



Federal Aviation  
Administration

# FAA **PAVEAIR**

## FAA PAVEAIR Workshop



# Unit 1

## What is a Pavement Management System?



# What is a Pavement Management Program?

- Defined in FAA Advisory Circular 150/5380-7B
  - Specifies the procedures to be followed to assure that proper preventative and remedial pavement maintenance is performed
- Public Law 103-305, section 107, amended Title 49, Section 47105 of the United States Code
  - To be eligible for federal funding, an airport agency must implement an effective pavement maintenance management program

# Pavement Management Programs Must Include:

- Pavement Inventory
  - Location, type of pavement, dimensions, construction date
- Inspection Schedule
  - Detailed inspection must be performed at least once a year (3 years if PCI is used)
  - Less detailed inspection periodically (daily, weekly, monthly)
- Record Keeping
  - Inspection date, location, distress types, maintenance scheduled or performed
- Information Retrieval
- Program Funding

# What is an Airport Pavement Management System?

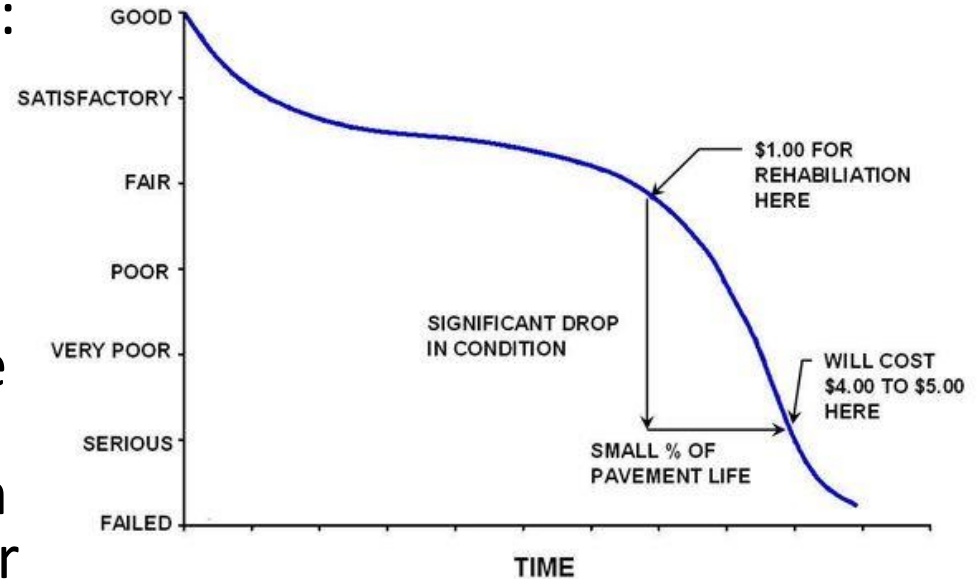
- Discussed in FAA Advisory Circular 150/5380-7B
  - A system which identifies optimum strategies to maintain pavements at an adequate level of serviceability
  - Includes systematic procedures for scheduling maintenance and rehabilitation activities
  - Optimizes benefits while minimizing cost

# Benefits of an Airport Pavement Management System

Provides	Identifies
Objective and consistent evaluation of pavement conditions	Budget requirements necessary to maintain pavements at various levels of serviceability
Systematic and documentable engineering basis for determining maintenance and rehabilitation needs	Impact on the pavement network as a result of performing no major repairs
Documentation on the present and future condition of the pavements in a network	Life-cycle costs for various maintenance and rehabilitation alternatives

# Pavement Life Cycle Curve

- First several years of life: low deterioration
- At a certain point in time: deterioration accelerates
- Preventive maintenance early in pavement life is more cost effective than major maintenance later in life
- Determine the optimum time to effectively apply funds



*Typical Pavement Life Cycle Curve*

# History of FAA PAVEAIR

## PAVER PMS

In 1968, CERL begins development of a mainframe PMS for the DOD. The first version is completed in 1972.

## Public Law 103-305

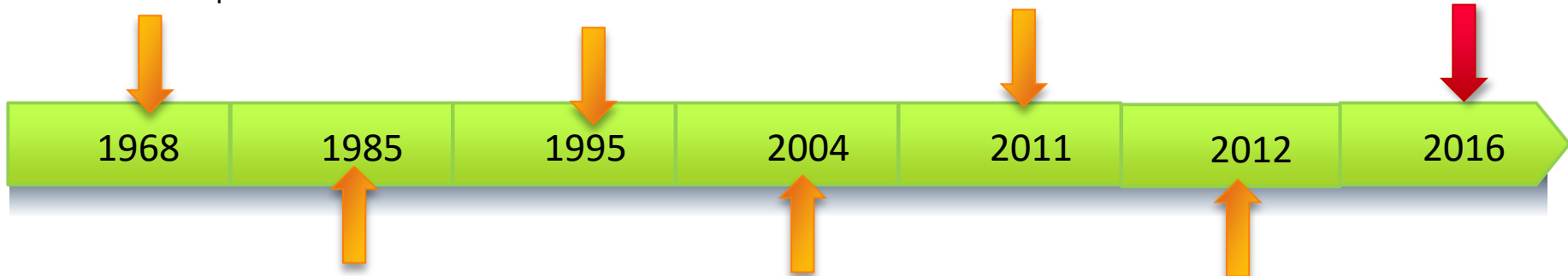
Requires an airport agency to show that it has an effective PMS in place to be eligible for federal funding.

## FAA PAVEAIR

February 2011, FAA releases a beta of FAA PAVEAIR, a public web-based APMS

## FAA PAVEAIR

May 2016, FAA releases FAA PAVEAIR 2.6.



## MicroPAVER

In 1985, the FAA funds CERL to develop a microcomputer version of PAVER, named MicroPAVER. The first version is released in 1987.

## APMS Systems in Use

By 2004, 84% of state aviation agencies in the US use an APMS.

## FAA PAVEAIR

June 2012, FAA releases FAA PAVEAIR 2.0.

\* CERL (U.S. Army Construction Engineering Research Laboratory)



# New for 2016

- Improved prediction modeling
- LCCA on server, not Excel
- Family curves integrated into M&R and Condition Analysis
- Change to comply with FAA web template
- Updated default costs
- Stored PCI values

# Unit 2

## FAA PAVEAIR Basics



# About FAA PAVEAIR

- Airport Pavement Management System
  - Publicly available and free to use (source code available)
    - Branch website
    - <http://www.airporttech.tc.faa.gov>
  - Data can be made “public” or “private”
  - Includes similar functionality found in MicroPAVER version 5.3
- Web-based
  - Access through the Internet, company Intranet, or a stand-alone PC
- Regional Settings
  - English / Metric

The screenshot shows the FAA PAVEAIR web application interface. At the top, there is a blue header with the Federal Aviation Administration logo and the text "Federal Aviation Administration". Below the header is a navigation menu with links: Home, Inventory, Work, PCI, Prediction Modeling, Condition Analysis, M&R, Reports, Maps, Tools, Login, Member Area, and Help. The main content area is titled "FAA PAVEAIR" and "Please choose a database". It features a "Welcome to FAA PAVEAIR" section with a brief description of the application. To the right, there is a "Login" form with fields for "User Name:" and "Password:", a "Remember me next time." checkbox, and buttons for "Login", "Register", and "Forgot password?". Below the login form is a "Databases" section with a "Select a Database" button. At the bottom of the page, there is a footer with the text "FAA PAVEAIR Version 2.6.0 build 2016.05.02 - View Change Log".

# Primary Functions

- Inventory
  - Manage Pavement Inventories
- Work
  - Record Pavement Work Histories
- PCI / Update Inspections
  - Calculate PCI / SCI / FOD
  - Record Condition Surveys
- Prediction Modeling
  - Predict future pavement conditions
  - Plot PCI vs. Age
- Condition Analysis
  - Provides projections about the viability of pavements
- Maintenance and Repair Planning
- Reports / Maps
  - Generate reports
  - Mapping support with shapefiles
- Compatibility
  - Import data from MicroPAVER (e60, e65)
  - Export data to XML

The screenshot shows the FAA PAVEAIR web application interface. At the top, there is a dark blue header with the Federal Aviation Administration logo and the text "Federal Aviation Administration". Below the header is a navigation menu with links: Home, Inventory, Work, PCI, Prediction Modeling, Condition Analysis, M&R, Reports, Maps, Tools, Login, Member Area, and Help. The main content area is white and contains the following elements:

- FAA PAVEAIR** (left-aligned) and **Please choose a database** (right-aligned) at the top of the main content area.
- Welcome to FAA PAVEAIR** (centered heading).
- A paragraph of text: "FAA PAVEAIR is a public, web-based application designed to assist organizations in the evaluation, management, and maintenance of their pavement networks. PAVEAIR is designed to fulfill the requirements of an Airport Pavement Management System as identified in Advisory Circular (AC) 150.5380-7A."
- A paragraph of text: "The FAA is pleased to announce the release of FAA PAVEAIR v2.0. This version includes several important new features, such as: an updated M&R module, Life Cycle Cost Analysis (LCCA) module, and MicroPAVER e65 support."
- A link: "Details on the improvements made to FAA PAVEAIR are available in the [Change Log](#)."
- A link: "For news and upcoming events, please visit the [News and Events](#) page."
- Login** section (right-aligned):
  - Input fields for "User Name:" and "Password:".
  - A checkbox for "Remember me next time."
  - A "Login" button.
  - Links for "Register" and "Forgot password?".
- Databases** section (right-aligned):
  - Text: "Use the 'Select a Database' button below to select a database. You will need to login to access your user databases. Public databases are read-only."
  - A "Select a Database" button.

