

Cost effective pavement thickness design

Dr Michael Moffatt

Engineering Road Note 9 May 2013

PROCEDURE FOR THE DESIGN OF ROAD PAVEMENTS

Western Australian Supplement to the Austroads Guide to
Pavement Technology Part 2: Pavement Structural Design

Government of South Australia
Department of Planning,
Transport and Infrastructure

**Safety and Service Division
Pavement Design**


**Supplement to the
Austroads Guide to Pavement Technology
Part 2: Pavement Structural Design**

Department of Transport and Main Roads

**Pavement Design Supplement
Supplement to 'Part 2: Pavement Structural Design' of
the Austroads Guide to Pavement Technology**

November 2013

Great state. Great opportunity.



October 2013

vicroads

Code of Practice

**Selection and Design of
Pavements and Surfacing RC 500.22**

1. Scope
This Code sets down VicRoads procedures for the selection and design of new road pavements and surfacings. This Code shall be read in conjunction with any associated contract documentation prepared for the works.

2. Reference Documents
Table 2.1 lists reference documents applicable to this Code.
Where a discrepancy exists between various parts of the reference documents, the following descending order of precedence shall apply:

- Contract Documents
- VicRoads Codes of Practice
- VicRoads Test Methods
- VicRoads Design Guides
- Standards Australia Test Methods
- Austroads Design Guides
- Other Design Guides

3. Appendices
Appendix A - Average Annual Rainfall of Victoria
Appendix B - Traffic Characteristics Information
Appendix C - Guide to Selection of Initial Seal Treatments on Pavements Constructed Clear of Traffic
Appendix D - Guide For Selection of Dense Graded Asphalt Types
Appendix E - Typical Characteristics of Dense Graded and Stone Mastic Asphalts Used by VicRoads.
Appendix F - Design Chart for Unbound Flexible Pavements.

4. Definitions
For the purpose of this Code the following definitions shall apply:

4.1. Unbound Flexible Pavement
A pavement consisting of an unbound granular base and subbase with thin asphalt or sprayed bituminous seal surfacing.

4.2. Deep Strength Asphalt Pavement
A pavement comprising asphalt wearing, intermediate and base courses placed on a cementtreated subbase.

4.3. Full Depth Asphalt Pavement
A pavement comprising asphalt wearing, intermediate and base courses placed directly on a layer of unbound subbase material.

4.4. Rigid Pavement
A Portland cement concrete pavement.

4.5. Mechanistic Pavement Design Procedure
A pavement design procedure used for pavements consisting of one or more bound layers based on determination of strain and use of material performance relationships to calculate the number of allowable load repetitions.

4.6. Heavy Vehicle Axle Groups (HVAG)
A set of closely spaced axles acting as a unit, including a single axle on a heavy vehicle, whereby a heavy vehicle is:

- (i) A two-axle vehicle with the minimum axle spacing greater than 3.2 m, or a three or more axle vehicle configured at least with two axle groups (excluding short towing vehicles, e.g. trailer, caravan, boats, etc.); or
- (ii) A vehicle having a gross vehicle mass exceeding 4.5 tonnes; or
- (iii) A Class 3 or higher classification vehicle.

keeping victorians connected RC 500.22 Oct 2013 Final Page 1 of 21

**Roads and Maritime
Austroads Guide**

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Transport
Roads & Maritime
Services

SUPERSEDES VERSION: 2.1

**Austroads Guide to
Pavement Technology
Part 2: Pavement Structural Design**

General

Austroads has released the Guide to *Pavement Technology, Part 2: Pavement Structural Design* and all road agencies across Australasia have agreed to adopt the Austroads guides to provide a level of consistency and harmonisation across all jurisdictions. This agreement means that the new Austroads guides and the Australian Standards, which are referenced in them, will become the primary technical references for use within the Agency.

This supplement is issued to clarify, add to, or modify the Austroads Guide to *Pavement Technology, Part 2: Pavement Structural Design (2012)*.

