Asset Management
Performance Measures for
Privatized Highway Concessions
in British Columbia

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Outline

1. DBFO Projects in British Columbia, Canada
2. OMR Requirements
3. OMR Output Specifications
DBFO Projects in British Columbia

- British Columbia Ministry of Transportation has embarked on several major highway improvement initiatives.

- All to be delivered within a design-build-finance-operate (DBFO) model.

- Outcome performance based contracts over a 25 to 30 year period.
DBFO Projects in British Columbia

- Development of Asset Management Performance Measures was fundamental to describing the required outcome in terms of Operations, Maintenance, & Rehabilitation

- Ensure that any privately operated public highway deliver service levels that are equal to or better than comparable provincially operated highways.

- Geoplan Opus has been Lead OMR Advisor working closely with Ministry staff since 2002 on all provincial DBFO projects.
DBFO Projects in British Columbia

Sea to Sky Highway Project

- 25 year performance based contract
- $600 million capital + OMR
- 2010 Winter Olympics
- 320 lane-km of highway / 155 major structures
- Status: Awarded and underway

www.seatoskyimprovements.ca
DBFO Projects in British Columbia

Okanagan Lake Crossing Project

- 30 year performance based contract
- Replacement of unique Floating Bridge Structure
- Integral part of transportation system in Kelowna
- Status: Awarded and underway

www.okanaganlakebridge.ca
Kicking Horse Canyon Project

- 25 year performance based contract
- Key highway corridor that traverses thru the Rocky Mountains
- Severe mountainous terrain and conditions
- Replacement of Park Bridge, highway improvements and OMR
- Status: Proponent selected / finalizing arrangements
DBFO Projects in British Columbia

Gateway Program

- Response to the impact of growing regional congestion and traffic demands throughout Greater Vancouver
- Four major highway corridor improvement initiatives to complement other regional road and transit projects
- Pitt River Bridge Design Build project underway
- Focus on Port Mann Bridge / TCH corridor project (330 lane km)
OMR Requirements

Operations, Maintenance & Rehabilitation
OMR Requirements

Scope of OMR Services:

- Routine Maintenance of Highway and Structures
- Rehabilitation of Highway and Structures
- Highway Operations and Corridor Management
- Winter Maintenance
- Avalanche Control and Weather Stations
- Emergency Response and Repair
- Traffic Maintenance and Line Marking
- Electrical Asset Maintenance and Rehabilitation
- Slope Stabilization
- Routine and Incident Inspections
- Record Management and Reporting
- Communications
OMR Requirements

Key Principles:

• Concessionaire is fully responsibility for delivery

• Service levels defined as specified performance measures - min conditions / response times

• Based on best practices review and built upon BCMoT Road and Bridge Maintenance Specifications for routine maintenance

• Desire by BCMoT to “standardize” service delivery across all DBFO projects

• Service levels consistent with adjacent highways

• Asset performance measures encourage good management practices that limit asset consumption
OMR Output Specifications

- Highway Maintenance Specifications
- Asset Preservation Performance Specifications
- Corridor Management Specifications
- Reporting Specifications
- Quality Management
- Local Area Specifications
- End of Term Requirements
OMR Output Specifications

Development History

• Developed over a three year period

• Incorporated best practices from other DBFO highway projects in Australasia, North America and UK

• Developed in extensive consultation and review with BCMoT staff, DBFO Project teams and Proponents

• Future changes to the specifications have to be considered relative to all MoT concessions and implemented by change provisions
OMR Output Specifications

General Specification Structure

Delivery of OMR services is guided by 3 levels of performance measures:

- **Key Performance Measures**
  - focus on key objectives for asset and corridor mgmt

- **Asset Preservation Performance Measures**
  - focus on ensuring sound asset mgmt takes place

- **Operational Performance Measure**
  - focus on day to day serviceability
OMR Output Specifications

Key Performance Measures

Define the principal outcomes in the Management of the DBFO project and delivery of services in the key strategic areas of:

- Asset Preservation
- Corridor Management

Objectives:

- Preserve the current value of assets by maintaining structural integrity during the term of the Concession.
- Maximize the reliability, safety and availability of the highway corridor at all times.
Table 2.2.1: Highway Running Surfaces KPMs