At the bottom of the page, there is a footer: "FAA PAVEAIR Version 2.6.0 build 2016.05.02 - [View Change Log](#)".

# Versions

- Three supported configurations
  - FAA Hosted version (<http://faapaveair.faa.gov>)
  - Intranet Version
  - Locally Installed version
- National Airport Pavement Test Facility
  - <http://www.airporttech.tc.faa.gov>
  - Additional information
  - Setup files
  - Source code

# User Accounts / Databases

- Registered Users
  - Create Database
    - Multiple databases supported
    - New database or import from MicroPAVER
    - Choose to make data “Public” or “Private”
  - Manage Database
    - Delete database
    - Change between “Public” and “Private”
    - Assign permissions to other registered users

# Pavement Hierarchy

- Pavement Network
  - High-level grouping of an organization's pavements for the purposes of maintenance and repair planning
  - Examples: Ohio State University Airport, JFK Airport
- Pavement Branch
  - Identifiable area of a pavement network having a distinct function
  - Examples: Runway 9L, Taxiway D, Apron
- Pavement Section
  - Subdivision of a branch with uniform construction, maintenance, usage, condition, traffic volume, and load intensity conditions
  - Example: Section A (Runway 32 end to 3,013' west)

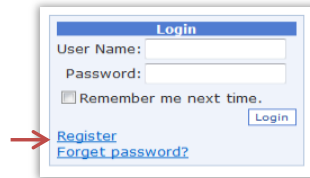
# Create a User Account and Pavement Database

- Purpose
  - Create a user account
  - Create a new blank database
  - Set English / Metric unit preferences



# Create a User Account and Pavement Database

1. From the “Home” page, click on the “Register” link in the “Login” box.



The screenshot shows a 'Login' form with the following fields: 'User Name:', 'Password:', and a checkbox for 'Remember me next time.'. Below these fields are two links: 'Register' and 'Forgot password?'. A red arrow points to the 'Register' link. A 'Login' button is located to the right of the 'Remember me next time.' checkbox.

1. Fill out the “User Information” form and click “Next”.



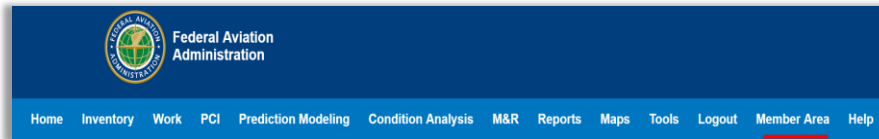
The screenshot shows the 'EAA.PAVEAIR : PAVEAIR Registration' form, specifically the 'User Information' section. The form includes the following fields: 'First Name:', 'Last Name:', 'Title:', 'Organization:', 'Address Line 1:', 'Address Line 2:', 'City:', 'State:' (with a dropdown menu showing 'ALABAMA'), 'Zip:', 'Country:', 'Phone#:', 'Fax:', 'Email:', and 'Preferred Contact Method:' (with a dropdown menu showing 'Email'). A 'Next' button is located at the bottom right of the form.

2. Fill out the “User Name and Password” form. Here is where you will choose the username and password you will use to access the system. The “security question” and “security answer” are used in case you need to recover your password. Once completed, click the “Create User” button.

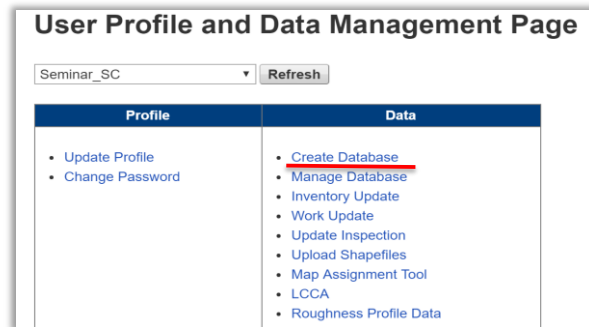


The screenshot shows the 'User Name and Password' form. It includes the following fields: 'User Name:', 'Password:', 'Confirm Password:', 'Security Question:', and 'Security Answer:'. At the bottom of the form are two buttons: 'Previous' and 'Create User'.

# Create a User Account and Pavement Database



3. Click on the "Create Database" link.



4. Choose a name and description for your database and enter it in the form. In order to easily identify your database from the other participants', it is recommended you use your last name and first initial followed by "\_UserDB1" as your database name. For this lab, choose "Public" and select "No. I will enter data manually", then press the "Create Database" button.

The image shows a screenshot of the "Create Database" form. It has a light gray background and is divided into several sections. The first section is "Create Database" and contains a "Database name:" label followed by a text input field containing "LastNameF\_UserDb". Below this is a "Database Description:" label followed by a text input field containing "Database Created By User". The next section is "Database Options" and contains two radio buttons: "Public" (selected) and "Private". Below this is another "Database Options" section with the question "Would you like to import data from a MicroPAVER e65/e60 file?" and two radio buttons: "No. I will enter data manually." (selected) and "Yes. Import a MicroPAVER e65/e60 file.". The final section is "MicroPAVER data upload" and contains a "Choose a MicroPAVER .e65/.e60 file" label followed by a "Browse..." button and the text "No file selected".

# Importing MicroPAVER Data

- Importing MicroPAVER Data
  - Create an e65 file in MicroPAVER
    - Paver Database Tools
  - Create a new FAA PAVEAIR database
    - Choose to import database from a MicroPAVER e65 file

# Importing MicroPAVER Data

Go to "Member Area" and Click on "Create Database" again.

**User Profile and Data Management Page**

Seminar\_SC

Profile	Data
<ul style="list-style-type: none"><li>• Update Profile</li><li>• Change Password</li></ul>	<ul style="list-style-type: none"><li>• Create Database</li><li>• Manage Database</li><li>• Inventory Update</li><li>• Work Update</li><li>• Update Inspection</li><li>• Upload Shapefiles</li><li>• Map Assignment Tool</li><li>• LCCA</li><li>• Roughness Profile Data</li></ul>

FAA PAVEAIR : Member Area : Create Database Current Database: TAP\_A\_UserDB2

Create Database

Database name:

Database Description:

Public  
 Private

Database Options

Would you like to import data from a MicroPAVER e65/e60 file?

No, I will enter data manually.  
 Yes, Import a MicroPAVER e65/e60 file.

MicroPAVER data upload

Choose a MicroPAVER\_e65/ e60 file

No file selected.

# Importing MicroPAVER Data

When complete, you will see the message “The database is created successfully.” Click **FAA PAVEAIR Home** to select your database.



FAA PAVEAIR : Member Area : Create Database  
Uploading Files...done.  
Unzip files...done.  
Extracting Shape Files...Done.  
Transforming PDMS Data...Done.  
Creating a new PDMS Database...Done.  
Loading PDMS Data...Done.

The database was created successfully.  
[FAA PAVEAIR Home](#)  
[Manage data](#)

# Unit 3

## Assessing Pavement Condition



# Pavement Condition Surveys

## Inspection Process

- ASTM D 5340-12 and ASTM D 6433-10
  - Provides step-by-step process for identifying distresses, filling out survey forms, and calculating section PCI
- Create Sample Units
  - Divide pavement sections into Sample Units for Inspection
- Determine the Number of Sample Units
  - Calculate the minimum number of sample units that must be inspected
- Record Distresses
  - Condition Survey Forms
- Enter Inspection Data
  - Enter inspection data into FAA PAVEAIR's Update Inspection module

# Updated ASTM Standards

ASTM D5340-12 and ASTM D6433-10 identify new distresses and their deduct curves. FAA PAVEAIR has been updated to reflect these changes.

