

WASHINGTON STATE AIRPORT PAVEMENT MANAGEMENT SYSTEM

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Presentation Outline

- What Is Airport Pavement Management?
- Pavement Management Process
- Washington State Airport Pavement Management Program
- Developing Your Pavement Maintenance and Rehabilitation Program

Washington State Airport Pavement Management System (APMS)

- Team
 - FAA
 - WSDOT Aviation
 - Applied Pavement Technology
 - CH2M HILL
 - CivilTech

Washington State APMS (cont.)

- Established in 2000
- Provides a tool to
 - Identify system needs
 - Make programming decisions for funding
 - Provide information for legislative decision making
 - Assist local jurisdictions with planning decisions
- Initially included 83 airports
- Expanded in 2005 to include 100 airports

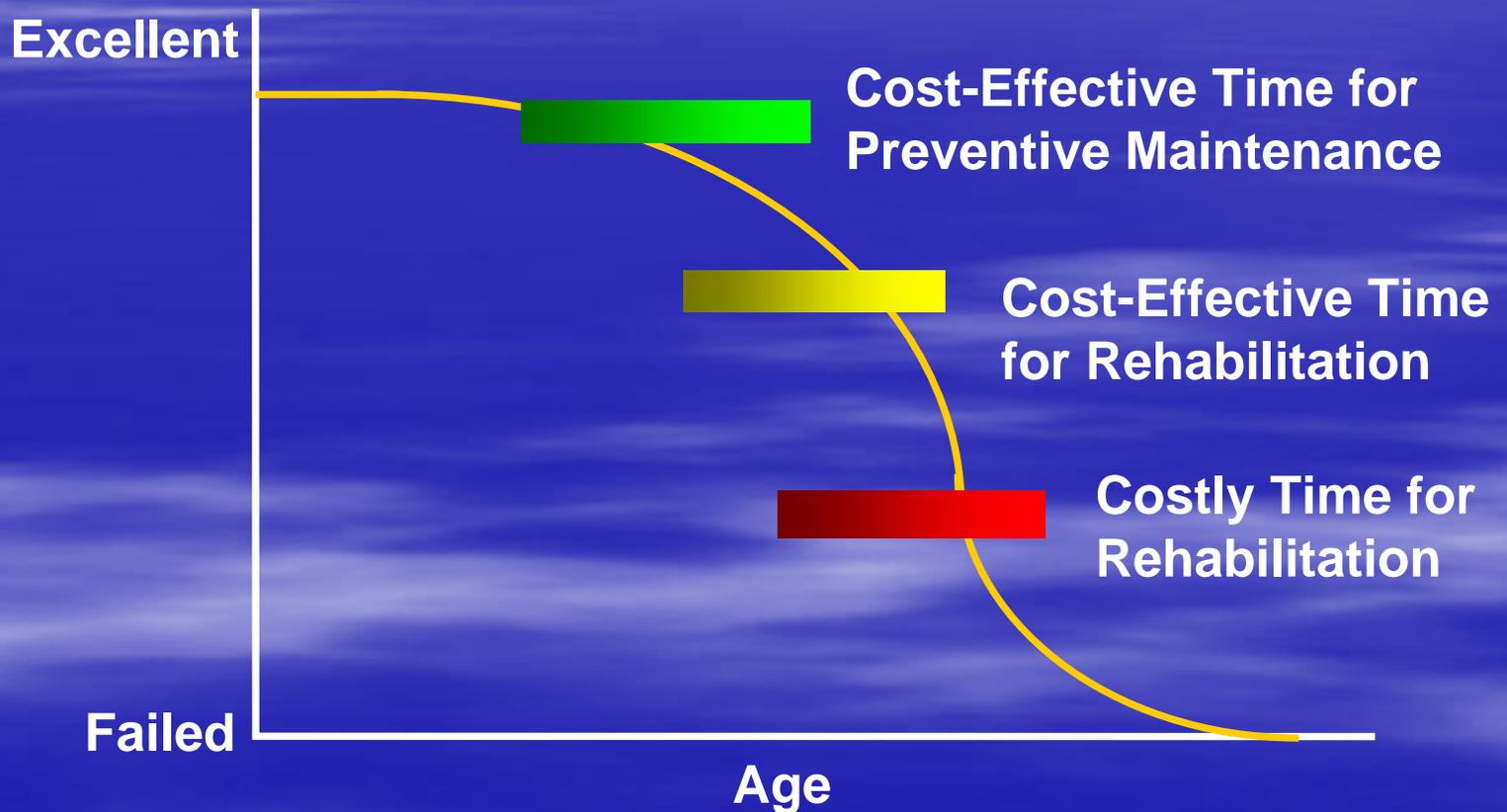
What Is Pavement Management?

