Data Requirement for Unsealed Roads

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Research Background

International Practice

Outcome from Industry Workshops

Next Steps
To comprehensively understand the data needs are from local councils who are managing unsealed roads. In particular, the team need to know:

- What are the maintenance drivers on unsealed roads
- What part of the decision-making process causes some difficulty for local councils
- How comprehensively do they currently report on unsealed roads
- What data do they currently collect, what is it used for and what value do they get from it
- How do they plan maintenance for the respective road categories
## International Practice

<table>
<thead>
<tr>
<th>Country/Region</th>
<th>Reference</th>
<th>Condition Data Approach</th>
<th>Other Items Assessed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Australia</td>
<td>Giummarra, 2009</td>
<td>Two-level approach with minimum performance data requirement including:</td>
<td>Dust, Drainage, Safety</td>
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<td></td>
<td></td>
<td>- Level of Service (LoS) - roughness</td>
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<td></td>
<td></td>
<td>- Structural – Cross fall and profile</td>
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<td></td>
<td></td>
<td>- Gravel thickness</td>
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<td></td>
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<td>Advance level goes into specific defects</td>
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<td>South-Africa</td>
<td>Jones et al., 2003</td>
<td>A five-point rating of over-all quality items such as gravel quality and quantity.</td>
<td>Moisture, Material type, Dust</td>
</tr>
<tr>
<td>Sweden</td>
<td>Alzubaidi, 2001</td>
<td>Predominantly a visual rating system</td>
<td>Gravel thickness, Drainage</td>
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<tr>
<td>Canada</td>
<td>MTO, 1989</td>
<td>Visual Rating System that is recorded for both the severity and extent of the defects.</td>
<td>Shoulder condition and features</td>
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<tr>
<td>USA- Wyoming</td>
<td>Huntington and Ksaibati, 2010</td>
<td>Comprehensive options between visual rating to automated collection</td>
<td>Maintenance history, Safety, Functional performance</td>
</tr>
<tr>
<td>Namibia</td>
<td>Tekie, 2002</td>
<td>Visual assessments District inspections</td>
<td>Safety</td>
</tr>
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</table>
Dust will become more of an issue for the future

- Legislation is getting more prescriptive
- Or community is becoming more aware
- We starting to understand the health issue better
Summary Literature Review

- There are many publications of different data collection frameworks for unsealed roads, fewer publications document what the data are being used for;
- Evidence suggested that many unsealed roads data collection is predominantly used for short-term maintenance prioritisation, scheduling or compliance (e.g. dust in the mines);
- Two decision frameworks are being favoured including:
  - Decision algorithms that take account of individual defects for making decisions on maintenance;
  - Converting defects into a composite index that is used for prioritising and assigning appropriate maintenance treatments;
- Few processes and systems aims at optimising resources for unsealed roads. One exception is the World Bank HDM-III, HDM-4 modelling approach that uses sophisticated deterioration models;
- There are interesting measurement techniques, but ultimately the usefulness of the data has to be balanced with the collection cost and effort.
Workshop Outcomes – Current Data Collection

- Roadroid roughness
- Windshield surveys/ Inspections
- Roughthometer
- Traffic counts
- Grader GPS monitoring
- Scanning rutting and roughness
- Various combinations of defect assessed at various frequencies
- Historical expenditure
Workshop Outcome - What information do we need?

- Measured profile
- Source material with date and use of road
- Operational management of routine maintenance with proper monitoring
- Something real time what the shape and condition (roughness)
- Camera technology showing the conditions (LiDAR survey)
Workshop Outcome general Comments

- Good grader operators”
- Training
- Go-pro on graders
- Tool to assist to prioritise the seal extensions
- Like to be more pro-active – before public complaints
- Different LoS across the network similar roads some are sealed other not
- Aggregate binders are expensive
- If there is an approach to save money and deliver LoS
- Tool to assist to prioritise the seal extensions
Next Steps

What do we use the data for?

Decision Process

- SURFACE FACTOR
  - Monthly routine maintenance
- STRUCTURAL FACTOR
  - Periodic maintenance

- Routine maintenance grading cycle
- Aggregate application in conjunction with routine grader and rolling
- Patching in conjunction with routine grading cycle
- Program of resurfacing road to shape and depth
- Winch, pipe and roll surface with or without a spoon depending on budget
- Heavy grading to get shape and width and cut out deep corrugated or potholes

Surface repairs Structural repairs

Data Framework

Performance Monitoring

- Asset management outcome measures
  - Customer outcome
    - Safety
  - Cost efficiency
    - Gravel use
      - Material quality
    - Problem areas
  - Asset preservation
    - Gravel loss
      - Maintenance required