<table>
<thead>
<tr>
<th>Item</th>
<th>Key Performance Measure</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Paved Highway Traffic Lanes</td>
<td>• Ensure paved highway traffic lanes are safe (free of hazards) and available.</td>
</tr>
<tr>
<td></td>
<td>• Ensure access at all times for all legal and permitted vehicles.</td>
</tr>
<tr>
<td></td>
<td>• No traffic delays.</td>
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<tr>
<td></td>
<td>• Provide two-way, two-lane access at all times.</td>
</tr>
<tr>
<td></td>
<td>• Provide acceptable riding comfort for Highway Users.</td>
</tr>
<tr>
<td>b. Paved Shoulders</td>
<td>Ensure shoulders are safe and available.</td>
</tr>
<tr>
<td>c. Paved Medians</td>
<td>Ensure medians are fully functional, tidy and free-draining.</td>
</tr>
<tr>
<td>d. Paved Pullouts &amp; Rest Stop Areas</td>
<td>Ensure pullouts and rest stop areas are safe and available.</td>
</tr>
<tr>
<td>e. Paved Entrance/Exit Ramps</td>
<td>Ensure entrance / exit ramps are safe and available.</td>
</tr>
<tr>
<td>f. Paved and Gravel Side Roads</td>
<td>• Ensure gravel side roads are safe and available.</td>
</tr>
<tr>
<td></td>
<td>• Ensure unlimited vehicle usage and access, at all times, for all legal and permitted</td>
</tr>
<tr>
<td></td>
<td>vehicles.</td>
</tr>
<tr>
<td></td>
<td>• No traffic delays.</td>
</tr>
<tr>
<td></td>
<td>• Provide a minimum of two-way, two-lane access at all times.</td>
</tr>
<tr>
<td></td>
<td>• Provide acceptable riding comfort for Highway Users.</td>
</tr>
<tr>
<td></td>
<td>• Ensure minimal dust on gravel roads.</td>
</tr>
<tr>
<td>g. Management</td>
<td>• Ensure inspection, condition survey and updating of the Ministry Highway Pavement</td>
</tr>
<tr>
<td></td>
<td>Management System (RPMS) is complete and accurate.</td>
</tr>
<tr>
<td></td>
<td>• Ensure programming of physical works is complete and based upon long term focus.</td>
</tr>
<tr>
<td></td>
<td>• Ensure best practices and continual improvement are applied.</td>
</tr>
</tbody>
</table>
OMR Output Specifications

Asset Preservation Performance Measures

Sound asset management that guides long term rehabilitation

Defined for:

- Highway Running Surfaces
- Major Structures
- Drainage Structures

Based on:

- Limiting asset consumption
- Achieving design life expectations
- BCMoT condition rating systems
Asset Preservation Performance Measures

Highway Running Surfaces:
- Annual measures
- Surface distress, roughness, rutting
- RPMS specifications

Major Structures:
- Annual and 5 Year measures
- BMIS specifications
- Extensive calibrations

Drainage Structures:
- 5 Year measures
## Asset Preservation Performance Measures

### Example: Structures APPM Hierarchy

<table>
<thead>
<tr>
<th>Structure Sub-Category</th>
<th>Level</th>
<th>Structure Feature</th>
<th>Performance Measure</th>
<th>Intervention Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bridges</td>
<td>1</td>
<td>Components</td>
<td>Component Condition Rating</td>
<td>• Limit Asset Consumption</td>
</tr>
<tr>
<td><strong>Major Retaining Walls</strong></td>
<td>2</td>
<td>Structure</td>
<td>Structure Condition Index</td>
<td>• Serviceability</td>
</tr>
<tr>
<td><strong>Major Culverts and Tunnels</strong></td>
<td>3</td>
<td>Stock</td>
<td>Stock Condition Index</td>
<td>• Limit Asset Consumption</td>
</tr>
<tr>
<td><strong>Major Sign Structures</strong></td>
<td>4</td>
<td>Network Components</td>
<td>Extent of Network Component Condition</td>
<td>• Serviceability</td>
</tr>
</tbody>
</table>

