Managing unsealed road dust in NZ

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What do we know?

Road dust can have significant local effects

- Approximately 64,400km sealed and 30,900 km unsealed roads in NZ
- Nearly all NZTA roads are sealed
- Greatest length of unsealed roads in Canterbury (followed by Otago, Southland and Northland)
- Most recent 9 yrs 1,400km reduction in unsealed road length
- Greatest distance travelled by unsealed road in Northland followed by Canterbury, Otago and Southland
- Largest number of “buildings” next to unsealed roads also in Northland followed by Canterbury, Otago and Southland
- Large proportion of TSP in road dust
- Exceedances of NES near unsealed roads
- Potential impacts on health, amenity, and land productivity
Responsibilities

Unsealed roads are in local road networks

• Management of unsealed roads – local council responsibility
• Funded through rates
• NZTA provides co-funding
• Councils must prioritise against a range of other factors
Funding/implementation

Local councils manage local network with funding assistance from NZTA

- Local councils can receive funding for road dust mitigation
- Eligible under ‘maintenance activity’ classes
- Options could include dust suppression or sealing
- Assess using least cost whole of life net present value
- Funded either:
  - Within existing allocated budget; or
  - Through cost scope adjustment
- Funding assistance is at rate relevant to the Council concerned
Criteria for funding

Based on effects and exposure

- Number of vehicles – HDV and LDV (total up to 8 points)
- Speed of vehicles – HDV and LDV (total up to 4 points)
- Number of dwellings per km (total up to 5 points)
- Other sensitive locations e.g. schools/maraes, ecologically sensitive areas, horticultural areas (total up to 6 points)
- Type of topography (up to 2 points)
- Rainfall (up to 2 points)
- Logging activity and duration (up to 2 points)
## Decision making
Based on effects and exposure

<table>
<thead>
<tr>
<th>Total dust risk score</th>
<th>Dust risk category</th>
<th>Potential benefit from dust mitigation</th>
<th>Action to be taken</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 to 9</td>
<td>Low</td>
<td>Little or no benefit from mitigation.</td>
<td>End of decision-making process.</td>
</tr>
<tr>
<td>10 to 19</td>
<td>Medium</td>
<td>There may some benefit from mitigation.</td>
<td>Return to and repeat the ‘Site dust risk factors and scores’ with refined site-specific information.</td>
</tr>
<tr>
<td>20 to 29</td>
<td>High</td>
<td>There is likely to be a benefit from mitigation.</td>
<td>Complete assessment of suitable mitigation options.</td>
</tr>
</tbody>
</table>
NZTA mapping of road dust risk

Trial completed
- National risk assessment / cost
- Preliminary identification/prioritisation of risk areas regionally
- Refinement of risk scores

Next steps
- Refinement of building type (dwelling vs farm building) and speed parameters
- Add dust emissions model?
- Add dust exposure model?
- Include social (health) cost?
NZTA mapping of road dust

Risk score distribution

Distribution of risk scores

Distribution of risk scores
NZTA mapping of road dust

Funding implications

Distribution of risk scores

Top 5%
1200 km of sealing
~ $300 million
## Mitigation options

Based on traffic volume, weather, road construction, and how long mitigation is required

<table>
<thead>
<tr>
<th>Mitigation option</th>
<th>Suitable traffic volume</th>
<th>Longevity of the dust mitigation option</th>
<th>Rainfall frequency and intensity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sealing the road</td>
<td>High – unlimited</td>
<td>10+ years</td>
<td></td>
</tr>
<tr>
<td>Magnesium chloride</td>
<td>Medium ~250 AADT</td>
<td>Medium – three to four months</td>
<td>Duration of effectiveness is reduced in high rainfall areas. Roadway can become slippery.</td>
</tr>
<tr>
<td>Lignin sulphate</td>
<td>Light &lt;100 AADT</td>
<td>Short – requires frequent refreshing</td>
<td>Duration of effectiveness is reduced in high rainfall areas.</td>
</tr>
<tr>
<td>Synthetic polymer emulsions</td>
<td>Light &lt;100 AADT</td>
<td>Short – requires frequent refreshing</td>
<td>Duration of effectiveness is reduced in high rainfall areas.</td>
</tr>
</tbody>
</table>
Mitigation options

Based on traffic volume, weather, road construction, and how long mitigation is required.
Mitigation benefits – health and maintenance

Fines (dust) retention can reduce unsealed road maintenance

Loss of fines (as dust) on an untreated road

Stable fines preservation on a treated road
Issues with funding

Not much take up of funding….

• Possible issues with criteria
• Local funding has competing interests
• Potential issues with communication/understanding of impacts