AUSTRALIAN ROAD RESEARCH BOARD

Identifying best pavement practice for major projects

Feedback from 2016 workshops

Workshop – 3 May 2017

Workshop issues

- Forms of contract
- Contract requirements
- Performance knowledge
- WOLCC
- Pavement types
- Improved engagement
- Underutilised materials
- Structural design issues

Forms of contract

Concerns raised

- D&C contracts inhibit innovation
  - All risk transferred: owner -> contractor -> designer
- STWC used in D&Cs prescriptive/restrictive
  - limit pavement options to those extensively proven by MRWA
- Alliance contracts provide more room for innovation
  - Gateway project was considered by one attendee as not reflecting world's best practice
- Early Contractor Involvement (ECI) projects seen as offering better room for innovation

Forms of contract

Suggested actions

- Clear that exploring forms of contract requires ‘buy in’ from many parts of MRWA
- Recommend formulation of MRWA discussion paper to include:
  - Early Contractor Involvement
  - Improved alliance
  - 3rd party procurement (design/construct/own)
  - ‘old school’ staged construction
  - Special contract form for examining MRWA initiated innovation
- Have commenced dialogue within MRWA

Contract requirements

Concerns raised

- Contractor focus generally on deflects liability period, not on proposing innovations

- Contracts specify pavement type/thickness as well as performance
  - But all risk transferred: owner -> contractor -> designer
  - Inconsistent?
    - Contractor takes risk: they should determine pavement composition
    - MRWA specify pavement type/thickness: they should ‘own’ the risk

- Incentives/penalties for non-conformance (rather than just reconstruction)

Contract requirements

Suggested actions

- Linked (to some degree) with forms of contract
- MRWA SWTC generally similar to other states, specifying:
  - required design standards
  - allowable pavement types (MRWA generally a little more limited)
  - wearing course mixes
  - design traffic loadings (ESAs)
  - some material moduli & compaction requirements
  - pavement performance requirements (MRWA more extensive)
- 3 differences to other states (for MRWA to consider)
  - Specified minimum thickness (c.f. leave it to design system with specified inputs)
  - SWTC includes detailed construction requirements (c.f. detail in separate construction spec)
    - some MRWA information repeated across STWC
  - Specified minimum traffic requirements (c.f. specify design traffic, as ‘better placed to know’).

Performance knowledge

Concerns raised

- Performance of pavement types and materials
  - MRWA best placed to know
  - Contractor (designer!) takes specific responsibility for performance

- Can MRWA provide performance data
  - Better inform contractors/designers
    - Leading to better decisions
    - Focussing effort where needed

Whole of Life Cycle Costing (WOLCC)

Concerns raised

- WOLCC is a requirement of SWTC
  - How often is it done?
- MRWA use WOLCC as part of process to specify pavement types
  - Generally do not provide this information to proponents
- Disconnect between focus:
  - Proponents bidding – focus on capital costs
  - MRWA specifying pavement types – want low capital costs on types with low WOLCC

ARRB view: need for much better dialogue and communication between parties.

Heavy duty pavement types for major projects

Pavement type	WA	NSW	Qld	Vic	SA
Full depth asphalt	Commonly used	Commonly used	Commonly used	Commonly used	Commonly used
Deep strength asphalt pavement	Not used	Commonly used	Selectively used, previously most common type >10 years ago	Commonly used	Rarely used, previously common type >8 years ago
Thin AC on granular	Commonly used	Not permitted as a heavy duty pavement type	Not permitted as a heavy duty pavement type	Not permitted as a heavy duty pavement type	Not permitted as a heavy duty pavement type
Thick asphalt over lean mix concrete (composite pavement)	Not used	Commonly used	Rarely used	Not used	Not used
Hydrated cement treated crushed rock base	Selectively used if prerequisites satisfied	Not used	Not used	Not used	Not used
Concrete pavements – PCP, CRCP, JCRP, SFRC	Limited use	Commonly used	Selectively used, particularly in tunnels and busways	Rarely used	Rarely used, but first major use underway
Spray seal on granular	Commonly used on rural freeways. Not permitted on urban projects	Commonly used on rural freeways. Not permitted on urban projects	Commonly used on rural freeways. Not permitted on urban projects	Commonly used on rural freeways. Not permitted on urban projects	Commonly used on rural freeways. Not permitted on urban projects

Heavy duty pavement types for major projects

- As alternative options to FDA, MRWA could consider:
  - Composite pavements
  - Deep strength asphalt pavements

- Has WOLCC analyses convinced MRWA that above not WOLC viable?
  - Recent WAPARC report indicates some cost advantage in some scenarios
  - What more does MRWA know?

ARRB view: need for much better dialogue and communication between parties.

Improved engagement

ARRB view: need for much better dialogue and communication between parties.

Concerns raised

- Why does MRWA differ from other states in:
  - Specifying minimum thickness (c.f. leave it to design system with specified inputs)
  - Having SWTC include detailed construction requirements (c.f. detail in separate construction spec)
  - Specified minimum traffic requirements (c.f. specifying design traffic).
- Can MRWA provide performance data for others assess their risk?
- Would MRWA consider pavement types not included in SWTC?
- Contractors/designers want more general interaction

Improved engagement

Suggested actions

- More:
  - MRWA TechXchanges
  - Workshops
  - WAPG publications
  - Construction industry involvement in WAPG?
- What else?

Underutilised materials

Concerns raised

- Recycled materials – C&D waste
- In situ foamed bitumen stabilisation
- Bitumen stabilised limestone
- Lime stabilised subbase and subgrade
- RAP in stabilised pavements
- Geosynthetics
- High performance materials in addition to EME2
- Permeable concrete & asphalt pavements
- Saline water for construction.

Examining current MRWA and other state practices

Underutilised materials

- Recycled materials – C&D waste
  - WA cracking concerns (even as use as subbase)
  - Consider developing assessment framework for approval of CRC suppliers (process control and QC focussed)
  - Investigate performance of C&D materials with higher percentages of mixed waste (ceramics, rubble, glass)

- In situ foamed bitumen stabilisation
  - MRWA currents lacks FBS basecourse spec
  - Austroads process being developed (based on QLD practice)

Underutilised materials

- Bitumen stabilised limestone
  - MRWA only agency placed to use it
  - Current deflection requirements discourage use
    - Can these be relaxed
  - Evidence that old BSL carries high traffic loads now
    - Can new BSL carry high traffic loads now?

- Lime stabilised subbase and subgrade
  - MRWA conservative c.f. other states
  - New Austroads Part 2 will include structural contribution of lime stab.

- RAP in stabilised pavements
  - Others use RAP in asphalt
  - Maximise its use in premium materials

Underutilised materials

- Geosynthetics
  - Other than crack inhibition, use is limited
  - Current QLD research work examining effect on pavement thickness
- High performance materials in addition to EME2
  - Still working on it
- Permeable concrete & asphalt pavements
  - Being used in low traffic applications
  - Other states not considering use for high traffic levels
- Saline water for construction
  - MRWA has an established (documented) process

Structural design issues

Coming up next!

Questions?