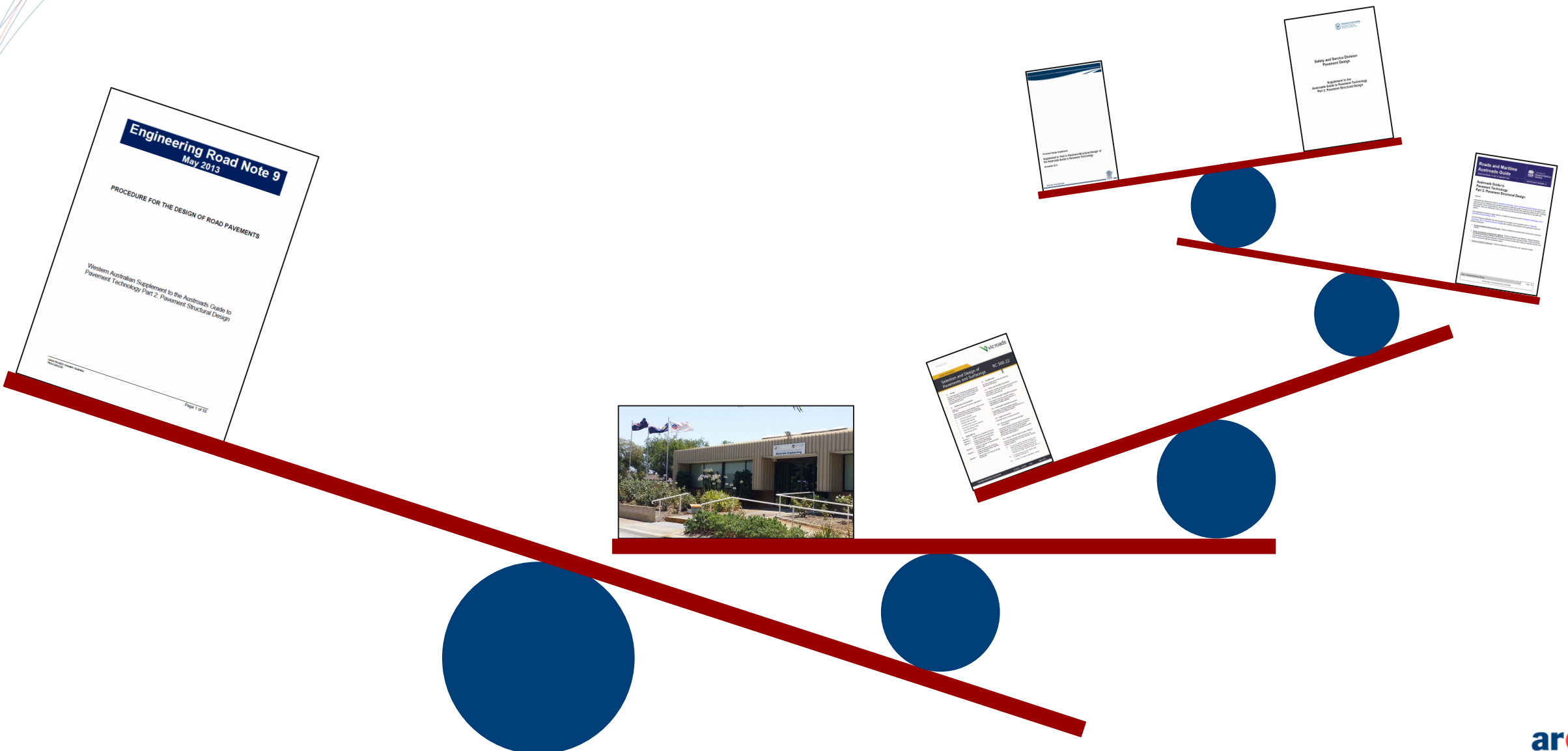
The NSW Roads and Maritime Services accepts the principles in the Austroads Guide to *Pavement Technology, Part 2: Pavement Structural Design* with variations documented in this supplement under the following categories:

- Roads and Maritime Enhanced Practice:** Roads and Maritime practices which enhance the Austroads Guides
- Roads and Maritime Complementary Material:** Roads and Maritime specifications, standard drawings and technical directions reference material that complements the Austroads Guides. These documents include Roads and Maritime Manuals, Technical Directions and/or other reference material and are to be read in conjunction with the Austroads Guides.
- Roads and Maritime Departures:** Roads and Maritime that depart from the Austroads Guides.

