Innovative Road Maintenance Treatments

Micropatching with TCM 8000
(Patent Pending)

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Presentation Outline

- Introduction and Background
  - Saskatchewan Road Network
  - Distresses and Treatments
- Need For New Maintenance Treatments
- Micropatching with TCM 8000
  - Mix Design
  - Field Validation
  - Equipment Fabrication
  - Field Performance
- Summary
Introduction and Background
Saskatchewan Public Road Network

Saskatchewan Road Network
Approximately 26 000 km
- Rural Road Class 1 Network (5,000 km)
  - Predominantly AC
- Rural Road Class 2 to 5 Network (21,000 km)
  - AC, Granular, TMS and Gravel
Introduction and Background

Increasing Pressures

- Decreased Aggregate Supply
- Public Level of Service Expectations
- Manufacturing and Economic Diversification
- Aging Infrastructure
- Elevator Closures
- Rail Line Abandonment
- Inflation
- Limited Budgets
- Oil and Gas Prices
- Increased Truck Haul
• TMS roads historically required high maintenance - crews adopted treatments and procedures accordingly
• Presently, not able to sustain TMS system due to increased traffic loading and other pressures
• Consequently, high number of TMS kilometers upgraded to AC and Granular system - trend expected to continue
• Crews have less TMS roads; therefore need new treatments to effectively treat the increased number of kilometers in the AC and granular systems
Treatments

- Major treatments:
  - Overlays, microsurfacing and full seals

- Minor treatments:
  - Machine patching, sand sulfur patching, hand patching, spot sealing, rubber asphalt crack sealing, sandvik blading, etc.
Distresses

- Crews specifically concerned about the following surface distresses
  - Depressed Transverse Cracking
  - Localized Rutting
  - Centerline Cracking
  - Block Cracking / Segregation
Distresses – cont...
Research Goals and Objectives
The Need

**Goal:** *Research, Develop and Implement* more cost effective methods for treating localized surface failures.

**Major Objectives:**
- Development of an effective maintenance treatment focused on treating depressed transverse cracks (DTC), centerline cracking, localized rutting and segregated surface areas.
Classification of Slurry and Micro-Surfacing Mix Systems by Cohesion Test Curves

- Cured Slip Torque
- Early Rolling Traffic
- "Set" Torque

Quick Set - Quick Traffic
Quick Set - Slow Traffic
Slow Set - Slow Traffic

Adopted from Pounder Emulsions Ltd. and modified after ISSA (1990)
Micropatching Mix Design

- Used Type II, Type III, washed Type III and reject aggregate from various sources
- All testing done at the Pounder Emulsions lab in Saskatoon
- Mix ingredients: aggregate, CQS polymer modified emulsion, water, set-retarding chemical and Portland cement
Micropatching Mix Design
Mix Design (cont ...)

[Images of mixes and test samples]
Mix Design – Cohesion
Mix Design – Wet Track Abrasion
Mix Design – Loaded Wheel
Field Validation – Summer 2002
Field Validation (cont ... )
Field Validation (cont ... )
Equipment Design

- Objective: design and fabricate equipment that would allow maintenance crews to mix and apply micropatching mixes to treat various surface distresses.
- Important considerations: mobility, batch production, compact unit, maneuverability, etc.
- Prototype – mostly a trial and error approach at first. From vague idea to sketches on a paper napkin to 3-D modeling.
Equipment Fabrication
Equipment Fabrication (cont ...)
Equipment Fabrication (cont ...)
Transverse Crack-filling Machine (TCM) 8000
Micropatching
Micropatching (cont ...)

2.21.2003
Micropatching (cont ... )
Micropatching (cont ...)
Field Performance
Field Performance (cont ...)

[Image of a large piece of machinery on a road with a date stamp of SEP 14 2004]
Field Performance (cont ... )
Field Performance (cont ...)

![Road Images]

- Images of a road with potholes and cracks, indicating poor field performance due to aging or maintenance issues.
Performance Monitoring - After 2yr
Performance Monitoring - After 3yr
Micropatching with TCM 8000: Pros and Cons

• **Pros:**
  • alternative treatment for cracking, segregation and localized rutting
  • Effective, efficient and flexible
  • environmentally “friendly” (no heat required)

• **Cons:**
  • testing to determine the “right mix”
  • aggregate availability and setting time
Micropatching with TCM 8000

• Due to interest generated for this technology in Canada and the United States, the Department has recently sold the licensing rights of TCM 8000 to WRT Equipment Ltd. from Saskatoon.

• WRT Equipment Ltd. will have TCM 8000 equipment available commercially in summer of 2006.
Thank You !!!

Questions?

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