## ASTM D6433-09 - Standard Practice for Roads and Parking Lots Pavement Condition Index Surveys

Surface Type	Old Distress	New Distress
Asphalt	19. Weathering / Raveling	19. Raveling
		20. Weathering

## ASTM D5340-10 - Standard Test Method for Airport Pavement Condition Index Surveys

Surface Type	Old Distress	New Distress
Asphalt	12. Weathering / Raveling	12. Raveling
		17. Weathering
Surface Type	Old Distress	New Distress
Concrete	10. Scaling / Map Crack / Cracking	10. Scaling / Map Crack / Cracking
		16. Alkali Silica Reaction (ASR)



# Types of Distresses

Distress Codes (AC)
1. Alligator Cracking
2. Bleeding
3. Block Cracking
4. Corrugation
5. Depression
6. Jet Blast
7. Joint Reflection (PCC)
8. Long. & Trans. Cracking
9. Oil Spillage
10 Patching
11. Polished Aggregate
12. Raveling
13. Rutting
14. Shoving from PCC
15. Slippage Cracking
16. Swell
17. Weathering

Distress Codes (PCC)
1. Blow up
2. Corner Break
3. Long / Trans / Diagonal Crack
4. Durability "D" Crack
5. Joint Seal Damage
6. Patching (Small)
7. Patching (Large) and Utility Cut
8. Popouts
9. Pumping
10. Scaling / Map Crack / Cracking
11. Settlement / Fault
12. Shattered Slab
13. Shrinkage Crack
14. Spalling-Joints
15. Spalling-Corner
16. Alkali Silica Reaction (ASR)



***Rutting***



***Patching (Small)***

# Distress Guide

The screenshot displays the FAA PAVEAIR web application interface. The browser address bar shows the URL <https://faapaveair.faa.gov/Help/default.htm>. The page title is "Distress Guide > Airfield Distresses (AC)". The main content area is titled "Block Cracking (3)" and includes a "Description" section, a "Severity Levels" section, and three photographs of pavement distresses. The "Description" section explains that block cracks are interconnected cracks that divide the pavement into approximately rectangular pieces, ranging in size from 1 by 1 ft. to 10 ft. by 10 ft. (0.3 by 0.3 m to 3 by 3 m). It notes that block cracking is caused mainly by shrinkage of the AC and daily temperature cycling. The "Severity Levels" section lists three types: L (non-spalled, light spalling), M (moderately spalled, non-filled cracks, or filled cracks with mean width > 1/4 in.), and H (well-defined, severely spalled). A left-hand navigation menu lists various distress types and modules, including "Airfield Distresses (AC)", "Alligator Cracking (1)", "Bleeding (2)", "Block Cracking (3)", "Corrugation (4)", "Depression (5)", "Jet-Blast (6)", "Joint Reflection Cracking (7)", "Longitudinal / Transverse Cracking (8)", "Oil Spillage (9)", "Patching (10)", "Polished Aggregate (11)", "Raveling (12)", "Rutting (13)", "Shoving (14)", "Slippage Cracking (15)", "Swelling (16)", and "Weathering (17)".

**Block Cracking (3)**

**Description**

Block cracks are interconnected cracks that divide the pavement into approximately rectangular pieces. The blocks may range in size from approximately 1 by 1 ft. to 10 ft. by 10 ft. (0.3 by 0.3 m to 3 by 3 m). Block cracking is caused mainly by shrinkage of the AC and daily temperature cycling (that result in daily stress/strain cycling). It is not load associated. The occurrence of block cracking usually indicates that the asphalt has hardened significantly. Block cracking normally occurs over a large portion of pavement area, but sometimes will occur only in non-traffic areas. This type of distress differs from alligator cracking in that the alligator cracks form smaller, many-sided pieces with sharp angles. Also unlike block cracks, alligator cracks are caused by repeated traffic loadings and are, therefore, located only in traffic areas (that is, wheel paths).

**Severity Levels**

**L** - Blocks are defined by cracks that are non-spalled (sides of the crack are vertical) or lightly spalled, causing no FOD potential. Non-filled cracks have  $\frac{1}{4}$  in. (6 mm) or less mean width and filled cracks have filler in satisfactory condition. Blocks are well defined by cracks that are severely spalled, causing a definite FOD potential.

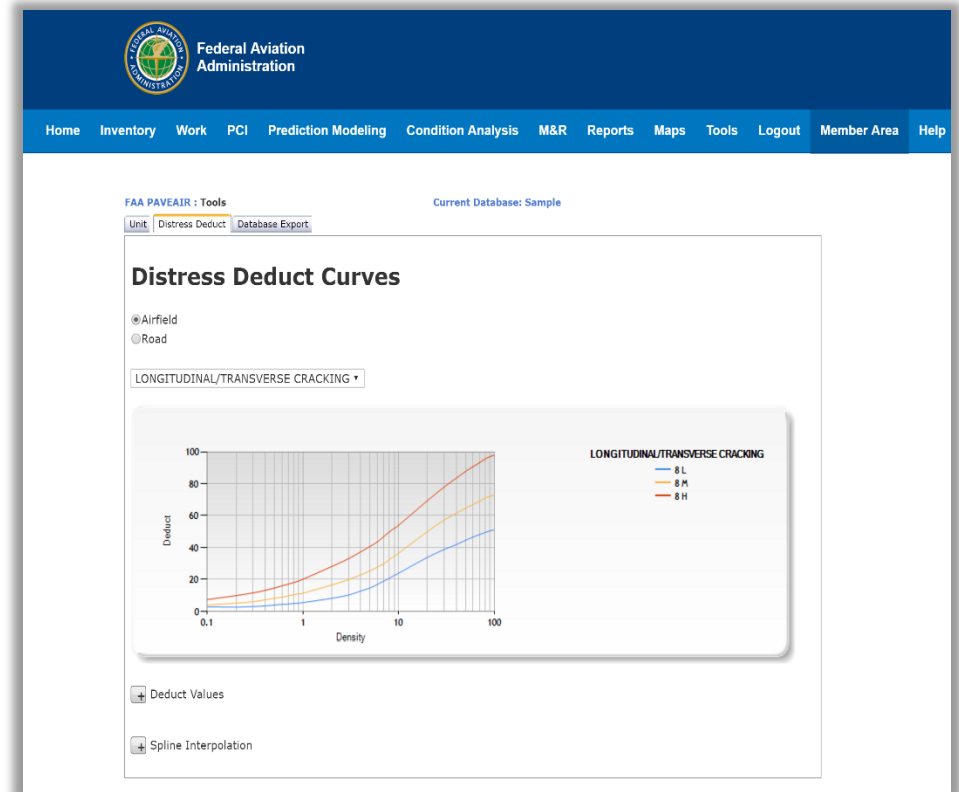
**M** - Blocks are defined by either: filled or non-filled cracks that are moderately spalled (some FOD potential); non-filled cracks that are not spalled or have only minor spalling (some FOD potential), but have a mean width greater than approximately  $\frac{1}{4}$  in. (6 mm); or filled cracks greater than  $\frac{1}{4}$  in. that are not spalled or have only minor spalling (some FOD potential), but have filler in unsatisfactory condition.

**H** - Blocks are well defined by cracks that are severely spalled, causing a definite FOD potential.

- Distress Guide
  - Part of the “Help” system
  - High resolution color pictures
  - Shows distresses at high, medium, and low
  - Explains how to properly measure each distress

# Distress Deduct Curves

- Distress Deduct Curves
  - View deduct curves for each distress
  - Deduct value details
  - Spine interpolation equation



# Create Sample Units

- Divide pavement sections into sample units for inspection
  - Asphalt
    - Subdivide into sample units consisting of 464.5 m<sup>2</sup> (5,000 ft<sup>2</sup>) of contiguous area ( $\pm$  186 m<sup>2</sup>)
  - Concrete
    - Subdivide into sample units consisting of 20 contiguous slabs ( $\pm$  8 slabs)

# Determine Number of Sample Units

- Total Sampling
  - Total sampling is desirable for project analysis
  - May not be feasible for routing management due to manpower, funds, and time required
- Partial Sampling
  - Calculate the minimum number of random sample units  $n$  that must be surveyed to obtain a 95% confidence level

$$n = \frac{Ns^2}{\left(\left(\frac{e^2}{4}\right)(N-1) + s^2\right)}$$

- $e$  = acceptable error in estimating the section PCI;  $\pm 5$  PCI points  
 $s$  = standard deviation of the PCI from one sample unit to another; assumed to be 10 for AC pavements and 15 for PCC pavements  
 $N$  = total number of sample units in the section

# Record Distresses

- Record distresses using the procedures documented in ASTM D5340-10 and ASTM D 6433-09
  - Divide pavements into sample units
  - Perform condition survey of sample units
  - Record distresses, severity, and quantity on survey data sheets
- Print survey data sheets from FAA PAVEAIR's Update Inspections Module
  - Distresses for Asphalt Pavements
  - Distresses for Concrete Pavements

The image displays two survey data sheets. The top sheet is titled "AIRFIELD CONCRETE PAVEMENTS CONDITION SURVEY DATA SHEET FOR SAMPLE UNIT". It includes fields for BRANCH, SECTION, SAMPLE UNIT, SURVEYED BY, DATE, and SAMPLE AREA. A "Distress Types" list includes: 1. Blow up, 2. Corner Break, 3. Long/Trans/Diagonal Crack, 4. Durability Crack, 5. Joint Seal Damage, 6. Patching, 7. Patching/Utility Cut, 8. Popouts, 9. Pumping, 10. Scaling/Map Crack/Crazing, 11. Settlement/Fault, 12. Spalls, 13. Spalls, 14. Spalls, 15. Spalls, 16. Alk. A "SKETCH:" area is provided with a grid. Below the list is a table with columns for DIST TYPE, SEV, and NO. SLABES.

