Use of Recycled Construction and Demolition Waste - A Main Roads Perspective

Municipal Waste Advisory Council Workshop
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Recycled Materials used in MRWA Road Construction

- In situ pavement rehabilitation
- Recycled pavement materials in subbase
- Crushed Recycled Concrete in subbase
- Recycled asphalt (RAP) in FDA asphalt
- Recycled rubber tyres in bitumen sealing
- Recycled plastic & tyres in guideposts
- Recycled glass in road marking paints
- Silica fume in S50M mass concrete
Current Research

- Main Roads Western Australia
  - Monitoring and evaluation of pavement trials
- Western Australian Pavement Asset Research Centre (WAPARC)
  - Performance of Recycled Asphalt Mixes
  - Waste Authority and MRWA joint 2013 project evaluating opportunities to increase use of C&D Waste in road construction
- Curtin University
  - Separate research project into improving Crushed Recycled Concrete blends

Crushed Recycled Concrete

- Good material for subbase under FDA
  - Replaces costly or sparse alternative materials
- Caution: do not regard CRC as unbound
  - Cement in CRC is still active
    - => Gains strength and stiffness over time
    - => Risk of shrinkage and fatigue cracking
  - Risk is not identified in standard UCS test
  - MRWA does not permit as basecourse
  - If used as basecourse on low traffic roads, apply geofabric reinforced seal
CRC Specification Status

- CRC Specification 501.92 temporarily withdrawn pending asbestos resolution
- Public Health Advisory Committee established to assist implementation of new DEC Guidelines into MRWA projects
  - MRWA will initially use CRC on Alliance projects under Committee’s guidance
  - Committee will resolve how to implement CRC Specification for general usage
CRC Asbestos Issues to Resolve

- Acceptance Criteria of 0.001% maximum
  - AS4964 cannot be NATA certified to 0.001%
  - Targetted sampling versus random sampling
- Independent end product audit testing
  - End product testing arranged by supplier
  - System and process audits by DEC
  - MRWA also requires end product audit testing by independent asbestos expert
- Stockpile rejection if any test >0.001%

Other CRC Specification Issues

- Criteria must reflect proven CRC
  - Add a minimum concrete content
  - Add allowable additives & fillers content
  - Consistency of material blends and properties
- Source materials must be inert
  - Test for and prevent contaminants
- Extend C&D materials specifications?
  - Criteria for asbestos / contaminants in recycled sand and recycled drainage rock
Discussion Points

- Asbestos content: max 0.001% or none?
- Consistency of material blends in CRC
  - Minimum 85% concrete as per VicRoads?
  - Register mix design (including fillers)?
- Controls to ensure no contaminants (e.g., chemicals) enter the CRC process
  - Testing to confirm materials are inert?
- Prequalification system and product audits
- Industry input welcome