- Pavement management is a tool to
 - Maintain an inventory of the pavement system
 - Monitor pavement condition
 - Identify pavement-related needs
 - Prioritize pavement-related work
 - Select most cost-effective repair strategy, both in short- and long-term
 - Communicate pavement-related needs

Why Pavement Management?

- Cost-effective way to track a very important capital investment and plan for its preservation and eventual rehabilitation

The Pavement Management Philosophy



Why Pavement Management?

- It goes a long way to helping NPIAS airports meet Public Law 103-305 regarding having an “effective maintenance management system”

Public Law 103-305

CFR Title 49 Section 47105(e) PREVENTIVE MAINTENANCE.

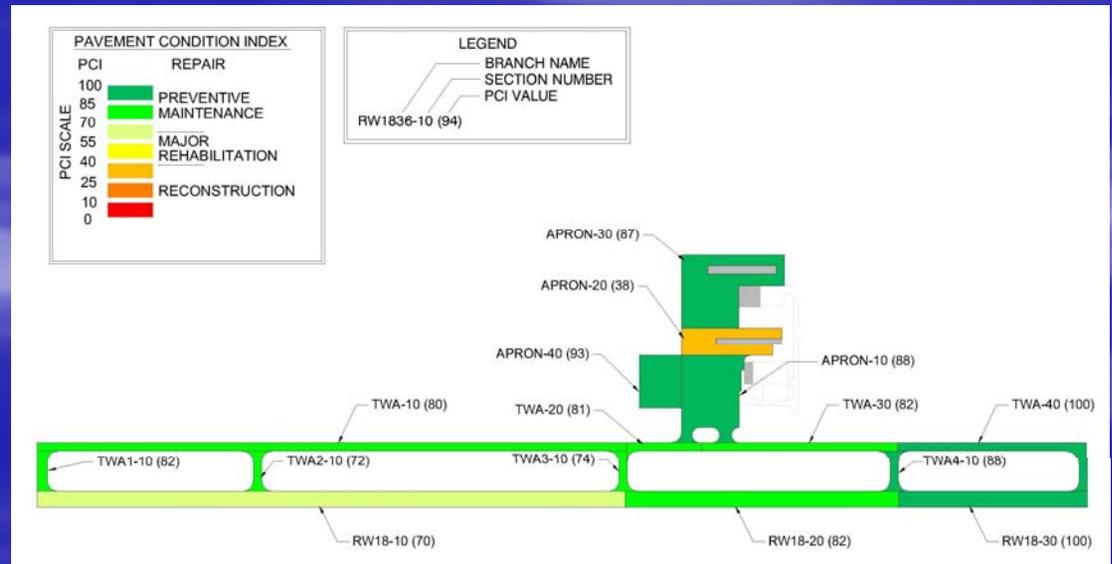
After January 1, 1995, the Secretary may approve an application under this subchapter for the replacement or reconstruction of pavement at an airport only if the sponsor has provided such assurances or certifications as the Secretary may determine appropriate that such airport has implemented an effective airport pavement maintenance-management program. The Secretary may require such reports on pavement condition and pavement management programs as the Secretary determines may be useful.

Washington State APMS (cont.)

- Analysis did not include:
 - Seattle Tacoma International Airport
 - Tri-Cities Airport
 - Spokane International Airport
 - Bellingham International Airport

Systems Inventory

During this project, information was gathered on the construction and maintenance history of the pavements at each airport. Maps showing the location of the different pavement areas were prepared.



Pavement Condition Assessment



- Pavement Condition Index (PCI) Procedure: Visual signs of distress were identified and measured.
- Documented in AC 150/5380-6A and ASTM D5340.

