Asphalt Recycling and Pavement Preservation in Hillsborough County, Florida

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Systems Planning
Discussion Points

- Hillsborough’s Inventory/Budget
- Pavement Process – “Tools of the Trade”
- Treatments – **Focus on Recycling**
  - Performance
  - Lifecycle – *Cost to Own*
- Project Examples
- Obstacles to Hot in Place Repaving - *IMHO*
Hillsborough Inventory/Budget

- 6,993 lane miles
  - Rural to major arterials
  - 4 lane miles of rigid pavement
  - Essentially zero dirt roads

- This Year - FY 2011 - $7.1 M
  - Gas Tax: $3.6M
  - CIT: $3.5M - FY12=$0
  - Ad Velorem: $0

Budget FY2009: $13.9M
Budget FY2010 and 11: $7.5M
Budget FY2012: $3.6M

More lane miles that 5 State DOT’s !!!
The Pavement Management Process

Accomplished by
1- Inspecting all road segments
2- Planning for projects based on budget and need
3- Implementation of appropriate treatments and evaluate performance
Tools of the Trade
Step 1 – Inspections

**Inspections Have Requirements**

- Inspect **ALL** of the roads every three years (GASB34 compliant)
- **Annual** report on Overall PCI: 0-100 scale
- Overall PCI is to be above 55 *(Hillsborough Adopted)*
  \[ \text{TARGET} = 62.5 \ i.e. \ FAIR \ CONDITION \]
- Hillsborough Co. adopted MicroPaver as PMS
Hillsborough Pavement Inspection Vehicles

- Began development of Pavement Inspection vehicle in 2006.
- Vehicle collects visual distress as measured by an inspector
- Onboard GIS/GPS enabled equipment
- Rut Bar measures cross slope in real time
- All data is uploaded to MicroPAVER database for calculation of PCI and modeling of pavement conditions.
Hillsborough Pavement Inspection Vehicles
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Rut Bar Visual Displays and Touch Tablet Input Menu
Hillsborough Pavement Inspection Vehicles
- Inspection Samples

System maps all inspection sites in GIS.
MicroPAVER - PMS
Hillsborough Pavement Inspections

Automatically Populated from Upload Process

Sample Defects

Area of Defects in Sample
MicroPAVER
Hillsborough Pavement Inspections
Tools of the Trade –
Step 2 - Planning

- Groups of Projects Based on Treatment and Fiscal Year
- A group is a “list” of roads that will be treated in any given fiscal by a given treatment based on:
  - Condition
  - Budget
  - Strategy (i.e. pavement philosophy)
    - Worst First (bring lots of cash!! – Which one is actually worst?)
    - Last Year’s Budget
    - Standard Program – (time re-occurrence, i.e. Treat Every 7 years)
    - “Fighting Fires” – (citizen driven)
    - Political Pressure – (Political considerations to establish priorities)
    - Gut Feel

- **HILLSBOROUGH STRATEGY – KEEP THE GOOD ROADS GOOD!!**
Tools of the Trade - Planning

Hillsborough's Planning tool is called RAPP

This was actually developed FIRST!!
RAPP- Yeah.... What is That???

Data window that creates and displays pavement management project groups based on selections made from a spatial environment.

RAPP Keeps Track of 
WHEN
WHAT
WHERE

Roadway Activity Planning Program
RAPP Data Window consists of a map, and a data screen.
Tools of the Trade –
Step 3 – Implementation / Evaluations

Right Treatment
Right Road
Right Time

...AND
what was the benefit?
Tools of the Trade –
Step 3 – Implementation

Hillsborough Treatments (Current)

- Crack seal – With Micro-Overlay
- Micro surface (Single-Dbl)
- Micro pave (sp4.75 w/76-22)
- Hot in Place Recycle Repaving (single pass – virgin lift)
- Overlay (SuperPave)
- Mill and Overlay (Wedge Mill)
- Full Depth Reclamation
- Conventional Reconstruction

10 HIR projects since 2002
Project Comparison - COST

Hot In Place Recycle Repaving - Example

- Cost comparison based on 2009 pricing
- Compare 2 " mill and fill vs. Hot in Place Repaving
- Virgin HMA 1” lift Superpave SP9.5 w/64-22 binder
- Assume that the road selection is correct.

Conventional Repaving

- Cost comparison based on 2009 pricing – HC Contract
- Compare 2 “ mill and resurface
- Superpave SP12.5 w/64-22 binder

Hot in Place Re-paving

- Cost comparison based on 2008 pricing – HC Contract
- Single Pass Hot in Place Repaving
- 1” Scarification Heat and Rework
- HMA 1” lift Superpave SP9.5 w/64-22 binder
Project Cost Comparison - COST

- Cost comparison based on 2009 pricing
- Compare 2 " mill and fill vs. Hot in Place Repaving
- HMA 1” lift Superpave SP9.5 w/64-22 binder
- Assume that the road selection is correct.

