INNOVATIVE MATERIAL SYSTEMS FOR THE SUSTAINABILITY OF RIGID AND FLEXIBLE PAVEMENTS

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Preservation

**Identify**
- What
- Where

**Quantify**
- How bad is it bad?
- Future progression & effects

**Solve**
- Cost-effective solutions
- Exceed design life
Pavement Preservation Program

- Establish specific goals of the program
- Set performance levels to determine the effectiveness of the program
- Identify elements to receive preservation treatments
- Determine materials/treatments specific to each element (cont)
Pavement Preservation Program

- Program treatment cycles
- Determine the effectiveness of the materials and treatments
- Modify Preservation Program (materials/treatments) if necessary
Preservation Treatments

- Joints
- Partial and Full Depth Concrete Repairs
- Surface Treatments
Joints
Pre-formed Seal Silicone
Joints
Pre-formed Polymer Foam
Joints
Pre-formed Compression Seals
Joints
Polyurethane Elastomeric Headers
Joints
Methyl Methacrylate Headers
Joints
Preservation and Repair

- Annual inspection and cleaning of debris
- Re-apply adhesive on un-bonded locations
- Remove and replace joint sections that are torn or perforated
- Maintain headers and joint bonding surfaces.
Partial and Full Depth Concrete Repairs Materials

- **Portland Cement Concrete**
  - 28 Day Cure
  - Curing Compound (Wet Cure)

- **Fast Setting Concrete**
  - 1-4 Hour Cure
  - Wet Cure

- **Polymer Concrete**
  - 1 Hour Cure
  - Dry Cure
Proper Repair Procedure

- Determine the extent of the repair area
  - Chain drag
  - Hammer sounding
  - Ground penetrating radar
    - (GPR)

- Preparation
  - Saw cut perimeter
  - Jackhammer damaged area (30lb max)
  - Sand blast reinforcing
  - Clean with dry compressed air
Proper Repair Procedure

- Mixing/Placing of Repair Material
  - Mixing equipment
  - Vibration
  - Finishing

- Curing
  - Wet cure
  - Curing compound
  - Dry cure
Preservation Considerations

- Deterioration Can Expand Very Quickly
- Public Serviceability, Opinion and Safety
- Rehabilitation and Replacement is Expensive
- Preservation Treatments are Cost Effective
- Preservation Treatments Extend Serviceable Life
Surface Treatments

- Surface and Crack Sealing
- Wearing Surface
  - Skid Resistance
  - Waterproofing
  - Wearing Surface
Treatment Timing

- When is the Best Time to Seal Surfaces and Cracks
  - New Construction/Rehabilitation
  - Existing Decks with Cracking
  - Decks with Cracking and Extensive Spalling
Rigid Pavement Sealing Materials

- Silane and Siloxane water or solvent based (percent active solution)
- Linseed Oil
- Methyl Methacrylate & High Molecular Weight Methacrylate
- Low Viscosity Epoxy
Material Characteristics

- Silane/Siloxane/Linseed Oil
  - Make surface porosity and smaller cracks hydrophobic
  - Will not seal larger cracks
  - Must be re-applied to decks to maintain effectiveness
  - Low initial cost
  - Easy to apply
Material Characteristics

- Methyl Methacrylate, High Molecular Methacrylate, Low Viscosity Epoxy
  - Seal surface porosity and cracks
  - Good penetration into cracks and seal with cured material
  - Reapplication not required
  - Higher cost
  - Easy to apply
Surface Treatments

- Protect pavement deck from intrusion of moisture
- Reduce corrosion potential (reinforced pavement)
- Increase skid resistance
- Easily maintained
- Low initial cost
- Long service life
Rigid & Flexible Pavement Surface Treatments (HFS)

- Epoxies
- Application Methods
  - Broom and Seed (1/8”)
  - Specialized Mixing Equipment
  - Standard Labor and Tools
Rigid Pavement Surface Treatments

- **Very Thin** (1/4” – ½”)
  Methyl Methacrylate and Epoxy
  - Dead load 3 – 4 lbs/ sq ft
  - Service life approx 20 years

- **Thin** (3/4” – 1 ½”)
  Polyester and Latex Modified Concrete
  - Dead load 17.5 lbs/ sq ft
  - Service life approx 20 years
Epoxies (1/8”-3/8”)
Application Methods

- Slurry/Broom & Seed
- Mechanical Mixing Machines
- Standard Labor and Tools
- 2-6 Hour Cure
Methyl Methacrylate (1/4”-3/8”)
Application Method

- Slurry Application
- Mechanical Mixing Machines
- Standard Labor and Hand Tools
- 1 Hour Cure
Polyester (3/4 - 1 1/4”)
Application Method

- Resin/Aggregate Mortar
- Special Mixing Equipment
- Vibratory Screed (Compaction)
- Tine Surface Profile
- 2 Hour Cure
Latex Modified Concrete (1 ¼” - 2”) Application Method

- Cement/Aggregate/Liquids
- Special Mobile Mixer
- Finishing Machines/Vibratory Screed
- 3 Hours VESLMC
- 7 Days LMC
Good Preservation Program
Expected Results

• Proactive Treatment Schedule
• Slow Pavement Deterioration
• Reduce Maintenance Cost
• Increase Service Life
• Treat More With Less Funds
• Predictable Results
Thank You!

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