PCI Scale



PCI

100

85

70

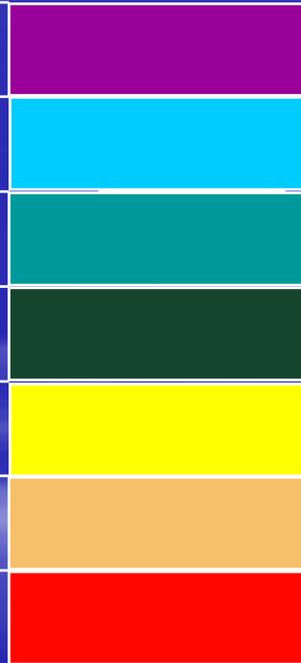
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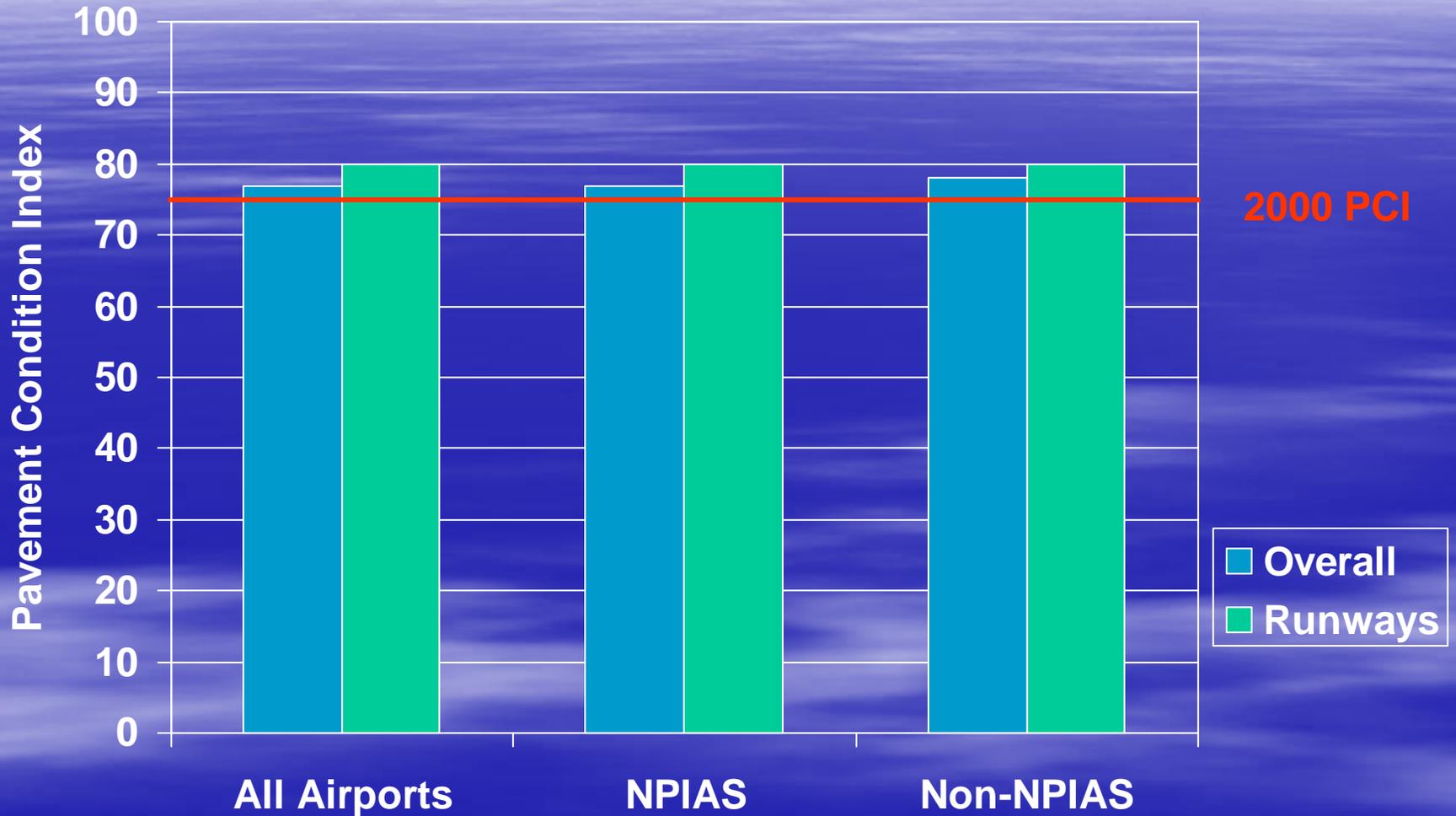