The bottom sheet is titled "AIRFIELD ASPHALT PAVEMENT CONDITION SURVEY DATA SHEET FOR SAMPLE UNIT". It includes fields for BRANCH, SECTION, SAMPLE UNIT, SURVEYED BY, DATE, and SAMPLE AREA. A "Distress Types" list includes: 1. Alligator Cracking, 2. Bleeding, 3. Block Cracking, 4. Corrugation, 5. Depression, 6. Jet Blast, 7. It. Reflection (PCC), 8. Long. & Trans. Cracking, 9. Oil Spillage, 10. Patching, 11. Polished Aggregate, 12. Raveling, 13. Rutting, 14. Shoving from PCC, 15. Slippage Cracking, 16. Swell, 17. Weathering. A "SKETCH:" area is provided with a grid. Below the list is a table with columns for DISTRESS SEVERITY, QUANTITY, TOTAL, DENSITY %, and DEDUCT VALUE.

# Enter Inspection Data

## Update Inspection

- Input / update inspection data from Condition Surveys
- PCI button
  - Calculates section condition (PCI)
  - Displays distress, deduct, and PCI details

The screenshot shows the Federal Aviation Administration's web application interface for entering inspection data. The header includes the FAA logo and navigation links: Home, Inventory, Work, PCI, Prediction Modeling, Condition Analysis, M&R, Reports, Maps, Tools, Logout, Member Area, and Help.

The main content area displays the 'Current Database: Sample' and 'Select Inventory' section. It includes dropdown menus for Network (My Sample Airy), Branch (TAXIWAY), and Section (A). Below this, there are links for 'Condition Survey Data Sheets: Asphalt Pavements' and 'Concrete Pavements (PDF)'. A 'Section 4 Summary' table shows data for TAXIWAY AAC with values 127400, 0.329, 99, and 0.00.

The 'Inspection Date' section shows a table with columns for Inspection Date, Comment, and New Construction. The date 8/29/2007 is entered, and there are 'Edit' and 'Delete' buttons. An 'Add New' button is also present.

The 'Samples for Inspection Date 8/29/2007' section displays a table with columns for Sample Number, Sample Type, Sample Size, Size Unit, Comment, and No Distress. The table lists several samples, including Sample 10, which is highlighted. Below the table, there is a 'Random' dropdown menu and an 'Add New' button.

The 'Distresses for Sample Number 10' section displays a table with columns for ASTM Code, Severity, Comment, Quantity, and Quantity Unit. The table lists three distress types: 12 Ravelling (L, 2,499.96 ft²), 3 Block Cracking (M, 5,099.96 ft²), and 1 Alligator Cracking (High, 1 ft²). There are 'Edit' and 'Delete' buttons for each row, and an 'Add New' button at the bottom.

At the bottom of the page, there is a 'PCI' button.

# Pavement Condition Index (PCI)

- FAA PAVEAIR uses the procedures documented in ASTM D5340 to calculate PCI
- Developed by the US Army Corps of Engineers
- Quantify Airport Pavement Condition
- Numerical rating of the pavement condition

PCI	
100	Good
85	Satisfactory
70	Fair
55	Poor
40	Very Poor
25	Serious
10	Failed
0	



# Unit 4

## Predicting Pavement Performance



# Prediction Modeling

- Collect Model Data
  - Group pavement sections of similar construction and with similar traffic patterns
- Review Model Data
- Use Boundary / Outlier
  - Filter out erroneous data points
- Options
- Prediction Curve
  - Plot predicted PCI vs. Age

FAA PAVEAIR : Prediction Modeling Current Database: Seminar\_SC\_2016

Model Name	Sample_May_2016_Semina ▾
Database Name	Seminar_SC_2016
Family Type	PCI vs Age
Allow Public Access	True
User	faa

Open New Delete

Note: Only registered users can create a prediction model and only the model owner can make changes to an existing model.

1: Collect Model Data | 2: Review Model Data | 3: Use Boundary/Outlier | 4: Options | 5: Prediction Curve | 6: Model Assignment

Equation and Status:  
 $Y = -0.0030(X-M)^3 + 0.1738(X-M)^2 + -2.4444(X-M) + 80.9734$   
M: Mean value of X  
Mean Err: 0  
Abs Err: 4.7718896451685  
Correlation: 0.728068374962011  
Standard Deviation: 5.56354398069115  
R2 = 0.530083558619823

# Definitions from Research

- Serviceability: Comparison of pavement's actual behavior and performance to an expectation
  - Does this pavement do what we want?
  - Not an inherent property since it is a comparison
- Distress: A condition or property that reduces serviceability
- Performance: Change in serviceability with time
- Failed: No longer meets expectations
- Condition: A quantification of serviceability to enable repeatable assessment and comparison of pavement

# Condition Analysis

- Provides projections about the viability of pavements
- Analysis based upon:
  - Prior inspection data
  - Comparison of values between previous inspections
  - Projected conditions
- Graph PCI vs. Age

Federal Aviation Administration

Home Inventory Work PCI Prediction Modeling Condition Analysis M&R Reports Maps Tools Logout Member Area Help

FAA PAVEAIR : Condition Analysis Current Database: Seminar\_SC\_2016

Network: Demo\_Sample Demo\_Sample Airport  
 Branch: Sample Runwa Sample Runway  
 Section: A A

Condition Start Date: (MM/DD/YYYY) 5/10/2016 Years: 30

[Continue](#)

Network	Branch	Section	Date	Activity	PCI	Age	Area	Unit
Demo_Sample Airport	Sample Runway	A	10/20/2016	Family Curve	69	15	88500	ft²
Demo_Sample Airport	Sample Runway	A	10/20/2017	Family Curve	66	16	88500	ft²
Demo_Sample Airport	Sample Runway	A	10/20/2018	Family Curve	63	17	88500	ft²
Demo_Sample Airport	Sample Runway	A	10/20/2019	Family Curve	60	18	88500	ft²
Demo_Sample Airport	Sample Runway	A	10/20/2020	Family Curve	57	19	88500	ft²
Demo_Sample Airport	Sample Runway	A	10/20/2021	Family Curve	54	20	88500	ft²
Demo_Sample Airport	Sample Runway	A	10/20/2022	Family Curve	51	21	88500	ft²
Demo_Sample Airport	Sample Runway	A	10/20/2023	Family Curve	48	22	88500	ft²
Demo_Sample Airport	Sample Runway	A	10/20/2024	Family Curve	45	23	88500	ft²
Demo_Sample Airport	Sample Runway	A	10/20/2025	Family Curve	42	24	88500	ft²
Demo_Sample Airport	Sample Runway	A	10/20/2026	Family Curve	39	25	88500	ft²
Demo_Sample Airport	Sample Runway	A	10/20/2027	Family Curve	36	26	88500	ft²
Demo_Sample Airport	Sample Runway	A	10/20/2028	Family Curve	33	27	88500	ft²
Demo_Sample Airport	Sample Runway	A	10/20/2029	Family Curve	30	28	88500	ft²
Demo_Sample Airport	Sample Runway	A	10/20/2030	Family Curve	27	29	88500	ft²
Demo_Sample Airport	Sample Runway	A	10/20/2031	Family Curve	24	30	88500	ft²

# Unit 5

## Maintenance and Repair Planning



# Maintenance and Repair Planning

- Scope
- Timing
- Plan Mode
  - Critical PCI Method
  - Minimum Condition
  - Consequence of Local Repair
- Policies
  - Apply Inflation Rate
  - Apply Policy in First Year
  - Global
- M&R Data
  - Applied Policy Consequence
  - Applied Policy Details
  - Inventory Info

The screenshot shows the Federal Aviation Administration's Maintenance and Repair Planning software interface. The header includes the FAA logo and the text "Federal Aviation Administration". The navigation menu contains: Home, M&R Management, M&R Tables, Consequence of Local Repair, Minimum Condition, Critical PCI, and Help.

The main content area displays "MR: 100:tocrepsample:Sample" and "Open Existing M&R". Below this, there are fields for "M&R Name" (SeminarCLR), "Database" (Seminar\_SC\_2016), and "M&R Type" (ConsequenceOfLocalRepair). An "Open" button is present.

Below the "Open" button are tabs for "Scope", "Timing", "Option", and "Result". The "Option" tab is selected, showing a "Save All Changes" section with a "Save" button.

Below the "Save" button is a dropdown menu for "Applied Policy Consequence" with a green checkmark icon.

