

PROJECT SELECTION FOR HIR, CIR, AND FDR

August 5, 2014

Roy D. Risky P.E.

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 overriding objective
- ▣ Overriding Factor: Keep the water out!

Assessment of Pavements

Pavement Management System is key component to managing a system.

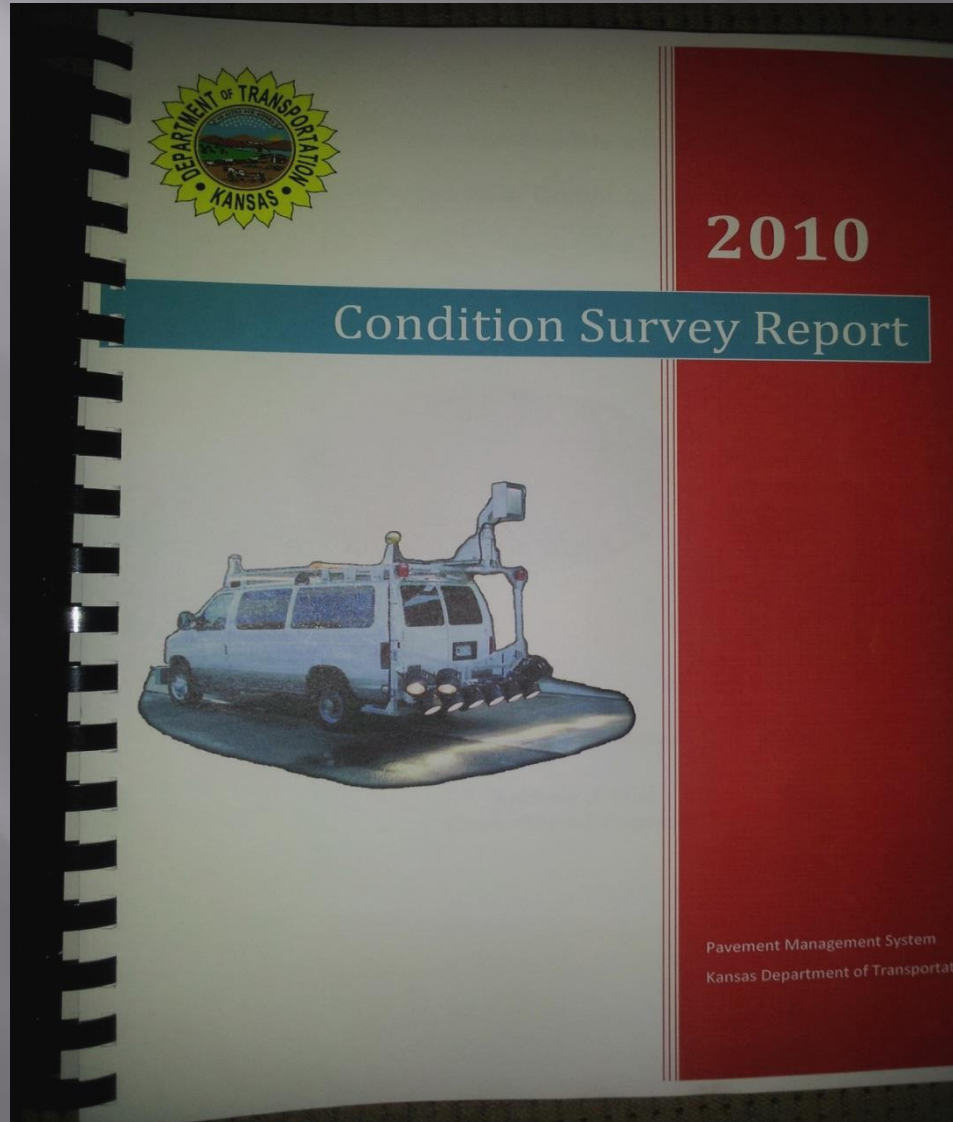
Historical Database of pavements is key to choosing correct solution.

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

Condition Survey Report



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

Start

Roadway Conditions
NOS survey

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

Plans and Contract
Districts/areas develop plans

PPDC Meets
Sets funding

PMS Optimization
Candidate projects
identified

Project Lettings

Project selection
Districts/areas select
projects from listing

January

July

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 1/2" 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.

Additional HIR Benefits

- ▣ 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



Ideal HIR Project



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 sheepsfoot

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



Full Depth Reclamation

- ▣ What precautions are warranted?
 - Adequate subgrade condition
 - Maintaining drainage is critical
 - Compatibility of stabilizing agent



FDR Candidate Project



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

Utility and Roadway Impacts

▣ 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.