Preventive
Maintenance

Major
Rehabilitation

Reconstruction

Pavement Condition



Excludes the 4
large commercial
airports

Specific Deliverables for Airports

- Airport Report
- Pavement Management Manual

Individual Airport Report

- This report provides you with all the data collected during the project (inventory and condition) as well as a base work program
- You need to take this report and use its results to develop a tailored program for your airport based on:
 - Local costs
 - Funding constraints
 - Other considerations (operational, plans for future work, and so on)

Individual Airport Report

- Pavement inventory results
 - Network definition map
 - Work history map
- Pavement evaluation results
 - Distress type, quantity, severity
 - Cause of deterioration
 - Pavement condition map
- Preliminary maintenance and rehabilitation plan

Pavement Management Manual

- To help you further tailor the pavement maintenance and rehabilitation recommendations in the individual report we prepared the pavement management manual.

Pavement Management Manual

- Pavement Management Process
- Monitoring Pavement Condition
 - Requirements of Public Law 103-305
 - Conditions Requiring Immediate Attention
- Developing and Implementing a Pavement Maintenance and Rehabilitation Program for Your Airport

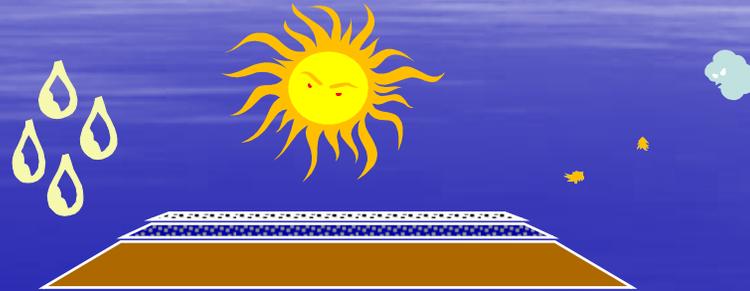
When reviewing the distresses observed at your airport you need to consider ...

- Extent and Severity of Deterioration
- Cause of Deterioration
- Rate of Deterioration
- Possible Maintenance Rehabilitation Options

Causes of Deterioration



Traffic/Load



Environment



Material/Mix Problems



Water Infiltration/Poor Drainage

Load-Related Distresses

Load



Plastic
Deformation



What Can You Do To Address Load-Related Distresses?

- Pavement strength is inadequate and must be increased through an overlay or reconstruction, unless the deterioration is localized and can be cost-effectively corrected through patching
- Preventive maintenance actions such as surface treatments and crack sealing are not appropriate or cost-effective

Environment/Aging-Related Distresses

Environment/
Aging



Asphalt
Hardening



What Can You Do To Address Environmental/Aging Related Distresses?

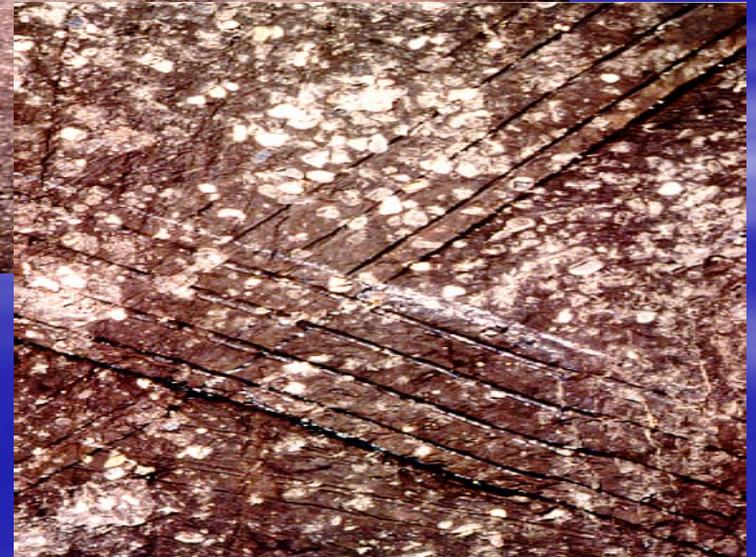
- Preventive maintenance techniques are very cost-effective if applied early in the deterioration cycle
 - Surface treatments
 - Crack sealing

Material/Mix-Related Distresses

Material Problems



Friction Loss



What Can You Do To Address Materials/Mix Related Distresses?

