Bridge Structures Management for Public Private Partnerships in British Columbia (Canada)
- An Operators Perspective

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Summary of Presentation

• Scope of concession highway projects in BC
• Typical concessionaire structure
• Typical requirements
• Our experience
• Conclusions
British Columbia
Concession Highway Projects in BC

- William R. Bennett Bridge - Kelowna
- Kicking Horse Canyon - Golden
- Sea to Sky Highway – Vancouver
- Port Mann Highway 1 – Vancouver
- South Fraser Perimeter Road - Surrey
- Golden Ears Bridge – Maple Ridge
- Massey Tunnel Replacement - Richmond
Concession Highway Projects in BC

- Sea to Sky Highway (300 Structures)
- South Fraser Perimeter Road (100 Structures)
- Port Mann Highway 1 (100 Structures)
- Golden Ears Bridge
- Massey Tunnel Replacement (Proposed)
Typical Concessionaire Structure

- SPV
- DBJV
- OMRJV
- Maintenance Contractor
- Specialist Consultants

Risk flowchart:
- Risk flows to DBJV and OMRJV
- Maintenance Contractor and Specialist Consultants handle risk
Key Performance Measure Requirements

Conditional

Asset Preservation Performance Measures (APPM)

Component
Structure
Stock
Network
APPM - Inspection System

SUBSTRUCTURE
5 Found Movement
6 Abutments
7 Wing Retaining Walls
8 Embankment
9 Footings/Piling
10 Pier Columns/Walls/Cribs
11 Bearings
12 Caps
13 Corbels
14 Dolphins/Fenders

% Condition
APPM - Performance Targets

Network (components) - 50 Criteria
Stock - 1 Criteria
Structure - 2 Criteria
Comp. - 3 Criteria
APPM - Components

- All component
- Average condition of each component
- Three exceedance criteria (starting at “Fair” condition)

**Fair Condition** = “Performing well, some maintenance required”
APPM - Structures

- All structures
- Structure Condition Index (SCI)
- Two exceedance criteria (2.6 and 2.9)

SCI of around 3.5 indicates that a structure is a candidate for replacement.
Average SCI of Structures (Grouped by Age)

Target Average SCI

Actual Average SCI
APPM - Network (Components)

• Select key components
• % of network below condition ‘X’
• Higher thresholds than component APPM

Example:
“No more than 10% of wearing surface in a condition state worse than Fair”
APPM are structured to prevent the Concessionaire from maintaining all components at just above a ‘Fair’ condition.
Annual Management Cycle

Annual Inspections

Implementation

APPM Analysis

Reporting

OMR Planning
Rehabilitation Program Process

1. Condition / APPM analysis
2. Identify / list exceedances
3. Focus on
   - Structure
   - Stock
   - Network
4. End of term requirements
5. Schedule repairs (5 year plan)
6. Identify repairs and rehabilitation
Our Experience

• Design & construction specs. are less stringent than APPM requirements, resulting in APPM Exceedances before handover:
  • Bearings - loss of contact
  • Approach fill settlements
  • Hydrology - skew piers
Our Experience

• Repairs undertaken to address exceedances that would not be undertaken otherwise:
  • Deck soffits - transverse cracks
  • Bearings - loss of contact
Our Experience

• At times the inspection system does not adequately capture safety related risks (*condition vs extents*):
  • We modified the inspection criteria to capture safety related risks
Our Experience

- Timeframe to discharge APPM is typically 12 months which does not facilitate effective management practices:
  - Social impacts
  - Financial impacts
Conclusion

• Structures maintained in better than average condition

• Equity partners now involved on all sides, resulting in better sharing of risk

• End of Term?
  
  • Reliant on concessionaires proving remaining service life in older components using observed condition and theoretical deterioration models
Questions?

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