



Unlocking the Use of Crumb Rubber in New Zealand

Quick Update of Draft Review Report



Acknowledgements

- Waka Kotahi NZ Transport Agency
- Ministry for the Environment
- Waste Management NZ Limited
- Fulton Hogan
- Higgins
- Rubber Solutions
- Scion
- Z Energy
- Australian Asphalt Pavements Association
- Tyre Stewardship Australia

Background

- Follow up on the NZTA Research Report 578 (2015)
- Focus:
 - Supply
 - Technological barriers
 - Specifications and legislation
 - Australian practice
 - Performance benefits and whole of life costs
 - Environmental effects

Supply

- Crumb rubber in roading
 - Use As an aggregate replacement
 - As a modifier of bitumen
- Tyre availability
 - ~70,000 tonnes of end-of-life tyres (ELTs)
 - Landfilled, exported, or tyre-derived fuel (TDF)
 - Waste Management NZ, Golden Bay Cement funded by Waste Minimisation Fund
 - What about crumb rubber?
- Crumb rubber supply in NZ
 - Rubber Solutions in Upper Hutt – 1,500 tonnes p.a. – tyre retreads ONLY
 - \$5-10M capex for a crumbing plant

Technological barriers

- No barriers apart from resources required by the industry to gear up
- Move towards emulsion – A potential show-stopper for application in chip seals
- Knowledge gap exists in benefits, if any, of using different forms of ELTs as:
 - Sealing aggregates
 - Aggregate in pavement layers

Specifications and Legislation

- Existing NZTA specifications do not prohibit nor permit the use of crumb rubber
- Current performance based material specifications can be revised to include standard test methods for crumb rubber, crumb rubber modified binders and mix
- Government legislation
 - Priority product stewardship scheme
 - National Environmental Standard (NES) for outdoor storage of tyres
 - Other NES for air and water quality

Review of Australian Practice

- Existing specifications for use of recycled materials
 - Experience with crumb rubber dates back to 1970s
 - Efforts to harmonise specifications
- Increasing crumb rubber use
 - Tyre Stewardship Australia (TSA)
 1. Industry bodies and research organisations – R&D to create demand
 2. State and Local Government to trial and demonstrate benefits
 3. Federal Government to enable supply
 - Funding to address odour and emission concerns
- Different levels of waste levies collected

Performance Benefits and Whole-of-Life Costs

- Asphalt
 - Appropriate modification by crumb rubber do provide performance benefits over unmodified mixes
 - Key is to demonstrate that it can compete against other polymer modified products
- Chip seals
 - Field evidence of crumb rubber modified chip seals' performance is unclear
 - Comparison against polymer modified products to justify the economic case

Environmental Effects

- Emission and worker concerns
 - Increased emission and thus concerns for the safety of workers and immediate surrounding. However, the detectable levels are still well within acceptable thresholds
- Leaching concerns
 - Zinc and other heavy metals may be leached out of bare crumb rubber
 - Most of the studies to date focused on leaching problems of disposed ELTs
- Recyclability
 - Studies from California US and Australia have shown the crumb rubber modified asphalt can be recycled

Summary

- Potential solution in TDF but merits exist in crumb rubber use in roading as alternative high-volume end-market
- Supply remains an issue but success stories from Australia and abroad are showing a way forward
- Economics remains a barrier... but government initiatives can remove this
- Road industry, with government's support, can demonstrate and work through operational issues
- Further research and field trials will help answer questions relating to environmental impact of its use

Draft Recommendations

1. Commitment by the NZTA to use crumb rubber modified binders in place of or in addition to SBS polymer modified binders
 - Additions or modifications to binder specifications to explicitly allow crumb rubber binders as an acceptable option
 - Investigation of a specific crumb rubber binder specification or at least a crumb rubber material specification
 - Promotion and education of the industry about the technology

Draft Recommendations

2. Funds to invest into the use of crumb rubber modified binders, so that the product is competitive against SBS polymers or other alternatives
 - A user-pays levy on tyres via the proposed Product Stewardship Scheme
 - Central and local government being prepared to pay a premium for crumb rubber modified binders
 - Investment into capital equipment

Draft Recommendations

3. Demonstration of the performance benefits through controlled field trials or testing
4. To address the implication of emulsification of crumb rubber modified binders and open up chip seals as an end-use market
 - Further research needs to be undertaken to determine if practical technologies suitable for use in New Zealand are available for the emulsification of crumb rubber

Draft Recommendations

5. Assessment of the relationship of the levels of emissions and leaching expected from crumb rubber use in road surfacings and relevant New Zealand regulations and environmental guidelines
6. Assessment of the potential effects of odour emissions from crumb rubber binders on existing resource consents for asphalt plants
 - Trial the effectiveness of odour suppressants and other technologies such as warm mix additives to reduce odour

Draft Recommendations

7. Evaluation of the recyclability of crumb rubber modified road surfacing material
 - Following up international studies as well as conducting local trials

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Thank you

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