The Wairoa Experience:
Making the most of what we’ve got

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Unsealed Roads in NZ

NZTA – Network Statistics 2007

- 32,4730km of unsealed roads in NZ
- Over 35% of the total NZ roading network
- Wairoa District network is 69% unsealed
Wairoa District – “our Asset”

268km sealed
606km unsealed
WDC Aggregate Resources

Quarries and Gravel Pits in Wairoa

Legend
- Limestone Mulch
- Red Mulch
- River Mulch
- Rock Products
- State Highway
- Local Roads
- Lakes and rivers

Note:
- Sedimentary Geology
- Alluvial Deposits
- Limestone Formations
WDC Aggregate Resources

Alluvial deposits (Active River)

River Metal

- Formed Outside District
- High Quality Greywacke
- Limited use Unsealed Pavements
- Resource Facing Depletion
WDC Aggregate Resources

Alluvial deposits (Ancient River Terraces)
Red metals

- Predominate Use in Unsealed Pavements
- Good Source Properties, Highly Plastic
- Relatively Abundant but Finite Resource
WDC Aggregate Resources

Land Based (Limestone)

- Variable Historic Use
- Gaining Favour through Trials
- Low Crushing Strength High Binding
Blending WDC Aggregates

Red Metal / River Metal

• Q.R.S has been Blending for More than 10 Yrs

• All Season Applications
Blending WDC Aggregates

Red Metal / Limestone

• Blending via Application of a Limestone
• Blended in Stockpile and Applied to Pavement
• Grading and Compaction Essential
• Pavement Prone to Scour
WHAT WE ARE LEARNING…

- Continuous Improvement through Cooperation
- Blending Aggregate produce better Pavements
- Bound Pavements preserve local Resource
Wairoa District Loss of Metal

“unsealed roads lose metal”

This occurs through:

1. Weather impacts (scour/wind etc)
2. Traffic attrition
3. Grader operations
4. Stock movement

Do less is best !!
Attrition / Loss of Metal

Metal Loss Model Studies

![Graph showing roughness progression and alternative strategies.]
Case Studies – Alternative Metals

Waireka Staircase – Blended Metals Trial

18 months before first grade

Constructed 25 June 2001 - Blended AP40 Red 25%, AP40 River 25%, AP20 Limestone Kokohu 50%

v.p.d 32
HCV 46%

Unravelling @ 11 months,
Limestone reapplied Jan03
Hereheretau Rd – AP65 Limestone Trial

AP65 Limestone + 30mm fines

v.p.d 70
HCV 10%

1st flat site – potholed!
Added metal for shape

Good skid - resistance

Constructed 22 Apr 2002
one grade in March 04

22 4 2002

19 11 2002
Okare Station Hill – AP40 Limestone Metal Trial

Rounded River Metal caused Frequent traction problems

v.p.d 34
HCV 16%

@ 28 months old
4 months after
1st grade

Constructed 21 Mar 2002
one grade in March 04

@ 18 months & no grading
Case Studies – Alternative Metal PROBLEMS

- AP65 Limestone – Trial & error!
  - Stone size retains strength, great interlocking for traction and HCV loads
  - Weathering of fines creates “rough ride”
  - Cant grade this surface

NB: pavement still there
Case Studies – Alternative Metal PROBLEMS

- AP40 Limestone – Trial & error!
  - weak, breaks down, stiffen clay subgrade
  - build up of fines makes slushy surface
  - ‘rilling’ from run-off formed in hard surfaces
On-going Studies – Alternative applications

- Loose spread application of AP40 Limestone
  ~ on ‘bony’ areas

- Reject chip application
  ~ on ‘slushy’ areas (WIP)

- On-site blending of Red (or River) & Limestone
  ~ load for load to reduce double handling at quarries + cartage
Conclusions of the Wairoa Experience

- Get buy-in (i.e. local ownership etc).

- Know what you’ve got - and how much.

- Understanding how it behaves and manage accordingly = risk opportunity!

- Site specific treatments to suit ‘environment’.

- Modifying aggregates works.

- Bound sealed roads need less - is best.
Wairoa “Making the most of what we’ve got”

Thank you

QUESTIONS?