- Preventive maintenance will not correct these types of distresses
- Removing the bad material and replacing it with good material is the only long-term solution

Water/Poor Drainage Related Distresses

Cracks
+
Moisture
Infiltration



Breakdown of
Existing Cracks and
Subgrade Softening



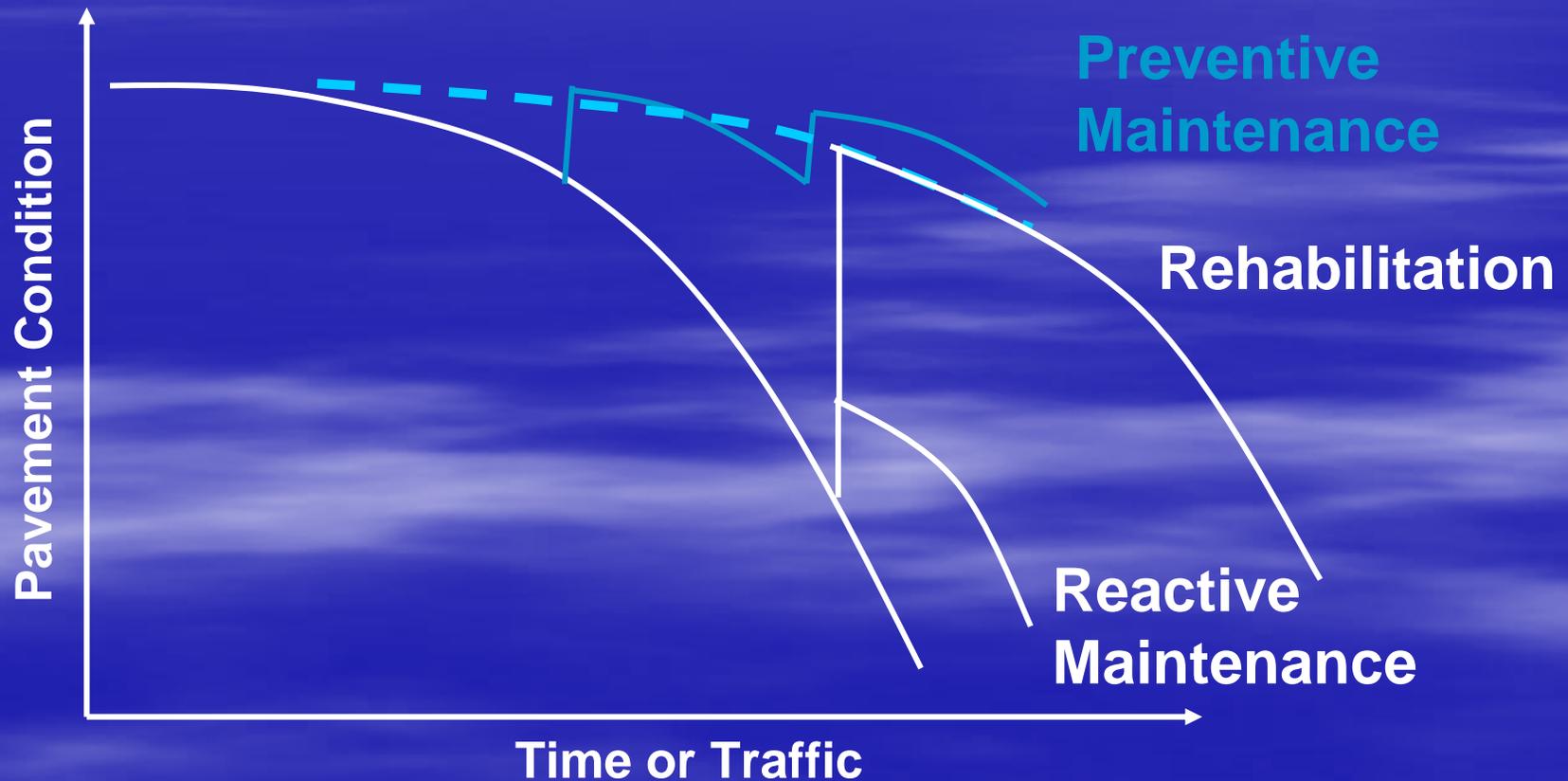
What can you do to address water-related distress?

