contractor shall verify that cold milling to the depth specified plus the groove depth plus tolerance shall not damage the bridge structure. **Hold Point 1**

6 COLD MILLING OPERATION

6.1 General

Where shown in the Drawings, the existing deck wearing surface (DWS) on a bridge shall be cold milled to the depth shown and the resultant rubble removed from the site of the works.

The Contractor shall advise the Administrator at least three days prior to the planned commencement of any scarifying operations. The Contractor shall arrange with the relevant road Authority for any traffic detector loops to be located and disconnected as necessary.

6.2 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 –

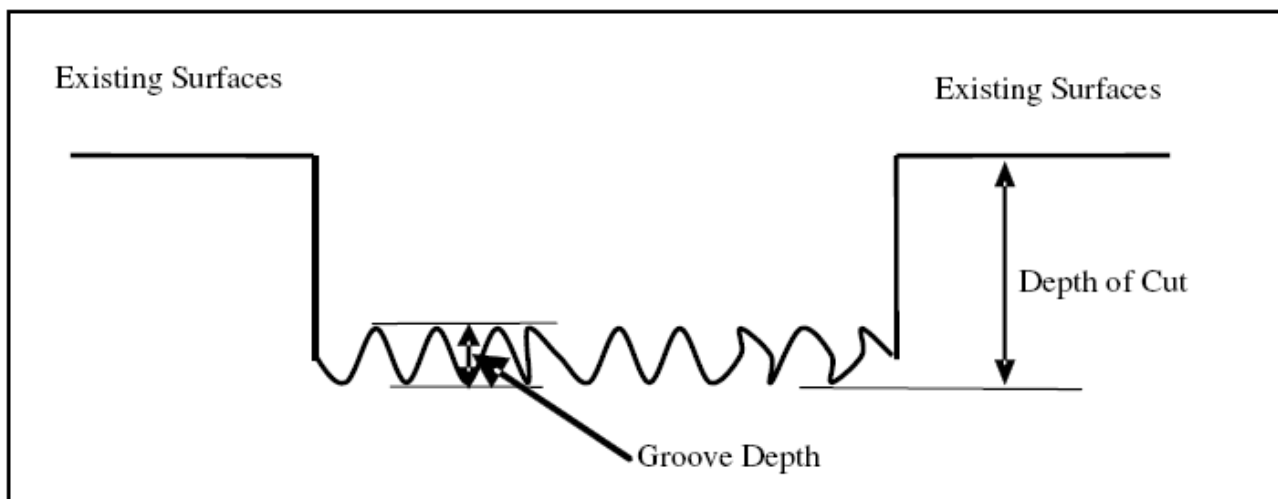
- a) a list of all Vehicles, Plant and Equipment that will load the bridge;
- b) gross mass of all individual Vehicles, Plant and Equipment in tonnes including any incidental mass, fuel and any attachments on Vehicles, Plant and Equipment;
- c) vibrating frequency (Hz) and nominal amplitude (mm) of vibrating 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.

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**

6.3 Milling to Profile

When milling to specified depth, the depth at any point shall not vary from the specified depth by more than 5 mm. For this purpose the depth shall be measured from adjacent surfaces to the top of the milled surface as shown in Figure 6.3.

Figure 6.3 - Cold Milling Depth



When milling to a surface specified in the Drawings, the top of the milled surface shall not vary by more than ± 5 mm from the levels shown on the drawing.

The difference in vertical surface profiles between adjacent runs, measured under a straight edge shall not exceed 5 mm.

6.4 Construction

The asphalt shall be cold milled in a manner which shall not cause damage to the remaining pavement, bridge relieving slabs, kerb, or kerb and channel.

The existing pavement shall be cold milled over the areas shown in the Drawings.

Where the edge of the remaining existing surface adjacent to the area to be cold milled remains exposed, that edge is to be saw cut to a minimum depth of 40 mm prior to cold milling.

During cold milling operations the Contractor shall have one staff member solely responsible for monitoring operations to ensure that the bridge structure is not damaged as a result of the work operations including, but not limited to, excessive milling depth or excessive vibrations on the bridge deck.

If the bridge is damaged, work shall immediately halt and the Contractor shall undertake an investigation and prepare and submit to the Administrator remedial action procedure in respect to the repair of the damage and further cold milling operations. The Contractor shall not re-commence cold milling operations until the remedial action procedure has been submitted to the Administrator and approval (which shall not be unreasonably withheld) has been given by the Administrator. **Hold Point 3**

The Contractor shall not cause damage to concrete medians or kerbs, manholes, gully grates, utility covers or similar structures. Where damage is caused, it shall be repaired at the Contractor's expense.

Utilisation/disposal of excavated materials shall be in accordance with the requirements in Clause 11 of MRTS01 *Introduction to Technical Standards*.

6.5 Barriers and Expansion Joints within the Milling Area

The Contractor shall cold mill to between 50 mm and 150 mm from longitudinal objects such as kerbs and parapets. Removal of remaining asphalt shall be by other means.

The Contractor shall not longitudinally cold mill asphalt surfacing closer than 1000 mm from transverse obstacles such as expansion joints. Removal of asphalt within 1000 mm of transverse obstacles may be by a combination of transverse cold milling where applicable and by other means.

6.6 Floor of the Milled Surface

The pavement shall be swept free of all loose material and the resultant rubble shall be removed from the Site of the works.

Notice in writing regarding the completion time of the milling and cleaning operation shall be given by the Contractor to the Administrator at least 24 hours in advance.

Cold milling and cleaning plant shall not be removed from Site until this hold point is released by the Administrator. **Hold Point 4**

6.7 Clean Up and Disposal of Milled Material

Following the cold milling operation all loose material shall be removed from the Site.

6.8 Unsuitable Material

Any weakened planes of asphalt, concrete or any unsuitable material existing below the specified milling depth which is not removed by the milling operation shall be removed.

6.9 Trafficking Milled Surfaces

In order to open a milled surface to traffic, the transverse edges of the milled surface shall be ramped to tie into the existing road levels. The ramp shall have a minimum taper length of 2.5 m for each 50 mm variation in levels or part thereof. Where the permanent speed limit prior to commencing road works on the site is 60 km per hour or less a minimum taper length of 1.5 m for each 50 mm variation in levels or part thereof shall apply. The ramp can be formed by either bevelling with the cold milling machine or by using asphalt. When bevelling is used, the lip between the milled run and the unmilled run shall not exceed 10 mm.

Where traffic is required to travel on a longitudinal edge, it is to be ramped as required for transverse edges except that the taper shall be a minimum length of 1.0 m for each 50 mm variation in levels or part thereof. Work shall be arranged so that longitudinal edges of milled work which have not been ramped are not open to traffic.

Asphalt ramps shall be formed and compacted around manholes, gully grates, utility covers or other similar structures. The ramp shall have a minimum taper length of 1.5 m for each 50 mm or part thereof, of material removed.

Ramps may be formed with cold mix provided that –

- a) an emulsion tack coat is applied to the milled surface prior to the placement of cold mix;
- b) the maximum thickness of the cold mix does not exceed 40 mm;
- c) the cold mix ramp is not to be left in place longer than one week; and
- d) the Contractor maintains the line and level of the ramp while it is under traffic.

Where work under the Contract includes the replacement of the milled material with the new materials, any ramps shall be removed before the new material is placed. The ramp material shall be disposed of in accordance with Clause 6.4.