At the bottom, there is a table with the following data:

Network	Branch	Section	StartCondition	Policy	EndCondition	Cost
Demonstration RW04-22	01		69	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)	69	\$0.00
Demonstration RW04-22	02		68	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)	68	\$0.00
Demonstration TWA		01	74	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)	74	\$0.00
Demonstration TWA		02	69	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)	78	\$9,133.86
Demonstration APRON		01	72	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)	83	\$8,876.19

# Customizable M&R Settings

- Localized M&R
  - Policy
  - Work Type / Cost
  - Work Consequence
- Global M&R
  - Policy
- Major M&R
  - Minimum Condition
  - Branch Use Priority
  - Section Rank Priority
  - Major M&R Priority
- Cost by Condition
  - Cost by Condition
  - Budget

Open Existing M&R

M&R Name	Database	M&R Type
SeminarCLR	Seminar_SC_2016	ConsequenceOfLocalRepair

Scope | **Timing** | Option | Result

Localized

Policy < Critical	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)	<input type="button" value="Edit"/>	Default Cost by Work Type	<input type="button" value="Edit"/>	Factor:
1					
Policy > Critical	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)	<input type="button" value="Edit"/>	Default Cost by Work Type	<input type="button" value="Edit"/>	Factor:
1					
Policy Consequence	Localized Policy Consequence (Default)	<input type="button" value="Edit"/>			

## Edit Localized M&R

- [Localized Policy](#)
- [Localized Work Type / Cost](#)
- [Localized Work Consequence](#)

## Edit Global M&R

- [Global Policy](#)

## Edit Major M&R

- [Minimum Condition](#)
- [Branch Use Priority](#)
- [Section Rank Priority](#)
- [Major M&R priority](#)

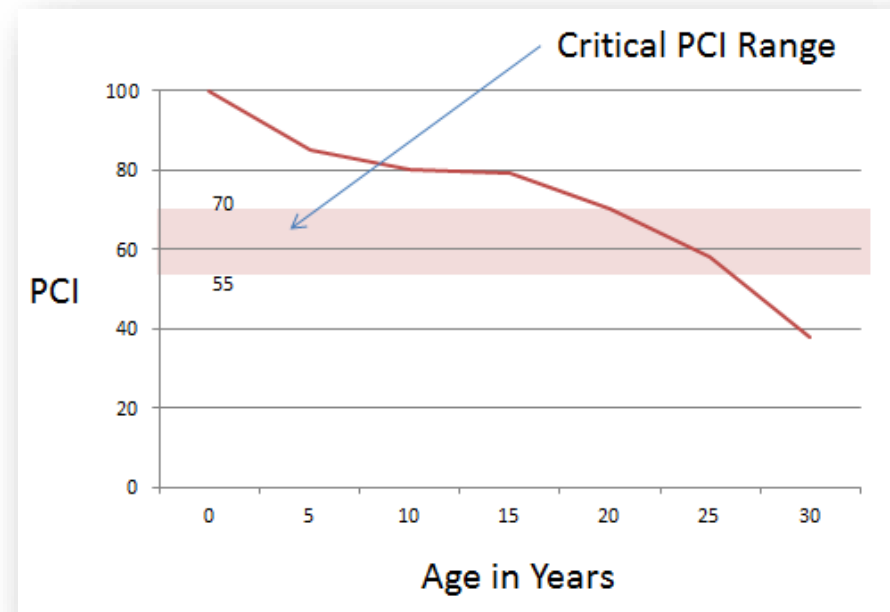
## Cost by Condition / Budget

- [Cost by Condition](#)
- [Budget](#)



# Critical PCI Method

- Critical PCI
  - PCI value after which a pavement rapidly deteriorates
  - Usually between a PCI number of 70 and 55
- More economical to maintain pavements above rather than below the Critical PCI
  - The cost of applying localized preventive maintenance increases significantly





# Minimum Condition

- Minimum Condition
  - Only concerned with the Major M&R required to maintain a minimum PCI
    - Major M&R: Any overlay or other major work that results in a PCI of 100
  - Select the lowest pavement condition that is allowed for each pavement rank
  - Prioritize the Maintenance and Repair plan to reflect the choice of “Minimum Condition” as the variable for decision making in regard to future work

# Consequence of Local Repair

- Consequence of Local Repair
  - Calculates the cost and resulting condition from the immediate implementation of local maintenance and repair.
  - M&R actions are based on current distresses and their severity.
  - Consider this plan mode for pavements above Critical PCI.

# Unit 6

## Additional Functions



# Mapping

- Add a shape file to the current database
  - Use the “Upload Shapefiles to Current DB” tool
- Import a shape file from MicroPAVER
  - Shapefiles are imported with MicroPAVER data
- Shape file assignment tool
  - Allows the assignment of pavement sections to shape file objects
  - Non-concurrent sections are supported



# Reporting

- Available Reports
  - Branch Listing Report
  - Work History Report
  - Branch Condition Report
  - Section Condition Report
  - Re-Inspection Report
- View, print, or export in Adobe PDF or Microsoft Excel format
- Condition Reports support additional mapping features

The screenshot displays the FAA PAVEAIR Reports interface. The top navigation bar includes the FAA logo and the text "Federal Aviation Administration". Below the navigation bar, the current database is identified as "TAP\_UserDB2". The main content area shows a list of reports under the heading "FAA PAVEAIR : Reports". The selected report is "Branch Condition Report". The report title is "Please Select a Network Name" and "Branch Condition Report". The report is generated on 05/20/10 at 10:45 PM. The report content includes a table with the following data:

Branch ID	Branch Name	Blvd Section	Sum Section Length	Avg Section Width	Tree Area	Branch Size	Avg PCI	PCI Std Deviation	Height Avg PCI
2	HWY2010	1	2,264	100	27,702	HWY2010	61	22	77
3	HWY2010	4	8,933	107	1,422,942	HWY2010	55	12	72
4	HWY2010	2	8,263	100	938,708	HWY2010	54	2	65
6	HWY2010	2	620	100	42,001	HWY2010	62	42	62
1	HWY2010	4	1,774	17	30,816	HWY2010	54	18	68
5	HWY2010	21	29,224	95	1,822,517	HWY2010	54	23	43

# Life Cycle Cost Analysis

- Shares data with the AAPTTP AirCost LCCA application
- Economic Analysis
  - Evaluate the long-term economic efficiency between different pavement design strategies
- Procedures
  - Establish alternative pavement design strategies
  - Determine the performance period and activity timing
  - Estimate costs
  - Compute Net Present Value (NPV)
  - Analyze results
  - Re-evaluate pavement design strategies

The image displays the AirCost LCCA application interface, which is a web-based tool for performing Life Cycle Cost Analysis for Airport Pavements. The interface is part of the Federal Aviation Administration's (FAA) AAPTTP (Airfield Asphalt Pavement Technology Program) Project 06-06.

The screenshot shows the main menu with options: Home, Inventory, Work, PCI, Prediction Modeling, Condition Analysis, M&R, Reports, Maps, Tools, Logout, Member Area, and Help. The current database is Seminar\_SC\_2016. The user is logged in as FAA PAVEAIR.

The main content area shows the "Springfield Regional Airport" project selected. The "LCCA Parameters" tab is active, displaying a table of project details:

Field	Value
Airport Name	Springfield Regional Airport
Location (City, State)	Springfield
Airport Authority Name	Springfield Airport Authority
Airport Consultant Name	Airport C
Project AIP Number	
Project Description	Rehab of Asphalt R
LCCA Date	1/1/2015

Below the table, there are buttons for "Add Spec/ Pay Items & Unit Costs" and "View Spec/ Pay Items & Unit Costs Library".

The "Create/Modify Alternatives" section shows four alternatives: Alternative 1, Alternative 2, Alternative 3, and Alternative 4. The "Run LCCA Simulation" section has an "Execute Simulation" button.

The "Help" section includes buttons for "Save Workbook" and "Exit AirCost". The version information is "Version 1.0.0 3 January 2011".

The bottom of the image shows the "AirCost" logo and the title "Life-Cycle Cost Analysis for Airport Pavements". Below the logo, it states: "Developed under the Federal Aviation Administration (FAA) Airfield Asphalt Pavement Technology Program (AAPTTP) Project 06-06". To the right, there is a graphic for the "Airfield Asphalt Pavement Technology Program" showing a runway at sunset.

