PAVEMENT PRESERVATION FOR GENERAL AVIATION AIRPORTS

2011 ASU MATERIALS/PAVEMENT CONFERENCE
Overview

- The Problem
- Typical Types of Distress
- Elements of pavement preservation program.
  - Pavement Management
  - Tool box
- 80 to 85% of the airfield pavements are Hot Mix Asphalt
- The Majority of these are General Aviation Airfields
- Limited Funding for Maintenance and Repairs
General Aviation
What is the primary distress and what is its Extent?
Non-Load Related Distress

- Transverse Cracking
- Block Cracking
- Raveling

Usually the result of significant hardening of the asphalt binder
Transverse Cracking
Block Cracking
Raveling and Weathering
Where does Non-Load Distress Occur?

![Bar chart showing the percentage of non-load associated distress for Runway, Taxiway, and Apron.]

- Runway: 40%
- Taxiway: 45%
- Apron: 15%
Mitigation of Non-Load Associated Distress

Management of the Problem
To Mitigate Non-Load related distress an Airport Owner must:

“At the right time apply the right treatment”
Governed by FAA Advisory Circular AC150/5380-7A

Benefits

- An objective & consistent evaluation of network
- A systematic and documentable engineering basis for maintenance and rehabilitation needs
- Identify budget needs
- Provide documentation for present and future condition of network
- Develop life-cycle costs
*MicroPAVER* was developed by the Corps of Engineers initially for airports and now has been expanded to street systems.

The *MicroPAVER* database can be used to document the following:

- The location, dimensions and pavement types of all runways, taxiways and aprons.
- The year of construction and the major pavement preservation techniques.
- The results of periodic pavement surveys.
PAVEMENT CONDITION INDEX (PCI)
Airport Pavement Management

Grand Canyon Airport
$1 invested here

15% drop in condition in 40% of life

40% drop in condition in 15% of life

Costs $4-8 if delayed

Pavement Performance
Pavement Deterioration Curve & Trigger Points
Example of a Statewide Application

<table>
<thead>
<tr>
<th>PCI Value</th>
<th>Action Taken</th>
</tr>
</thead>
<tbody>
<tr>
<td>85 – 100</td>
<td>No action</td>
</tr>
<tr>
<td>70 – 85</td>
<td>Slurry seal</td>
</tr>
<tr>
<td>55 - 70</td>
<td>Place an overlay</td>
</tr>
<tr>
<td>Less than 55</td>
<td>Replace</td>
</tr>
</tbody>
</table>
Mitigation of Non-Load Related Distress

Techniques or Tools
Unique Considerations
Unique Consideration

Fuel Spillage Pictures

FUEL DAMAGE
Techniques to be Discussed

- Spray Applied Seals
- Slurry Surfacing Seals
- Thin Overlays
Spray Applied Sealers
Spray Applied Sealers

Materials

- Asphalt Sealers
- Asphalt Rejuvenators – FAA Spec P-632
- Gilsonite sealer binders
- Coal-Tar emulsion sealers – FAA Spec P-631
Spray Applied Sealers

- Function
  - Reduce the rate at which surface properties change with aging

- Advantages/Disadvantages
  - Reduces the permeability of the surface
  - If applied too heavily to a nonporous surface – can leave pavement slippery and unsafe
Life expectancy depends on the condition of the HMA pavement prior to placement

- PCI 80 – Good condition – 3 to 5 years
- PCI 60 – Fair condition – 1 to 3 years
- PCI 40 – Poor condition – 1 to 2 years
Slurry Sealing
Slurry Sealing

Types

- Standard Slurry seal
- Polymer-modified slurry seal
- Microsurfacing
- Evolving technology
  - Rubber-emulsion aggregate slurry (Flexseal)
  - Coal tar slurry (Grip-Flex)
Slurry Sealing
Function

Slurry seal or microsurfacing is used for the following:

- Seal sound pavements
- Restore the surface texture in a pavement by providing a skid-resistant surface
- Reduce the permeability of the surface
- Correct raveling
- To fill ruts in an HMA pavement (microsurfacing)
Advantages

- Seal sound pavements
- Restore the surface texture to provide a skid-resistant surface
- Reduce permeability of the surface

Disadvantages

- No structural value
- Requires specialized equipment
- Turning movements can result in loose rock causing a FOD problem
Life expectancy depends on the condition of the HMA pavement prior to placement of the standard slurry seal

- PCI – 80, good condition – 7 to 10 years
- PCI = 60, fair condition – 3 to 5 years
- PCI = 40, poor condition – 1 to 3 years
Thin Overlays
Thin Overlays are used to

- Restore the skid-resistant surface of the surface
- Reduce the permeability of the surface thus minimizing the moisture damage due to water infiltration
- Provide some structural improvement
Advantages

- Increases structural capacity
- Restore the surface texture to provide a skid-resistant surface
- Does not require specialized equipment
- Long life

Disadvantages

- More expensive
• Life expectancy depends on the condition of the HMA pavement prior to placement of the standard slurry seal
  • PCI – 80, good condition – 10 to 12 years
  • PCI = 60, fair condition – 5 to 7 years
  • PCI = 40, poor condition – 2 to 4 years
THANK YOU