AAPA 15th International Conference

Austroads Pavements Technology Initiatives working with Industry in delivering achievements and future directions – Part 1

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Roads and Maritime Services, NSW
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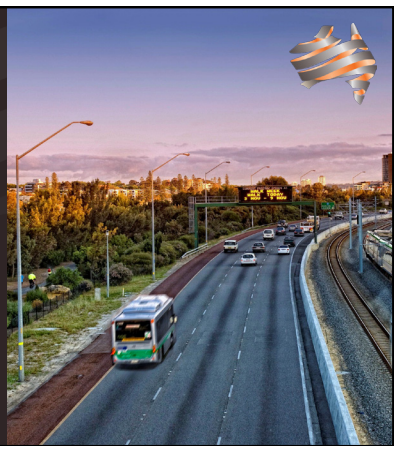
Improving Australian and New Zealand transport outcomes



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An Overview

- Association of Australian & New Zealand road / road transport authorities
- 11 members include:
  - six Australian states
  - two Australian territories
  - Australian government (DoIT)
  - Local government (through ALGA)
  - New Zealand Transport Agency
- annual budget about $14m

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Delivering Road Research via Taskforces

- While there are over 12 Task Forces the most relevant ones to AAPA are

  - Pavement Technology and
  - Asset Management

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Austroads Pavement Technology Taskforce

Austroads Pavements Technology Taskforce comprises:

- All road authorities in Australia and New Zealand
- Industry including AAPA represented by John Lambert
- Local government representatives
- National Transport Commission
- ARRB as SME and project leaders for much of the research.

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Austroads Pavement Technology Taskforce

Austroads working through the Pavement Technology Task Force produced the updated Guide to Pavement Technology including:

- Part 4B Asphalt
- Part 4F Bituminous Binders
- Part 4H Test Method
- Part K Seals
- Part 4J Aggregate and Source Rock

Updated on a rotating 5 year cycle.

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Austroads Guides - Relevance to Industry

Austroads is working to

-Harmonise the guides to achieve consistency across Australia and reduce/ minimise the need for supplements

-Identify with Industry issues that require improvement including research.

-Ensure guides are reasonable, readable and can be used by their target audience

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Austroads Pavement Guides

Why Harmonise?

Austroads Guides recognise that individual road authorities have significant differences to manage such as :-

-Traffic volume
-Traffic type
- Climate etc

The Guides provide for various pavements and pavement treatments to meet such needs.

But many differences can be minor and need to be rationalised in favour of a national and consistent approach

Productivity will be the winner

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Austroads Pavement Research

-Technology Program

Pavements have been in the forefront of Austroads research in recent years with budgeted funds as follows

$1.8M (16%) 09/10.
$ 2.5m (22%) 10/11
$ 3.7m (25%) 11/12
$ 3.8m (25%) 12/13

This does not include contributions in kind which industry and in particular AAPA have contributed towards specific research projects

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Austroads Pavement Research

-Key Projects in recent years

- Asphalt Properties and Mix Design Procedures
- Optimising Binder Performance
- Performance of Warm Mix asphalt
- Polymer Modified Bitumen Spray Seal Trials
- Maximising the use of reclaimed asphalt pavement in mix design

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Austroads Pavement Research

-Industry Support and co operation

- Austroads Pavement Taskforce is strongly supported by working groups with significant industry participation –

Bituminous Surfacings Working Group (BSWG)

Asphalt reference Working Group (ARWG)

Pavement Structures Reference Working Group (PSWG)

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Austroads Pavement Research

-Industry Support and co operation

I would like to thank all the industry members and companies who assisted the Pavements Technology Taskforce and the working groups over the past 4 years.

A special vote of thanks to John Lambert of AAPA who supported and encouraged the collaboration between Austroads and industry

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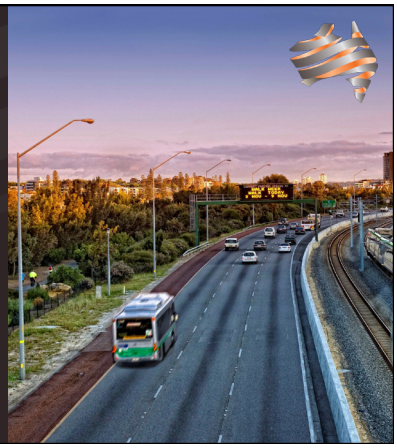
Improving Australian and New Zealand transport outcomes



Pavement Research highlights for 2013/14

John Spathonis
Program Manager
(Technology) - Austroads

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Austroads research program areas

- Technology
- Assets
- Freight
- Safety
- Network
- Registration & Licencing

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Technology program task forces

- Pavements
- Bridges
- Tunnels
- Road design
- Project delivery
- Economic evaluation & planning

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Pavements research topic areas

- Sprayed seals
- Asphalt
- Pavement design
- Vehicle damage
- Rehabilitation
- Updating manuals and guides
- Review of CPEE training courses

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Impact of new freight trucks on existing pavements

- part of Austroads assets program
- impact of heavier vehicles on pavement surfacing needs to be quantified
- lack of guidance regarding the assessment of the impacts of horizontal tyre forces for new freight vehicles in current PBS
- development of vehicle simulation modelling to predict horizontal loads applied by SMART trucks and pavement wear
- development of incremental price and mass-distance charging of heavy vehicles
- tyre - force and surface wear mobile rig built in 2012/2013.