# Life Cycle Cost Analysis

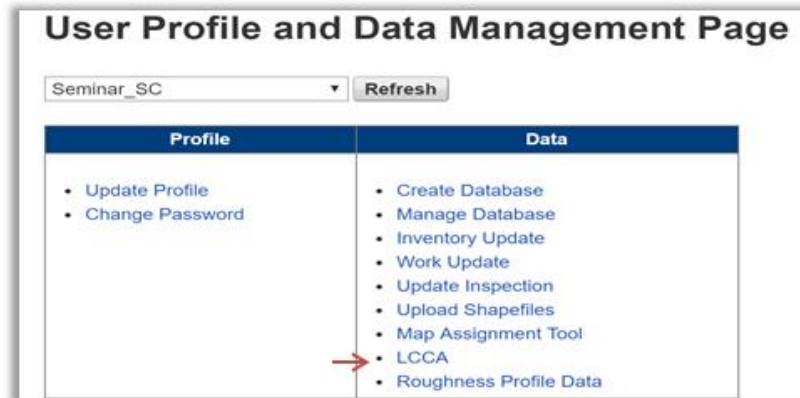
- Purpose
  - To demonstrate how to work with LCCA plans
  - Show how FAA PAVEAIR links with the AirCost application

# Life Cycle Cost Analysis

1. Select "Member Area" from the Navigation Bar.



2. From the Member Area, click the LCCA link.



3. The "Add New" and "Delete" buttons are used to create and delete your LCCA projects. For this demonstration we will use the "Springfield Regional Airport" sample LCCA plan included with FAA PAVEAIR. From the Select Airport/ Project dropdown box, select "Springfield Regional Airport".





# Life Cycle Cost Analysis

- The "Airport Information" tab displays general information about your airport. The "Edit" link is used to update this information.

Airport Information	Project Detail	LCCA Parameters	Pay Item & Unit Cost	Create Alternatives	Execute LCCA
<b>Airport Name</b>	Springfield Regional Airport				
<b>Location (City, State)</b>	Springfield				
<b>Airport Authority Name</b>	Springfield Airport Authority				
<b>Airport Consultant Name</b>	Airport Consultants, Inc.				
<b>Project AIP Number</b>					
<b>Project Description</b>	Rehab of South End (3800 ft) of Existing Asphalt Runway				
<b>LCCA Date</b>	1/1/2015				
<a href="#">Edit</a>					

- The "project Detail" tab is used to record the details regarding the category of work to be performed. The "Edit", "New", and "Delete" links are used to manage your Project Details.

Airport Information	Project Detail	LCCA Parameters	Pay Item & Unit Cost	Create Alternatives	Execute LCCA
<b>Facility Type:</b>	Runway				
<b>Feature/Facility ID:</b>	Runway 5-23				
<b>Event Type:</b>	Rehabilitation				
<b>Description</b>	Rehab of South End (3800 ft) of Existing Asphalt Runway				
<b>From STA:</b>	0+00				
<b>To STA:</b>	38+00				
<b>Pavement Area:</b>	35955.00 Sq Yd				
<b>Shoulder Area:</b>	6000.00 Sq Yd				
<b>Lighting:</b>					
<b>Striping:</b>					
<b>Grooved Pavement Area:</b>	0.00 Sq Yd				
<b>Comments:</b>					
<a href="#">Edit</a> <a href="#">New</a> <a href="#">Delete</a>					

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# Life Cycle Cost Analysis

6. The LCCA Parameters tab is used to modify the LCCA input parameters used for the simulation. Use the “Select project feature/facility ID” dropdown list to select our “Runway 5/23” project.

LCCA Parameters	
Select project feature/facility ID	Runway 5-23
Analysis Base Year	2015
Initial Construction Year	2018
Analysis Period	50
Salvage Value	<input checked="" type="checkbox"/> Prorated Life
Administrative Cost	5.00%
Engineering Cost	5.00%
Maint. of traffic Cost	5.00%
<a href="#">Edit</a>	

7. The “Analysis Variables tab is used to select the type of Discount Rate (Deterministic, Normal Probabilistic, Uniform Probabilistic, or Triangular Probabilistic), Service Life, and Pay Item Unit Costs.

Analysis Variables	
Select project feature/facility ID	Runway 5-23
Discount Rate	Deterministic
Mean	2.75%
Std. Deviation	0.00%
Service Life	Normal Probabilistic
Pay Item Unit Costs	Deterministic
<a href="#">Edit</a>	

Analysis Variables	Description
Discount Rate	Annually updated 30-year discount rate from OMB Circular A-95A.
Service Life	The service life should be based on experience.
Pay Item Unit Costs	Should be based on products purchased and used in the same geographic region.

# Life Cycle Cost Analysis

9. The "Iteration Control" tab is used to control the accuracy and running time of the analysis, as well as which results to report.

Parameter	Value
Iterations	5000
ConvTol	5.00 %
Percentile1	10.00 %
Percentile2	50.00 %
Percentile3	75.00 %
Percentile4	90.00 %

Edit

Indirect/ User Costs	Description
<b>Iterations</b>	Maximum number of repetitions in the simulation
<u>ConvTol</u>	How precise must the results be? Lower numbers indicate higher precision and require longer run times
<b>Percentile1</b>	Percentile of first reported result. The cost for which <i>Percentile1</i> percent of the simulations were lower.
<b>Percentile2</b>	Percentile of first reported result. The cost for which <i>Percentile2</i> percent of the simulations were less expensive.
<b>Percentile3</b>	Percentile of first reported result. The cost for which <i>Percentile3</i> percent of the simulations were less expensive.
<b>Percentile4</b>	Percentile of first reported result. The cost for which <i>Percentile4</i> percent of the simulations were less expensive.

# Life Cycle Cost Analysis

10. The “Pay Item Cost” tab is used to manage the material library for inclusion in events and alternatives.

Airport Information									Project Detail									LCCA Parameters									Pay Item & Unit Cost									Create Alternatives									Execute LCCA								
Add Item & Unit cost																																																					
Edit-Update	ID	Spec/Pay Item Name	Spec/Pay Item No	Classification	Unit	Mean Unit cost	Std Dev	Unit Cost	Delete																																												
Edit	1	Common Excavation	P-100-4	Base/ Subbase	cu yd	7.42	1.94		Delete																																												
Edit	2	Topsoil Borrow (LV)	P-100-5	Base/ Subbase	cu yd	25.67	4.04		Delete																																												
Edit	3	Aggregate Base Class 5 (CV)	P-100-7	Base/ Subbase	cu yd	19.67	2.89		Delete																																												
Edit	4	Subbase Course	P-154-A	Base/ Subbase	cu yd	0.00	0.00		Delete																																												
Edit	5	Aggregate Base Course-Uncrushed	P-208-A	Base/ Subbase	cu yd	0.00	0.00		Delete																																												
Edit	6	Aggregate Base Course-Crushed	P-208-B	Base/ Subbase	cu yd	0.00	0.00		Delete																																												
Edit	7	Crushed Aggregate Base Course (6-in depth)	P-209-A1	Base/ Subbase	sq. yd	6.50	1.30		Delete																																												
Edit	8	Crushed Aggregate Base Course (8-in depth)	P-209-A2	Base/ Subbase	sq. yd	8.00	1.60		Delete																																												
Edit	9	Crushed Aggregate Base Course (10-in depth)	P-209-A3	Base/ Subbase	sq. yd	9.50	1.90		Delete																																												
Edit	10	Crushed Aggregate Base Course (12-in depth)	P-209-A4	Base/ Subbase	sq. yd	11.00	2.20		Delete																																												
Edit	11	Crushed Aggregate Base Course (cu yd)	P-209-B	Base/ Subbase	cu yd	25.00	5.00		Delete																																												
Edit	12	Crushed Aggregate Base Course (ton)	P-209-C	Base/ Subbase	ton	14.00	2.80		Delete																																												
Edit	13	Concrete Pavement Rubblization	P-215-A	Base/ Subbase	sq. yd	2.50	0.50		Delete																																												
Edit	14	Recycled Concrete Aggregate Base Course (6-in depth)	P-219-A1	Base/ Subbase	sq. yd	2.75	0.55		Delete																																												
Edit	15	Recycled Concrete Aggregate Base Course	P-219-A1	Base/ Subbase	ton	6.00	1.20		Delete																																												

11. The “Create Alternatives” tab allows you to create up to four different scenarios for analysis.

Airport Information									Project Detail									LCCA Parameters									Pay Item & Unit Cost									Create Alternatives									Execute LCCA								
Alternative 1																		Alternative 2																																			
Alternative 3																		Alternative 4																																			

# Life Cycle Cost Analysis

11. The "Create Alternatives" tab allows you to create up to four different scenarios for analysis.

Airport Information | Project Detail | LCCA Parameters | Pay Item & Unit Cost | **Create Alternatives** | Execute LCCA

Alternative 1 | Alternative 2  
Alternative 3 | Alternative 4

12. Click on "Alternative 1". From the dropdown box select the Life-Cycle Event: "Initial construction". We now view and edit the specifics for the plan. For this demonstration, the "Initial construction" and "Rehab 1" events have been pre-defined. Click the "Back to LCCA" button.

