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

- Cost-Effective Time for Preventive Maintenance
- Costly Time for Rehabilitation

Excellent vs. Failed

Age
Why Pavement Management?

- It goes a long way to helping NPIAS airports meet Public Law 103-305 regarding having an “effective maintenance management system”
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.
Analysis did not include:
- Seattle Tacoma International Airport
- Tri-Cities Airport
- Spokane International Airport
- Bellingham International Airport
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.
Pavement Condition

Excludes the 4 large commercial airports

Pavement Condition Index

Overall Runways

2000 PCI

All Airports NPIAS Non-NPIAS

Overall Runways

Bar graph showing pavement condition index for different categories, excluding the 4 large commercial airports. The categories include All Airports, NPIAS, and Non-NPIAS.
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

Rutting

Fatigue Cracking
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

- Block Cracking
- Long/Transverse Cracking
- Weathering

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

Bleeding/Flushing

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
- Reactive Maintenance
- Rehabilitation

Graph showing the relationship between pavement condition and time or traffic.
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!