Highway Maintenance & Rehabilitation Practices
Fredericton-Moncton Highway (PPP Development with Province of NB)

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Presentation Outline

• History

• OMM (Operations, Management & Maintenance) Responsibilities
  ➢ Periodic, Routine & Rehabilitation

• Pavement Preventative Maintenance
  ➢ Pavement Management System
  ➢ Crack Sealing
  ➢ Microsurfacing

• Pavement Rehabilitation Projects
  ➢ Surface Treatments (Mill & Pave vs. Overlays)
  ➢ XJB & J-Band Applications used in HMA treatments
Who is MRDC?

Joint Venture comprised of:

- Miller Paving Ltd.
- Vinci (Formerly GTMI)
- Dragados Y Construcciones
- Fomento De Construcciones Y Contratas (FCC)
History

  - 4 lane - 195 km divided highway (Moncton & Fredericton)

- January 1998: Engaged in 30 year Contract
  - Develop, Design & Build (DDB) Contract (Term 1998 to 2001)
  - Operations Management, Maintenance & Rehabilitation (OMM) Contract (Term 1998 to 2028)
Fredericton–Moncton Highway Limits

• RAD 120

• 195 km c/w 20 interchanges & 3 connectors
Construction: 1998 to 2001
Grand Opening: October 2001
150 structures
4 depots
OMM Work Includes...

- Routine Maintenance
- Periodic Maintenance
- Rehabilitation

Staffing: 70 people
Routine Maintenance

- Summer Maintenance
  - Roadside
  - Inspections
  - Grass & Brush cutting
  - Sweeping & Flushing
  - Road Patrol
  - Safety
Routine Maintenance

- Winter Maintenance
  - Snow and Ice Control
  - Road Patrol
  - Safety
Periodic Maintenance …

- Line Painting
- Crack Sealing
- Asphalt Patching
- Re-shouldering
- Slopes
- Bridge and Pavement Inspections
- Minor Bridge Maintenance
- Signs, Barriers & Guide rails
- Re-lamping
Rehabilitation

- Asphalitic Overlays &/or Surface Treatments
- Major Bridge/Structure Maintenance
- Sign Replacement
- RWIS
Pavement Preventative Maintenance

- Pavement Management System
- Crack Sealing
- Microsurfacing
Pavement Management System

1. Visual Inspections

2. Daily Road Patrols

3. Detailed Inspections
   - Surface Distress … SDI
   - Road Roughness … IRI
   - Rutting
   - Strength … FWD
Network Level Condition Survey

- Level of Service for Roads
  - SDI > 7.9
  - IRI < 2.5 m/km
  - Rut < 20 mm
  - FWD < 0.710 mm
Crack Sealing Objectives:

- Preserve service life of pavement
- Prevent intrusion of water and fines from entering cracks
- Seal all cracks before crack severity becomes too high for crack sealing
Types of Cracks to Seal & Not to Seal

Effective

- Longitudinal cracks
- Random cracks
- Transverse cracks
- Reflective cracks
- Construction joint cracks
- All cracking prior to Surface treatments

Not Effective

- Alligator cracks
- Extensive Block cracks
- Cracks located on pavements exhibiting severe levels of surface distress
Considerations for Crack Sealing

- Time of Year (pavement temperatures)
- Transverse cracks exhibit greater movement than longitudinal cracks
- Best conditions for sealant installation during summer

![Diagram showing seasonal changes in pavement contracts and asphalt pavement expansions](image)
How to Treat Cracks?

- **Rout & Seal Operations**
  - Scheduling (spring, summer or fall)
  - Involves routing, cleaning, drying & sealing
  - Material selection (ASTM 6690 Type 2 or 4)

- **Blow & Go Operations**
  - Scheduling (spring or fall)
  - Involves cleaning, drying and sealing
  - Material selection (ASTM 6690 Type 4)
Geometry Configurations

- Blow & Go Operation
- Rout & Seal Operation

Diagram:
- Flush-Fill with Overband
- Reservoir with Overband
Crack Sealing Operations

Traffic Control

Routing

Cleaning & Drying

Sealing
Microsurfacing:

- Preventative Maintenance Measure for extending service life
- Scheduled before road surface becomes too severe and pavements are rated as fair to good
- Can include tack coat, rut fill, scratch coat & overlay coat
- Intended to seal wearing courses
Pavement Rehabilitation Projects

- HMA Surface Treatments (Mill & Pave vs. Overlays)
- J-band/Extruded Joint Bond Applications
Mill & Pave Programs:

• Scheduled when seal surface is unsalvageable

• Require effective cold planning procedures

• Cold plane to depth of intersecting layer

• Asphalt preparation work performed:
  - Cleaning & tacking
  - J-band and/or Extruded Joint Bond
  - Ensure Proper Paving Procedures
Overlay Programs:

• Scheduled when seal surface is deemed fair to good condition

• Pavement structures requires increased strength (bearing capacity)

• Asphalt preparation work performed:
  ➢ Cleaning & tacking
  ➢ J-band and/or Extruded Joint Bond
  ➢ Ensure Proper Paving Procedures
Extruded Joint Bond Application

- Applied as a band along vertical face of cold joint with pumper kettle
- Re-melts, filling voids at the joint improving flexibility, bond and reducing permeability
- Allows the joint to expand/contract relieving stress build-up due to temperature fluctuations
J Band Applications

- Placed under longitudinal joints and over transverse cracks
- Applied 30 to 45 cm wide by 3 mm thick with pumper kettle
- Material re-melts during HMA placement
- Improving joint performance by reducing permeability of mix
## Estimated Service Life (Years) of Treatment

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Good Condition (PSI = 60 to 80)</th>
<th>Fair Condition (PSI = 40 to 60)</th>
<th>Poor Condition (PSI = 20 to 40)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crack Sealing</td>
<td>3 to 5 yrs.</td>
<td>1 to 2 yrs.</td>
<td>N/A</td>
</tr>
<tr>
<td>Microsurfacing</td>
<td>8 to 12 yrs.</td>
<td>5 to 7 yrs.</td>
<td>2 to 4 yrs.</td>
</tr>
<tr>
<td>Mill &amp; Pave</td>
<td>N/A</td>
<td>N/A</td>
<td>10 to 12 yrs (Will improve IRI &amp; SDI)</td>
</tr>
<tr>
<td>HMA Overlays</td>
<td>10 to 14 yrs (Will improve IRI &amp; SDI &amp; strength)</td>
<td>8 to 12 yrs (Will improve IRI &amp; SDI &amp; strength)</td>
<td>N/A</td>
</tr>
</tbody>
</table>
Thank You

Questions ???