Setting Parameters for Alternative 1 « Back to LCCA

Select Pavement Life Cycle Event:

Alternative Description:

Exclude From Analysis:

Update |

Mainline Construction | Shoulder Construction | Scheduled Maintenance 1 | Scheduled Maintenance 2

Event Description:  Daily Revenue % Reduction:  Duration of Const (days):

Service Life (in Years)

Definition Type:  Mean:  Std Dev:

Description	Spec/ Pay Items	Quantity	Units	Unit Cost	Include in Salvage?
	Mobilization	1	EA	29333.33	<input checked="" type="checkbox"/>
	Bituminous Material (for Seal Co)	35955	gallon	1.50	<input checked="" type="checkbox"/>
	Sawing Bituminous Pavement	200	ft	4.08	<input checked="" type="checkbox"/>
	Common Excavation	3865	cu yd	7.42	<input checked="" type="checkbox"/>
	Topsoil Borrow (LV)	100	cu yd	25.67	<input checked="" type="checkbox"/>
	Machine Time	5	EA	270.00	<input checked="" type="checkbox"/>
	Aggregate Base Class 5 (CV)	1968	cu yd	19.67	<input type="checkbox"/>
	Type SP 12.5 Wearing Course Mi	35986	sq. yd	5.91	<input type="checkbox"/>
	Type SP 12.5 Non-Wearing Course	35986	sq. yd	5.91	<input type="checkbox"/>
	Traffic Control	1	EA	3366.67	<input type="checkbox"/>
	Erosion Control Blanket Category	5465	sq. yd	1.87	<input type="checkbox"/>
	Erosion Control	1	EA	4550.00	<input type="checkbox"/>
	Pavement Marking Special	25341	sq. ft	0.24	<input type="checkbox"/>
	Adjust PAPI	2	EA	1916.67	<input type="checkbox"/>

# Life Cycle Cost Analysis

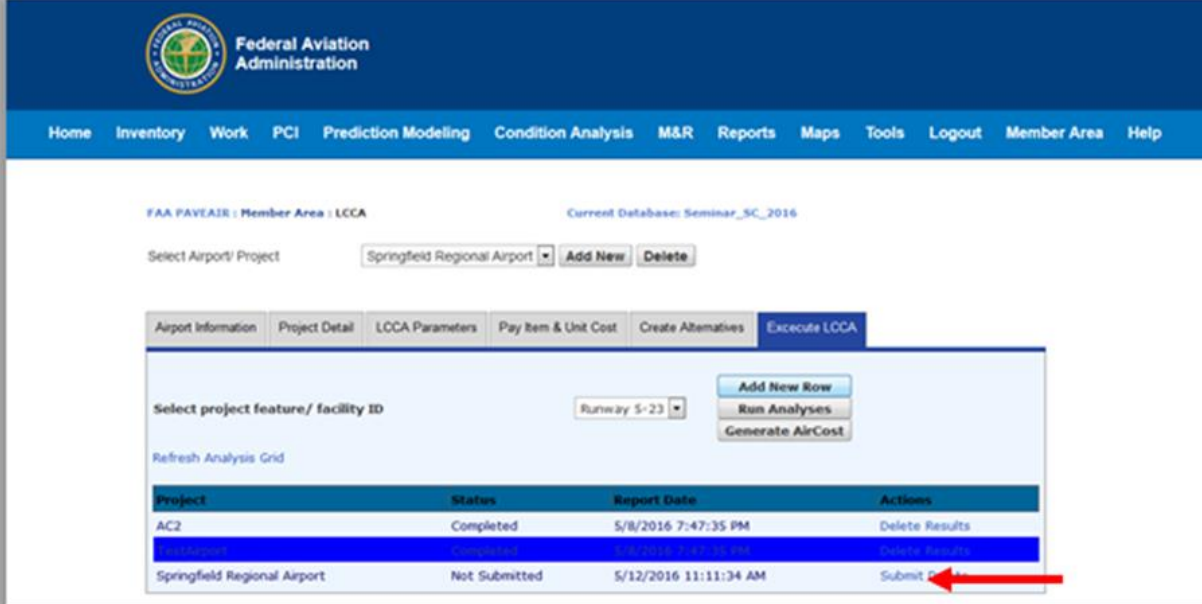
13. A queueing system is used to manage analysis runs. This allows users to set up multiple analysis and have them run in the background. Analyses are listed in the analysis grid. The status of each analysis is shown. “Not Submitted” indicates that the analysis has not been finalized and submitted to the analysis module. “Queued” indicates the analysis has been finalized and submitted, but results have not be calculated. “In Progress” indicates the results of that analysis are currently being calculated. “Complete” indicates the results are ready for viewing. To queue an analysis, select it from the “Select project feature/facility ID” drop down and press “Add New Row”. A new row is added to the analysis grid.

The screenshot displays the FAA PAVEAIR LCCA interface. At the top, the Federal Aviation Administration logo and name are visible. Below the logo is a navigation menu with items: Home, Inventory, Work, PCI, Prediction Modeling, Condition Analysis, M&R, Reports, Maps, Tools, Logout, Member Area, and Help. The main content area shows the user's current session: FAA PAVEAIR : Member Area : LCCA and Current Database: Seminar\_SC\_2016. A dropdown menu for 'Select Airport/ Project' is set to 'Springfield Regional Airport', with 'Add New' and 'Delete' buttons. Below this is a tabbed interface with 'Execute LCCA' selected. The 'Execute LCCA' tab contains a 'Select project feature/ facility ID' dropdown set to 'Runway 5-23', and three buttons: 'Add New Row' (highlighted with a red arrow), 'Run Analyses', and 'Generate AirCost'. A 'Refresh Analysis Grid' link is also present. At the bottom, an analysis grid table is shown with the following data:

Project	Status	Report Date	Actions
AC2	Completed	5/8/2016 7:47:35 PM	Delete Results
AC2	Completed	5/8/2016 7:47:35 PM	Delete Results

# Life Cycle Cost Analysis

14. Click the "Submit" button to submit the parameters to the analysis engine. Any changes made in the analysis parameters made after clicking "submit" will not be reflected in the results.



The screenshot displays the FAA PAVEAIR LCCA interface. At the top, the Federal Aviation Administration logo and name are visible. Below the logo is a navigation menu with items: Home, Inventory, Work, PCI, Prediction Modeling, Condition Analysis, M&R, Reports, Maps, Tools, Logout, Member Area, and Help. The main content area shows the user is in the 'Member Area' for 'LCCA' and the current database is 'Seminar\_SC\_2016'. A dropdown menu for 'Select Airport/ Project' is set to 'Springfield Regional Airport', with 'Add New' and 'Delete' buttons. Below this is a tabbed interface with tabs for 'Airport Information', 'Project Detail', 'LCCA Parameters', 'Pay Item & Unit Cost', 'Create Alternatives', and 'Execute LCCA'. The 'Execute LCCA' tab is active. In this tab, there is a 'Select project feature/ facility ID' dropdown set to 'Runway 5-23', and buttons for 'Add New Row', 'Run Analyses', and 'Generate AirCost'. A 'Refresh Analysis Grid' link is also present. Below these controls is a table with the following data:

Project	Status	Report Date	Actions
AC2	Completed	5/8/2016 7:47:35 PM	Delete Results
Springfield Regional Airport	Not Submitted	5/12/2016 11:11:34 AM	Submit Results

A red arrow points to the 'Submit Results' button in the table's 'Actions' column for the 'Springfield Regional Airport' row.

# Life Cycle Cost Analysis

15. Click the “Run Analyses” to start the analysis engine. Results will be calculated for all analyses with the status of “Queued”.

