PROJECT SELECTION FOR HIR, CIR, AND FDR

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Selection of Treatments for Pavement Preservation

- Pavement Maintenance: A systematic approach to keeping good pavements in good condition by applying the right treatment, to the right pavement, at the right time.
- Condition of system overridding objective
- Overriding Factor: Keep the water out!
Assessment of Pavements

Pavement Management System is key component to managing a system.

Historical Database of pavements is key to choosing correct solution.

Information needed:

1. Layer Diagram (Action Type, thickness, chronological time, properties of action)
2. Current Road Data: Cracking, Rutting, Smoothness, Cross slope

Electronic collection of Roadway Data with vans critical on yearly cycle
Assessment of Pavements

Pavement Management System needs to contain a computer model to:
Rate condition of system
Make initial selection of projects
Suggest mileage for each geographical area
Model should also make suggestions on repair actions based on distresses
Roadway Conditions
NOS survey

PPDC Meets
Sets funding

PMS Optimization
Candidate projects identified

Final Project Selection & Scope
DE & Chief of C&M and M&R
Tour projects

Plans and Contract
Districts/areas develop plans

Project selection
Districts/areas select projects from listing

Project Lettings

January

Project Lettings

July

PPDC Meets
Sets funding

PMS Optimization
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Final Project Selection & Scope
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Project Lettings

Year one

Year Two
Tour Treatment Selection

Keys for Team:
Know capabilities of tool box of fixes
Know what distresses can be fixed with each treatment or combinations of fixes
Consider core information and layer history in picking viable options
Consider shoulder drop-offs and clearance heights on section
Roadway Core Samples
Tour Treatment Selection

Keys for Team continued:
Be able to identify distresses when traveling down the road with occasional stops
Select cost effective treatment that will keep maintenance of the section for 5-7 years
Reach consensus among team on section
Time to action drives treatment
Matching distresses to fixes is key to success
Distresses

- Cracking: Transverse, Longitudinal, Fatigue
- Rutting
- Smoothness
- Edge Failures
Pavement Preservation Toolbox
Recycling Actions

Hot In-Place Recycling

Cold In-Place Recycling

Full Depth Reclamation
**Hot In Place Recycling**

- **What is it?**
  - Reworking the top 1” - 3”
  - Material is Heated in Layers
  - Asphalt Rejuvenating Agent is added
  - Placed with a Paver
  - Compacted with Rollers
Candidates for HIR

- Transverse thermo cracks, longitudinal cracks, and fatigue cracking in wheel paths
- Ride #’s, oxidation, and surface course rutting
- Previous actions within the top 3” is important
- Is overall structure carrying the present loads
Hot In Place Recycling

- What does it do?
  - Adds life to an oxidized surface
  - Removes Cracks in surface
  - Removes Surface Course Ruts
  - Can re-establish Cross-Slope
  - Needs to go just thru layer or ½” above layer
    - Watch for false edges
    - No width increases
HIR Benefits

- **GREEN ASPECT:** 100% Recycle of existing surface as opposed to 2” mill & Inlay can only use 30% of RAP on this project so 70% of aggregate needs to be virgin material.

- Only uses approximately 1% new oil verses 3-5% for HMA with RAP.

- Reduces hauling of material over existing roadway.

- Does not increase the elevation of roadway as opposed to overlays and so shoulders don’t need addressing.

- No drop offs with this process.
Ride Quality
Versatility for varied AADT
Quick Shutdown of Operation
No plant site needed
Minor hauling of new materials
Faster than traditional repairs
Economical vs existing repairs
Typical Hot In-place Recycle Repairs
Notice the additional cracking present?
Good HIR Project
Potential HIR Project
Cold In Place Recycling

- What is it?
  - Typically Rework the top 4-5"
  - Material is Milled
  - Emulsion and Lime is Added or other binder
  - Placed with a Paver
  - Compacted with Rollers
Cold In Place Recycling

- What does it do?
  - Breaks up Severe Transverse Cracking Patterns
  - Removes Ruts
  - Can Re-establish Cross-Slope
  - Can increase width, fix cross slope, adjust crown
Cold In Place Recycling

What precautions are warranted?
- Adequate Existing Pavement Structure
- Cold Days
- The train is long
- Project Selection is important
Full Depth Reclamation

- What is it?
  Pulverizes HMA layer and into base typically 5-12” and incorporates binder with re-claimer
  Compacted with vibratory sheepfoot
  Trimmed to grade and cross slope
  Surfaced with material commensurate to traffic loads
Full Depth Reclamation

- What does it do?
  - Recycles worn out pavements
  - Repairs all defects that caused the failure
  - Re-establishes crown, cross slope, grade and loading
What precautions are warranted?
Adequate subgrade condition
Maintaining drainage is critical
Compatibility of stabilizing agent
Pavement Preservation Toolbox

Actions Discussed

• Hot In-Place Recycling
  • Cracking
  • Surface Coarse Rutting
  • Cross Slope

• Cold In-Place Recycling
  • Thermo & Depressed Cracking
  • Rutting
  • Crown, Cross Slope, Width

• FDR
  • Failure to carry loads
  • Crown, Cross Slope, Grade
HIR: (1-3”) Loop detectors, Survey pins, Water/Gas valves, Manholes. Scarification process okay milling process doubtful.

CIR: (4-5”) Loop detectors, Survey pins, high crossroad pipes. Milling process would make very hard to do MH or valves unless all lowered beforehand.

FDR: (4-12”) Loop detectors, Survey pins, crossroad pipes, underdrains, storm sewers, sewer lines, telephone, water and gas lines.
Geotextiles can cause major headaches in all processes especially with the milling heads and pulverizers. Deal breaker for most contractors.
HIR: Can be done on all volume roads with lane closures or pilot cars.

CIR: Can be done on all volume roads with lane closures or pilot cars.

FDR: Preferred to be done with road closures but can be done with pilot car if no grade change are being made.
Historical Prices

2" Hot in Place Recycle Projects Average Cost Per Mile Per Year
HIR: 2” HIR w/chip seal is $90-100K/ mile with Novachip $160-180 K/mile @ 24’ wide.

CIR: 4” CIR w/ 1- 1/2” HMA OL runs around $200-225K/ mile @ 24’ wide. Varies when additive changes.

FDR: 7” FDR w/ 3” HMA OL runs around $310-330 K/mile @ 24’ wide

FDR: 12” FDR w 3” HMA OL runs around 390-410K/ mile@ 24’ wide

All pricing variable with flucuation of additive used
What would you select

- HIR or CIR
- CIR or FDR
FDR vs CIR
QUESTIONS

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