Calcium Magnesium Acetate as a de-icing/anti-icing agent on local authority urban roads in Dunedin

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Introduction

Winter maintenance activities in Dunedin are quite extensive due to the geographical location. Winters here involve many frosts that require reactive maintenance to ensure road user safety.

- Dunedin City Council is actively seeking to enhance its winter maintenance programme with the use of CMA.
- This presentation is in two parts:
  - Strategic Planning
  - Fred Coralde, Dunedin City Council
  - Operational Aspects
  - Paul Howard, Downer EDi Works
STRATEGIC PLANNING
Why bother?

- current policy working perfectly
- rate payers do not know
- is it worth trying?
Council’s approach

• roads are narrow and rolling
• improve the levels of service
• increasing road safety awareness profile
• long term LTCCP strategy
The 2006 trial

- resource consent
- roads affected
- the strategy
The result.....

• public initial perception
• the positive ‘buying-in’
• environmental report
• the disadvantages
Strategy developed

- trial continuity
- the expansion strategy
- desired outcome
OPERATIONAL ASPECTS
CMA vrs Grit

- Calcium Magnesium Acetate – de-icing/anti-icing agent applied in pellet form or dissolved to form a liquid (common in NZ).
- CMA as an anti-icing agent remains active on the road for up to five days weather permitting.
- CMA allows forward planning and is safer to apply in dry conditions.
- CMA is visually difficult to detect so driver confidence lowers.
- Grit is a cheaper raw material (low initial capital).
- Grit used historically as a mechanical prevention to skidding on ice.
- Grit is a reactive treatment and is very abrasive to road markings it also needs to be collected or will fill mudtanks.
Objectives

- Meet the needs of the Dunedin City Council
- Improve knowledge of CMA abilities and applications
  - lower PSV chip
  - urban environment, lower speed, alignment.
Methodology

- Vehicle was a Toyota Corolla fitted with a Vericom VC3000, ABS system disabled.
- Tyre size, type and pressure recorded.
- Vehicle speed was 30km/hr.
- Selected sites were:

<table>
<thead>
<tr>
<th>#</th>
<th>Location</th>
<th>Surface</th>
<th>Slope (deg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Stevenson Rd</td>
<td>Mix 6 Asphalitic Concrete</td>
<td>1.7</td>
</tr>
<tr>
<td>2</td>
<td>Stevenson Rd</td>
<td>Type 2 Slurry Seal</td>
<td>2.1</td>
</tr>
<tr>
<td>3</td>
<td>Stuart Street</td>
<td>Mix 10 Asphalitic Concrete</td>
<td>7.1</td>
</tr>
<tr>
<td>4</td>
<td>Three Mile Hill</td>
<td>Second Coat seal (Gr4) – Worn, in good condition</td>
<td>0.3</td>
</tr>
<tr>
<td>5</td>
<td>Three Mile Hill</td>
<td>Second Coat seal (Gr4) – Worn, flushed areas</td>
<td>0.3</td>
</tr>
<tr>
<td>6</td>
<td>Taeiri Rd</td>
<td>Two Coat seal (Gr 4/6) – Worn, in good condition</td>
<td>5.9</td>
</tr>
</tbody>
</table>
Methodology  continued

- Sites selected based on surface type and location.
- Sequence of testing:
  - an untreated state
  - after gritting (road then swept)
  - immediately after CMA application
  - post CMA application, after drying.
- Locked Wheel Braking (LWB) used as test method.
- NZ Police driver and Police measuring equipment used.
The Setup
Conclusion

- Grit significantly increased average stopping distances.
- The increase in stopping distance was more significant on the finer textured asphalt and slurry surfaces.
- CMA (post application) performed better on average than grit.
- CMA (dry) performed better on all surfaces than a dry untreated road.