Challenges in Managing Alberta Transportation’s Pavement Assets

2016 C-TEP Workshop
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Presentation Outline

• Why highways are important to Albertans and our economy
• Challenges we are facing overall in all budgets
• Challenges we are facing with our pavement network
Our Mission / Desired Outcomes

“To provide a safe, integrated, innovative and sustainable transportation system that supports Alberta’s economy & quality of life”

Alberta Transportation’s 2015-18 Business Plan

Desired Outcomes:
- Well-integrated, multi-modal transportation system
- Sustainability & affordability of system
- Safe & secure transportation system
- Support environmental stewardship & quality of life
Highways support Alberta’s Priority on Economy

- $20 billion of commodities are imported & exported using trucks
- Support the efficient movement of people and goods within the province
Challenges Overall

- Major capital investments are needed to provide key infrastructures for economic growth
- Bridge and Road rehabilitation are both underfunded
- Cross-asset investment optimization of limited funding is a challenge
Aging of System:

**Bridge**

- % of bridges by age (Years):
  - 5 years: 15%
  - 15 years: 10%
  - 25 years: 20%
  - 35 years: 25%
  - 45 years: 20%
  - 55 years: 10%
  - 65 years: 5%

**Pavement**

- % of pavements by age (Years):
  - 5 years: 15%
  - 10 years: 10%
  - 15 years: 20%
  - 20 years: 25%
  - 25 years: 15%
  - 30 years: 10%
  - 35 years: 5%
  - 40 years: 5%
  - 45 years: 5%
  - 50 years: 5%

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*Design Life*

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*Note – older bridges designed for shorter service lives, smaller loads*
Challenges for our Provincial Highway Network

- More provincial highways than any other province
Deteriorating condition

- Network continues to deteriorate
  - Poor: 14.6% in 2011 to 16.5% predicted in 2017
50% of our highway network carries 80% of the traffic

Decreasing Function and Priority

Level 1
NHS

Level 2
Arterial

Level 3
Collector

Level 4
Local

% network

19%

31%

36%

14%

% traffic

53%

28%

16%

3%
Overweight loads causes damage
Aged Network Under Funded for Rehabilitation Treatments
Pavement Rehabilitation Deficits

Pavement Management System Output

Year

Network Deficit (km)
Need Year and Consequence of Delaying Treatments

- **Existing Performance**
- **Trigger Level**
- **Loss of Structural Integrity**

- **Alternative 1** (OL-$300k/km)
- **Alternative 2** (Recon-$1.5M/km)
Options to Extend Life of Pavements

PRESERVATION TREATMENT

- Includes treatments from simple crack sealing to conventional overlays and all potential treatments in between

Three Types:

- Reactive Maintenance - activities beyond our control, e.g. repair failures
- Preventative Maintenance - includes routine maintenance and other timely maintenance to extend the life of the pavement
- Structural Preservation - increase the structural capacity
TOOLBOX OF PAVEMENT PRESERVATION

LOW COST
- Crack Sealing
- Rout & Seal
- Spray Patch
- Thermo Patch
- Mill & Fill Cracks
- Skin Patch
- Deep Patch
- Fog Coat

MEDIUM COST
- Micro-Surfacing
- Cold Mill & Inlay
- HIR (Hot In-Place Recycling)
- Seal Coat
- Thin Overlay
- Slurry Seal
TOOLBOX OF PAVEMENT PRESERVATION

HIGH COST

- Structural Overlay
  - 10 Year
  - 20 Year
- Reconstruction

For each treatment application, typical unit cost, service life, condition improvement and limitations are presented in the Guidelines.
SELECTING PRESERVATION TREATMENTS

STRUCTURAL EVALUATION
(20 YEAR DESIGN)

Strong [40mm] → Smooth
PM (Low Cost Preventative Maintenance)
PM M & INLAY HIR
THIN O/L
TWO LIFT O/L

Weak [40mm] → Rough
PM M & INLAY HIR
THIN O/L
TWO LIFT O/L

Medium O/L → Smooth
PM M & INLAY HIR
10 YR. O/L

Rough
M & INLAY HIR
10 YR. O/L
20 YR. O/L
(TWO LIFT O/L)

Thick O/L → Smooth or Rough
20 YR. O/L
(TWO LIFT O/L)
Consequences of Delayed Rehabilitation Funding

- Convert paved highway back to gravel
Other Challenges

Edmonton Ring Road

Northwest
completed 2011
$1,420M

Northeast
under construction
$1,810M

Southwest
completed 2006

Southeast
completed 2007 - $497M
Other Challenges
Other Challenges

- Movement of large vessels
Other Challenges

- Congestion and safety
Other Challenges

• Changing Demographics of Drivers
• Knowledge Management of dept. and industry
• Integration of environmental considerations
Thank You
Questions?