



Experience with Pavement Recycling on Volcanic Subgrades

Matthew Thrush
Opus International Consultants, Taupo

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The Project

- **Area Wide Treatments**
- **Design 2003**
- **Construction 2003/04**

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The Site

- 700m section SH5 Napier-Taupo
- **Mode of Failure**
 - Cracking
 - Flushing
 - Rutting
- **Original 1950s construction (with repairs)**
- **Built on a fill**

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Investigations

- **Testpits**
 - Thick existing seal layers
 - 220mm greywacke AP65
 - Pumice sand subgrade
- **FWD**
 - Deflections average 2.1mm
 - 85%ile 2.5mm
 - Range 0.8mm to 3.2mm

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Design

- APDG 1992 / NZ Supplement May 2000
- Precedent Method
- Subgrade Model
 - Vertical modulus 10CBR, horizontal 5CBR
- No sub-layering required
- 100mm overlay with TNZ M/4
- Cement modify 2%, recycle to 250mm

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Construction

- Constructed in two 350m sections
- Direct water injection
- Dacite basecourse ex Tauhara
- Sealing soon after compaction
- Target densities not established
- Some density measurements not done
- Wet weather

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Problems

- Within 6 months ruts noticed up to 20mm, in discrete areas
- Ruts now widespread, typically 20mm to 25mm
- Cracking and pumping of fines
- Several post-construction testpits dug
- Pavement in wheeltracks is not well cemented

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Issues/Points for debate

- Enough protection for subgrade?
 - No clear evidence of subgrade deformation
- Design for subgrade strains?
 - Resulting pavement extremely thick
 - Upper limit for subgrade strain?
- Issue with materials?
 - Lack of “fine fines”
 - Material complied with TNZ M/4
- Was sufficient compaction possible?
 - Particularly for this material

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Suggestions for Change

- Use of repeated load triaxial testing to determine durability (even for M/4)?
- Develop new relationships for sub-layer moduli on volcanic subgrades?
- Cap allowable subgrade strain (as % of Austroads strain criterion)?

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