Conventional Repaving
- Tonnage SP12.5.......$85.00/ton (in place)
- Mill 2”.................... $2.30 per SY
- Price per SY ...........$10.80 per SY

Hot in Place Re-paving
- Heat and Re-work.........$2.20 SY
- Recycle Agent............ $0.15 per SY
- Tonnage SP9.5..........$82.11/ton (in place)
- Price per SY.............$6.45 per SY
Project Cost Comparison

- Cost comparison based on 2009 pricing
- Compare 2“ mill and fill vs. Hot in Place Repaving
- HMA 1” lift Superpave SP9.5 w/64-22 binder
- Assume that the road selection is correct.

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Cost Savings = 40%
Project Cost Comparison – Life Cycle

Cost to Own per Year = Cost per SY/Year

- Recycle project Life Cycle.........................10 years (assume)
- Conventional Resurfacing project.............15 Years

**Hot in Place Repaving**
- Cost per SY....$6.45
- Cost to own = $6.45/10Years
  
  Cost per SY/Year = $0.64

**Conventional Resurfacing**
- Cost per SY....$10.80
- Cost to own = $10.80/15Years
  
  Cost per SY/Year = $0.72

- Cost per square yard year appears to be similar... so this looks viable!!!
- The deterioration (PCI) curves will be different, with HIR being potentially steeper.
Tools of The Trade – ADDITIONAL LIFE

**Hot-in-Place Repaving**

Conventional Repaving

- Target PCI = 62.5
- Additional Life - $/SY-Year
- PCI
- Years

- Ravel-M, Block L, Pothole
- 70- Ravel L, Long Cr
- 83- Ravel, L
Project Examples

Hot in Place Repaving – 13 years old

New Construction – 10 years old
Project Example - Westshore Blvd

Hot in Place Repaving – 13 years old
Project Example - Westshore Blvd

Hot in Place Repaving – 13 years old
Project Example - Westshore Blvd

Hot in Place Repaving – 13 years old
Tools of The Trade – Get it RIGHT!

Hot in Place Repaving – 13 years old
Project Example - Westshore Blvd

Hot in Place Repaving – 13 years old
Project Example – Orient Road

Hot in Place Repaving – 7 Years old
Recycled Structural Course
Project Example – Orient Road

Hot in Place Repaving – 7 Years old
Recycled Structural Course
Project Example – Orient Road

Hot in Place Repaving – 7 Years old
Recycled Structural Course
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Hot in Place Repaving – 7 Years old
Recycled Structural Course
Project Example – Causeway Blvd
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Hot in Place Repaving – 2 Years old
Recycled micro-surface
Project Example – Causeway Blvd

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Recycled micro-surface
Project Example – Causeway Blvd

Hot in Place Repaving – 2 Years old
Recycled micro-surface
Project Example – Waters Avenue

Hot in Place Repaving
Recycled Microsurface /Friction Course
Tools of The Trade – Pre Construction

Micro surface on arterial – 3 years old treatment on friction coarse
Tools of The Trade – Post Construction

1” New HMA

1” Recycle

Hot in Place Repaving
Recycled micro surface
Obstacles to Hot in Place Repaving

IMHO
Obstacles to Hot in Place Repaving - IMHO

Recycling could benefit from additional clarity of terms.

"Hot in Place Recycling” sub-categories:

- **Surface Recycle** – Process used to soften the asphalt surface
  - could use multiple heating units
  - could use spring activated teeth, tines or a small diameter milling head.
  - could use recycling agent in scarified material (if required)
  - could be used to prepare for an HMA overlay (new surface)

- **Remixing** – Same as Surface Recycle but new HMA is added and mixed throughly.
  - could be left as the wearing course
  - could be overlayed
  - could be single stage, scarify in single pass
  - could be multi-stage, scarify in multiple passes-(windrow)

- **Repaving** – Combines Surface Recycling OR Remixing with the simultaneous placement of overlay of new HMA
  - could mix the recycle in a pug mill or using augers
  - could be single pass (two screeds)
  - could be multi-pass (conventional paver used for final riding course)
Obstacles to Hot in Place Repaving – *IMHO*

- **Specifications** - Many DOT’s do not have standard specifications for HIR/Recycling/Remixing/Repaving. Leaves some local agencies to develop own specs.
- **Experience** - Some agencies lack experience with these processes and become reluctant to attempt projects. *Nobody really likes trial and error.*
- **Poor Road Selection** – “Wrong Road” leads to failed projects.
- **Procurement** - Poor understanding of processes and application techniques leads to bids that are unclear.
Conclusions

- HIR processes can increase PCI at a cost savings when applied to the correct road.
- HIR processes are cost effective when compared to like conventional treatments.
- The HIR cost per SY year is comparable to conventional processes. However re-treatment may occur earlier.
- Standard DOT specifications would be beneficial to the proliferation of HIR processes.
- Clearer definitions and education could reduce confusion concerning HIR sub-catagories.
- Clearer understanding of the differences in the sub-categories of HIR would assist in the bidding process.
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Thanks!!!!

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