- Bridges
- Major Retaining Walls
- Major Culverts and Tunnels
- Major Sign Structures
OMR Output Specifications

Asset Preservation Performance Measures

Example: Highway Running Surfaces - Roughness

Pavement Roughness Profile - Cumulative Distribution
All Travel Lanes

Conforming Pavement
The pavement is conforming in respect to Pavement Roughness when the limits as set by the distribution curve are met or exceeded

<table>
<thead>
<tr>
<th>Percent Less Than</th>
<th>Average Wheel Path International Roughness Index Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;0.5</td>
<td>Baseline 0%</td>
</tr>
<tr>
<td>&lt;0.6</td>
<td>1%</td>
</tr>
<tr>
<td>&lt;0.7</td>
<td>5%</td>
</tr>
<tr>
<td>&lt;0.8</td>
<td>10%</td>
</tr>
<tr>
<td>&lt;0.9</td>
<td>15%</td>
</tr>
<tr>
<td>&lt;1.0</td>
<td>25%</td>
</tr>
<tr>
<td>&lt;1.1</td>
<td>35%</td>
</tr>
<tr>
<td>&lt;1.2</td>
<td>45%</td>
</tr>
<tr>
<td>&lt;1.3</td>
<td>55%</td>
</tr>
<tr>
<td>&lt;1.4</td>
<td>65%</td>
</tr>
<tr>
<td>&lt;1.5</td>
<td>70%</td>
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<tr>
<td>&lt;1.6</td>
<td>75%</td>
</tr>
<tr>
<td>&lt;1.7</td>
<td>80%</td>
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<td>&lt;1.8</td>
<td>85%</td>
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<tr>
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<td>90%</td>
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<td>96%</td>
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<tr>
<td>&lt;2.3</td>
<td>97%</td>
</tr>
<tr>
<td>&lt;2.4</td>
<td>98%</td>
</tr>
<tr>
<td>&lt;2.5</td>
<td>100%</td>
</tr>
</tbody>
</table>
OMR Output Specifications

Highway Maintenance Specifications

Consistent with BCMoT R&B specifications that cover:

- surface maintenance
- drainage maintenance
- winter maintenance
- roadside maintenance
- traffic maintenance
- structure maintenance
- emergency response

Key differences:

- routine/quantified combined
- caps removed
OMR Output Specifications

Corridor Management Specifications

Managing corridor operations and extends the Maintenance Specifications covering:

- key performance measures
- environmental management
- winter operations
- public relations / customer care
- safety management
- utilities coordination
- line marking
- electrical maintenance
- rest areas
OMR Output Specifications

Reporting Specifications

Documents the OMR reporting requirements for the concession covering:

- Quality and OMR Plans
- 5 Year Mgmt Plan
- Annual AM Plan
- Salt Mgmt Plan
- Monthly OMR Reports
- Asset Condition Reports
- Traffic Accident Reports
- Asset Inventory Data
- Asset Condition Data
- Traffic Data
OMR Output Specifications

Quality Management Specifications

Defines QM requirements for OMR services

- Part of standard QM specifications for design, construction, traffic, OMR and environmental
- Specifications for OMR Quality Management Plan
- ISO certification for OMR services
- Province audit program
- Consistent with existing BCMoT privatized road and bridge maintenance contracts
- QM auditing and performance linked to payment mechanism
Local Area Specifications

Captures requirements that are specific to the concession.

- Maintenance specifications for specific structures, systems
- R&B local area specifications
- Specific asset mgmt requirements
- Landscape maintenance
- Traffic management
- Unstable slope mitigation program
- Landslide management
- Snow avalanche/weather monitoring
- Traffic counting stations
- Specific reporting
OMR Output Specifications

End of Term Requirements

- Define hand-back criteria at end of concession term
- Developed in consultation with BCMoT
- Mandatory compliance with APPM’s and other Performance Measures
- Additional compliance specified criteria for:
  - Highway running surface (remaining service life)
  - Structure component condition
  - Drainage and debris control structures
  - Rockfall catchment areas
  - Avalanche control structures
  - Electrical systems
Questions

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