- **Subsurface Drainage**
 - Difficult to rectify inadequate drainage after construction
 - Keep drains clean and functional
- **Surface Infiltration**
 - Crack sealing
- **Standing Water**
 - Avoid “bathtub” effect by making sure ground around pavement edge not built up

When developing a pavement maintenance and rehabilitation plan for your airport using pavement evaluation results presented in your individual report . . .

- Assess current and project future pavement condition throughout the airport.
- Develop plan to address immediate “reactionary” needs, preservation needs, and long term rehabilitation needs.

Types of Repair



Preventive Maintenance

- Planned strategy of treatments to:
 - Slow surface aging and environmental cracking
 - Keep moisture out of pavement system
 - Reduce infiltration
 - Maintain drainage
 - Reduce debris infiltration into cracks

Preventive maintenance
is appropriate
for pavements in overall
good condition, exhibiting
little or no load-related
deterioration.



Preventive maintenance
is not appropriate
for pavements with
structural deterioration.



Preventive maintenance
is not appropriate
for pavements with
certain types of materials-
related distress.



Preventive Maintenance Actions

- Vegetation control
- Crack sealing
- Surface treatments
- Shoulder blading
- Restriction of heavy loads
- Cleaning up fuel and other spills

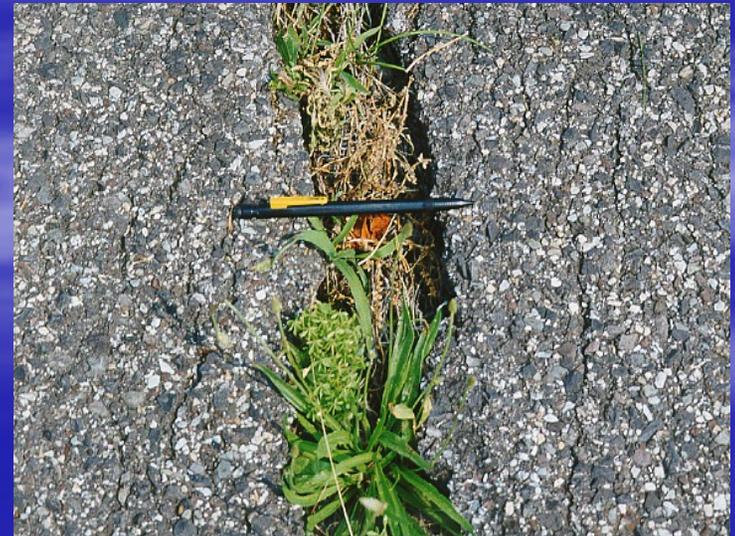
Preventive Maintenance Actions



Kill vegetation.

Preventive Maintenance Actions

- Seal cracks.
 - Eliminates stripping and the reduction of strength that can occur if water enters the subgrade and base layers
 - Keeps out incompressibles that may cause localized heaves as pavement expands during warmer weather



Preventive Maintenance Actions

- Apply surface treatments if appropriate.
 - May slow oxidation and aging of asphalt pavements.



Preventive Maintenance Actions

- Maintain good drainage.



Buildup of soil and vegetation along the edge of pavement traps water. Grade shoulders to reestablish good drainage.

Preventive Maintenance Actions

- Control loadings
 - Construction equipment
 - Fuel trucks
 - Air shows



Preventive Maintenance Actions

- Don't ignore solvent spills.
 - Continuous fuel spillage on a bituminous surface will soften the asphalt. Left unaddressed, it can cause serious damage to the pavement.



Finishing the Plan

- Adjust the major rehabilitation recommendations to account for fiscal, operational, and other factors and to incorporate project level design
- Develop plan for tracking condition and maintenance
- Work with FAA, WSDOT Aviation, and local sources to obtain funding if needed
- Implement plan

Thank You!