Unsealed Metaling Trials in the Mackenzie District

SCOTT MCKENZIE – ROADING MANAGER
Mackenzie District Overview

- Road classifications
- Network size.
- Wide range of conditions.
- Changing land use.
- Tourism Growth.
Climatic Conditions
Historic Maintenance

- 3 Graders full time on the network, in the latter years reducing to 2 on a (4 weekly cycle).

- Straight run AP20 historically used (river or pit source).

- Maintenance Spreads favoured over wearing courses

- Fine glacial moraine silts blended.

- Silty/clay spread up to 100mm to aid in the reuse of metal in couple of areas.
- 1 Grader on a 6 weekly cycle using continuous compaction (via walk ‘n’ roll system).

- Sandvik 2000 system.

- Grading cycles are outlined in our maintenance contract.
Material Today

Standard Metal
- AP20 silty/clay blend
- AP20 pit run

Metal Trials
- Weathered (Rotten) Rock
  - Raw Source
  - Crushed
  - Crushed & blended
The Reason for Trials

- AP20 silt/clay mix not performing as well as it could in some areas.

- AP20 silt/clay mix can only be manufactured, carted or spread weather dependant.

- Fines being lost, resulting in the existing material being unusable.

- Maintenance grading continually required & increasing.

- Standard metal ravelling under higher traffic volumes.
The Reason for Trials

- Dust issues in summer months given strong northwest winds and traffic volumes.

- Innovation – looking to better our maintenance and reduce defects in conjunction with our maintenance contractor

- Cost efficiency - Best whole of life cost
Historic Trials

- Mount Nessing Road – Golf Course (dust)
- Hamilton Road
- Haldon Road – Off end of seal in populated rural areas (dust & maintenance)
- School Road
- Nixons Road
- Braemar Road – Rural areas where varying sources trialled. (maintenance)
- Rollesby Road
Trial Materials
Trial/ Unsealed Performance

- Levelling sites established (cross section across road) fixed datum established.

- Monitored bi-monthly by our maintenance contractor.

- Measurements taken using a laser level.

- Results/ Levelling run recorded in an excel spreadsheet.
Trial/ Unsealed Performance

Braemar Road
- Ordinary Maintenance Metal

Braemar Road
- Weathered Rock Maintenance Metal
Rock Source Test
Trial 1

- Wearing Course 100mm with entirely weathered rock crushed to AP40

Clayton road
Trial 2

- Reusing Maintenance Material which has lost its fines

Lilybank Road
Trial 3

- AP20 and weathered rock trial through crushing plant
Trial Material Test Results

**PARTICLE SIZE ANALYSIS**
(NZS 4407:2015, Test 3.8.1)

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<th>Sieve Size (mm)</th>
<th>% Passing (by mass)</th>
<th>Contract Specification</th>
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Note: The percentage passing the 71µm test sieve was obtained by difference.

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Trial Issues

- Slippery when wet when first laid.
- Defects form if good cross fall shape lost.
- Increased costs due to cartage and winning material.
- Hardness of the rock material.
- Not always available close by.
- Complaints about vehicles been made dirty when it is damp.
Trial Benefits

- Very minimal to no dust
- Reduced Maintenance Cost
- Higher Resilience
- Good stone mosaic running surface
- Better interlock
- Self healing
- Reuse unusable material
Future Trials

- Chip sealing of weathered rock material
- Further crushing trials varying sizes of material
- Trial alternative weathered rock sources
- Spreading a clean running course material over wearing courses.
- Explore stabilising options.
Conclusion

- We will continue to look for further weather rock sources, enhance blended and continue material trials.

- The primary material is likely to remain a crushed blended AP20 given availability and accessibility.

- Weathered rock it is not likely that it will be used on the entire network given the material sources are currently limited.

- We will continue to use of weathered rock material on our network assessing sites on a case by case basis.