Geotextile Impacts

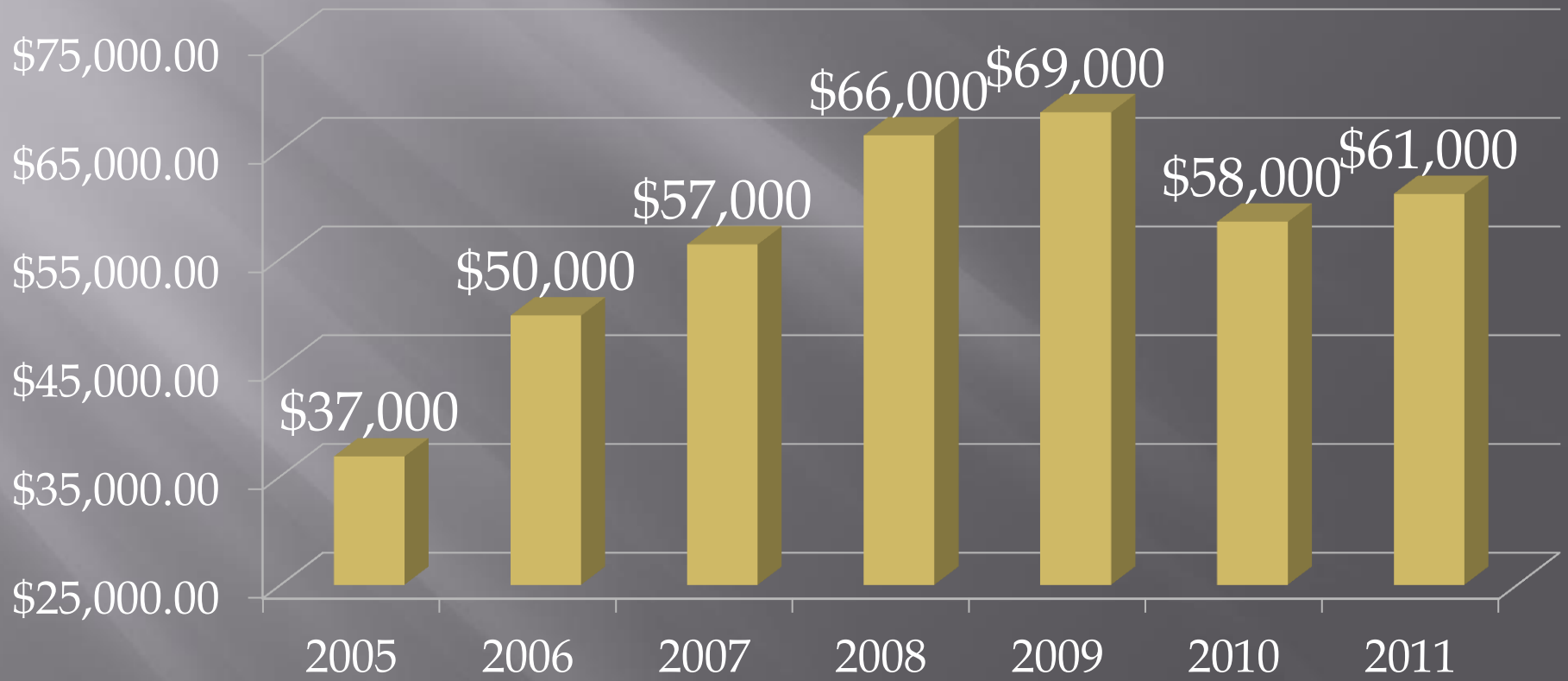
- ▣ Geotextiles can cause major headaches in all processes especially with the milling heads and pulverizers. Deal breaker for most contractors.

Existing Traffic Impacts

- ▣ 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



Prices

- ▣ 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 fluctuation of additive used

What would you select

▣ HIR or CIR

CIR or FDR



FDR vs CIR



QUESTIONS

Risky Consulting
4726 SE 25th Street
Tecumseh, KS 66542
(785) 215-1215
rdrisky@gmail.com

Business Cards

Risky Consulting

Pavement Preservation

4726 SE 25th Street
Tecumseh, KS 66542

(785) 215-1215 / cell
(785) 379-5361 / Home

Email: rdrisky@gmail.com



Roy D. Risky, P.E.
President/Owner

Dustrol, Inc.

PO Box 309
1200 E. Main
Towanda, KS 67144



www.dustrol.com

Roy D. Risky, PE

Consultant

e-mail: rdrisky@gmail.com

Home Phone: 785-379-5361

Cell: 785-215-1215