Part 2: Pavement Structural Design Page 11 28

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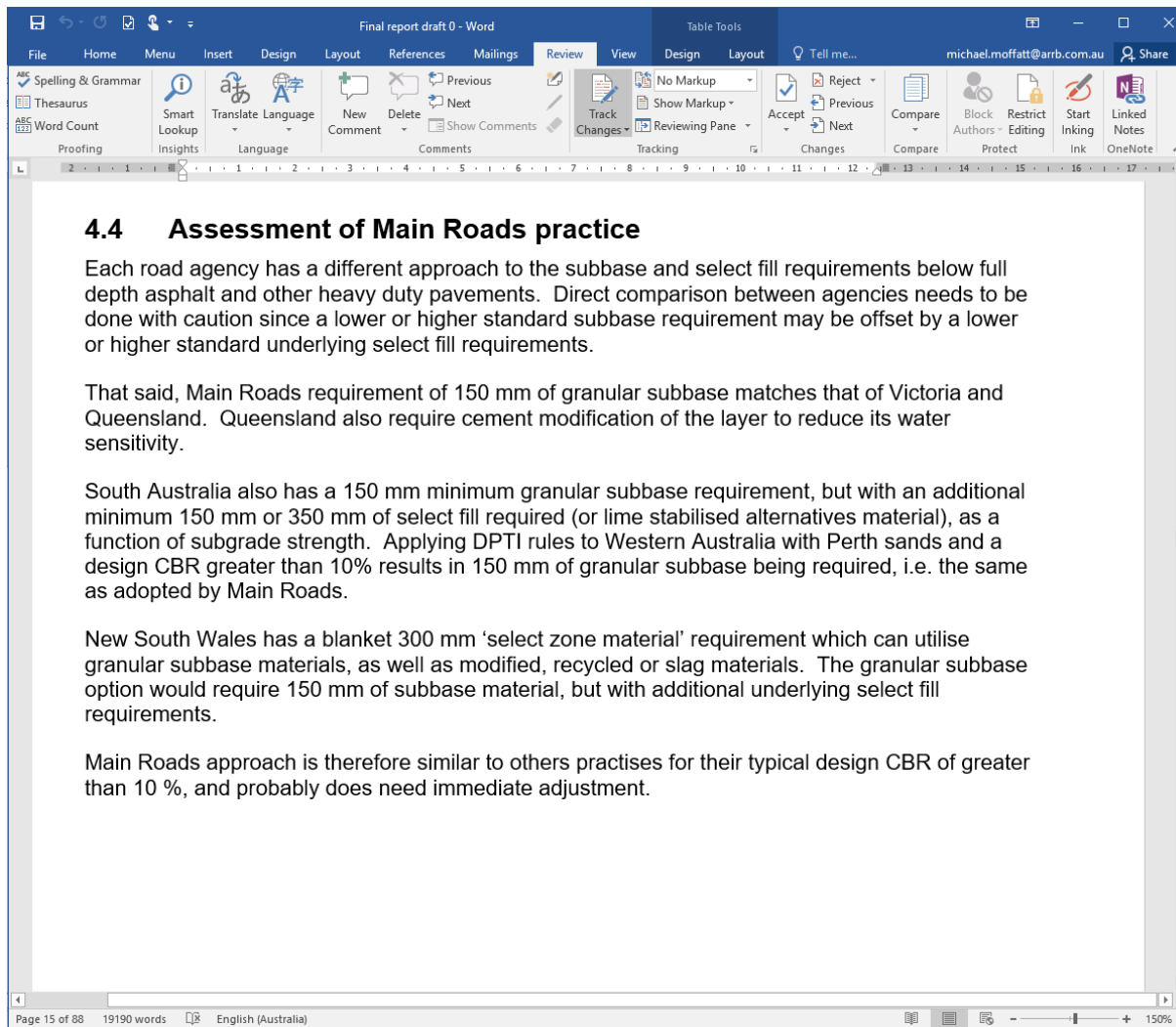




- Design periods & project reliability levels
- PMB asphalt minimum thickness
- Minimum thickness of structural asphalt
- Minimum thickness of subbase for FDA

- Construction tolerances
- Granular sublayer moduli
- Design speed for intersections
- Traffic multipliers for high stress areas

- Additional observations



4.4 Assessment of Main Roads practice

Each road agency has a different approach to the subbase and select fill requirements below full depth asphalt and other heavy duty pavements. Direct comparison between agencies needs to be done with caution since a lower or higher standard subbase requirement may be offset by a lower or higher standard underlying select fill requirements.

That said, Main Roads requirement of 150 mm of granular subbase matches that of Victoria and Queensland. Queensland also require cement modification of the layer to reduce its water sensitivity.

South Australia also has a 150 mm minimum granular subbase requirement, but with an additional minimum 150 mm or 350 mm of select fill required (or lime stabilised alternatives material), as a function of subgrade strength. Applying DPTI rules to Western Australia with Perth sands and a design CBR greater than 10% results in 150 mm of granular subbase being required, i.e. the same as adopted by Main Roads.

New South Wales has a blanket 300 mm 'select zone material' requirement which can utilise granular subbase materials, as well as modified, recycled or slag materials. The granular subbase option would require 150 mm of subbase material, but with additional underlying select fill requirements.

Main Roads approach is therefore similar to others practises for their typical design CBR of greater than 10 %, and probably does need immediate adjustment.