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Impact of new freight trucks on existing pavements

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Maximising use of RAP in asphalt mix design

- significant economic and environmental benefits
- due consideration of RAP during the mix design process needed to ensure satisfactory performance
- 2nd year of 3 year study
- provide guidance on the design and specification of RAP mixes
- overall goal to reduce uncertainty surrounding the performance of mixes containing RAP

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New long-term ageing tests for bitumen and PMBs

- current long-term ageing test methods unsustainable (Shell sliding plate) and testing time approx 14 days
- new method being developed will maximise the cost effectiveness and life of sprayed seals
- in addition to testing bitumen, new test must also have the ability to test PMBs
- development of a more robust durability parameter
- investigating two test methods using a dynamic shear rheometer (DSR) device and an Australian device (extensiometer)
- benefits - shorter test time 2 days and utilise existing laboratory equipment

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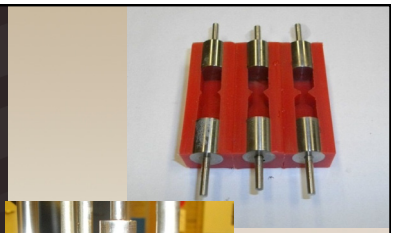
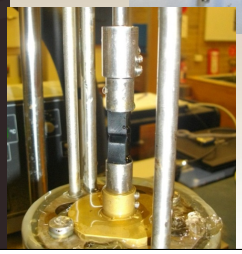
Extensiometer - mould and sample under test





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Performance evaluation of granular bases

- traditional materials depleting as road freight demand rises
- development of effective methods for evaluating the performance of UBGM and promote fit-for-purpose approach
- comparison of field performance using ALF and lab processes to support use of wheel tracker testing procedure and repeat load triaxial (RLT)
- increase pavement performance and improve use of existing and new pavement materials

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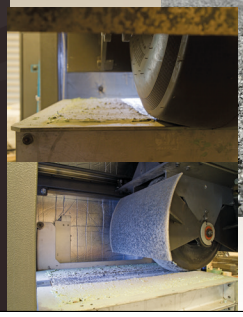
Performance evaluation of granular bases



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Maximising performance of sprayed seals

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Maximising performance of sprayed seals

- spray sealing viable low-cost solution for surfacing Australia's vast rural pavement network
- maximising performance is critical
- research into seal-design improvement methods to sustain heavy vehicles
- improvement for seal-design in low traffic environments
- feasibility study for a lab performance fatigue predictor test of spray-seal binder cracking
- trial spray-seal construction in collaboration with Sprayline at a pre-determined test site

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Characterisation of PMB performance to achieve enhanced performance

- binder is key component in the performance and service life of bituminous surfacings
- need to improve specifications for procurement to achieve optimum performance
- aim to identify the relationship between test properties and field performance of PMBs
- investigate whether segregating PMBs will show same performance as non-segregating PMBs
- test the effect of polymer degradation on the performance of PMBs

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Mix design and field evaluation of FBS pavements

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Mix design and field evaluation of FBS pavements

- improvement of marginal materials using recycling techniques known as 'stabilisation'
- bitumen stabilisation has become increasingly popular in Australia– particularly the use of FBS
- need to improve understanding of the performance of FBS materials under traffic loading
- finalising improvement of current Austroads mix and pavement design procedures
- monitoring the performance of under-designed FBS pavements

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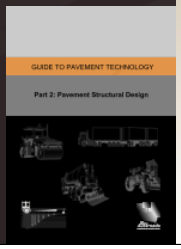
Improved design procedures for asphalt pavements



- purpose of project to provide improved procedures for designing longer-life asphalt pavements
- development of an improved model for fatigue damage prediction
- new procedures for determining asphalt moduli
- develop improved models for temperature prediction in deep lift asphalt pavements
- single temperature model → multi layered multi temperature model
- evaluation asphalt endurance limits methods
- eventual integration of long-life pavement design concepts into Austroads Guide to Pavement Technology Part 2

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National spray-seal trials

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National spray-seal trials

- monitor, interpret and report on the to-date performance of the Austroads Polymer Modified Binder sprayed seal trials on-site inspection of test sites
- collaborative partnership with industry including knowledge transfer and asset management
- develop and promote best practice and innovation

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High modulus asphalt technology transfer

- French laboratory – Laboratoire Central des Ponts et Chausséees (LCPC) developed methodology for a enrobé à module élevé Class 2 material
- Enrobés à module élevé Class 2

= **EME2**

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High modulus asphalt technology transfer

- French EME mixes offer the advantage of reduced asphalt thicknesses, and lower construction and maintenance costs
- assist industry in the successful transfer of EME technology to Australia
- initial reference testing of French EME2 mix to be conducted at ARRB to set benchmarks for mix-design using Australian test methods
- eventual development of Australian performance-based design guides for EME mixes
- challenge and opportunity for asphalt industry for a paradigm change

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