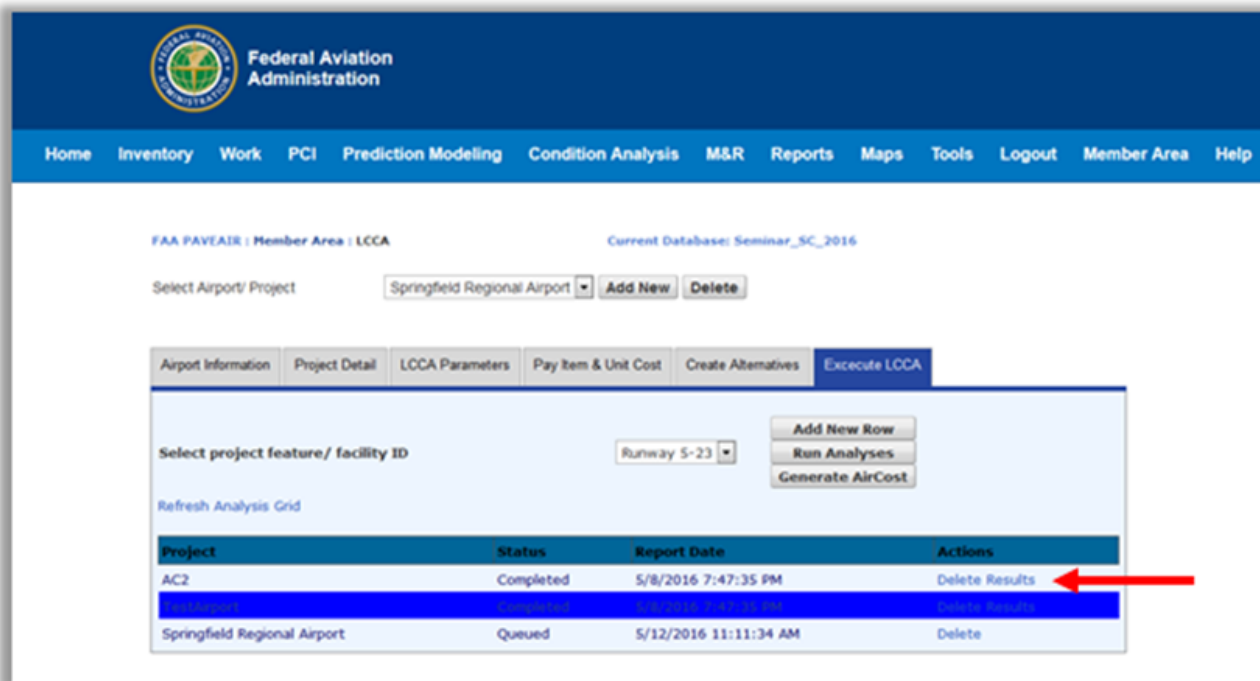
The screenshot displays the FAA PAVEAIR LCCA interface. At the top, the Federal Aviation Administration logo and name are visible. Below the logo is a navigation menu with options: Home, Inventory, Work, PCI, Prediction Modeling, Condition Analysis, M&R, Reports, Maps, Tools, Logout, Member Area, and Help. The main content area shows the user is in the 'Member Area' for 'LCCA' and the current database is 'Seminar\_SC\_2016'. A dropdown menu for 'Select Airport/ Project' is set to 'Springfield Regional Airport', with 'Add New' and 'Delete' buttons. Below this, a series of tabs includes 'Airport Information', 'Project Detail', 'LCCA Parameters', 'Pay Item & Unit Cost', 'Create Alternatives', and 'Execute LCCA'. The 'Execute LCCA' tab is active. Underneath, there is a 'Select project feature/ facility ID' dropdown set to 'Runway 5-23', with 'Add New Row', 'Run Analyses', and 'Generate AirCost' buttons. A red arrow points to the 'Run Analyses' button. Below the buttons is a 'Refresh Analysis Grid' link. At the bottom, a table displays the analysis results.

Project	Status	Report Date	Actions
AC2	Completed	5/8/2016 7:47:35 PM	Delete Results
Runway 5-23	Completed	5/12/2016 11:11:34 AM	Delete Results
Springfield Regional Airport	Queued	5/12/2016 11:11:34 AM	Delete



# Life Cycle Cost Analysis

16. Click "Results" to see the results of the analysis.

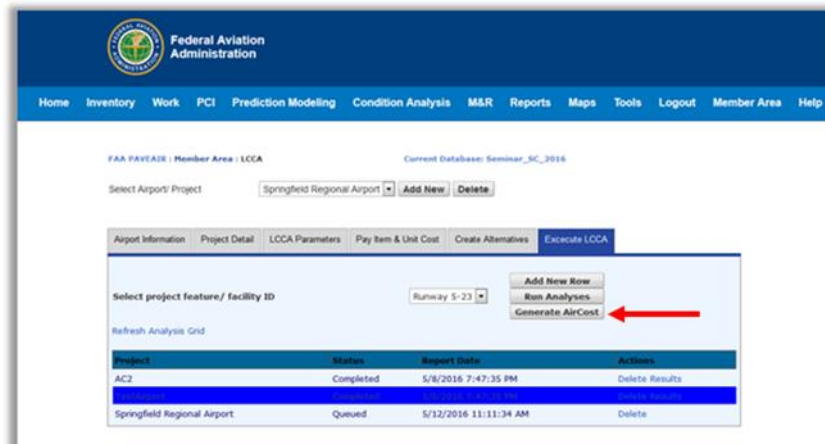


The screenshot displays the FAA PAVEAIR LCCA interface. At the top, the Federal Aviation Administration logo and name are visible. Below the logo is a navigation menu with options: Home, Inventory, Work, PCI, Prediction Modeling, Condition Analysis, M&R, Reports, Maps, Tools, Logout, Member Area, and Help. The main content area shows the user is in the 'Member Area' for 'LCCA' and the current database is 'Seminar\_SC\_2016'. A dropdown menu for 'Select Airport/ Project' is set to 'Springfield Regional Airport', with 'Add New' and 'Delete' buttons. Below this is a tabbed interface with 'Execute LCCA' selected. Under the 'Execute LCCA' tab, there is a 'Select project feature/ facility ID' dropdown set to 'Runway 5-23', and buttons for 'Add New Row', 'Run Analyses', and 'Generate AirCost'. A 'Refresh Analysis Grid' link is also present. The main data area is a table with the following columns: Project, Status, Report Date, and Actions.

Project	Status	Report Date	Actions
AC2	Completed	5/8/2016 7:47:35 PM	Delete Results
Runway 5-23	Completed	5/12/2016 11:11:34 AM	Delete Results
Springfield Regional Airport	Queued	5/12/2016 11:11:34 AM	Delete

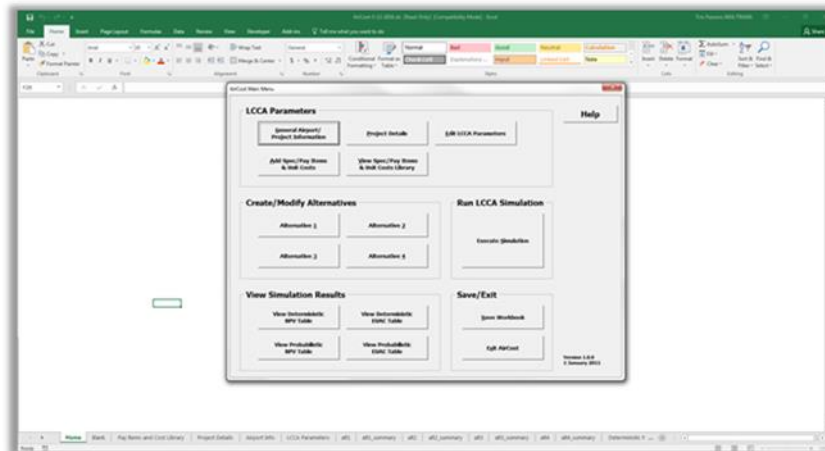
# Life Cycle Cost Analysis

17. Data can also be exported to the AAPT AirCost spreadsheet and run locally using the “Generate AirCost” button, but the LCCA routine built into PAVEAIR runs in approximately 10% of the time of the spreadsheet version.



The screenshot shows the FAA PAVEAIR web interface. At the top, there is a navigation bar with the FAA logo and the text "Federal Aviation Administration". Below the navigation bar, there are several menu items: Home, Inventory, Work, PCI, Prediction Modeling, Condition Analysis, M&R, Reports, Maps, Tools, Logout, Member Area, and Help. The main content area displays "FAA PAVEAIR | Member Area | LCCA" and "Current Database: Seminar\_SC\_2016". There is a dropdown menu for "Select Airport/ Project" set to "Springfield Regional Airport" with "Add New" and "Delete" buttons. Below this, there are tabs for "Airport Information", "Project Detail", "LCCA Parameters", "Pay Item & Unit Cost", "Create Alternatives", and "Execute LCCA". The "Execute LCCA" tab is active. In this tab, there is a "Select project feature/ facility ID" dropdown set to "Runway S-23" and three buttons: "Add New Row", "Run Analyses", and "Generate AirCost". A red arrow points to the "Generate AirCost" button. Below the buttons, there is a "Refresh Analysis Grid" link and a table with the following data:

Project	Status	Report Date	Actions
AC2	Completed	5/8/2016 7:47:35 PM	Delete Results
Springfield Regional Airport	Queued	5/12/2016 11:11:34 AM	Delete



The screenshot shows the LCCA Parameters dialog box in the PAVEAIR software. The dialog box has a title bar "LCCA Parameters" and a "Help" button. It is divided into several sections:

- General Airport/ Project Information:** Includes fields for "Project Details" and "LCCA Parameters".
- Add Item/ Pay Item & Unit Cost:** Includes a button "View Item/ Pay Item & Unit Cost Library".
- Create/Modify Alternatives:** Includes buttons for "Alternative 1", "Alternative 2", "Alternative 3", and "Alternative 4".
- Run LCCA Simulation:** Includes a button "Execute Simulation".
- View Simulation Results:** Includes buttons for "View Probabilistic BPC Table", "View Deterministic BPC Table", "View Probabilistic EAC Table", and "View Deterministic EAC Table".
- Save/Exit:** Includes buttons for "Save Workbook" and "Exit PAVEAIR".

The dialog box is overlaid on a spreadsheet application window, which shows various tabs and data columns.

# Roughness Profile Data

- Store Airport Pavement Roughness Profile Data
  - Store computed BandPass, Boeing Bump, IRI, and Profile Index
  - Store RAW data in database (.pro, .csv, .txt)
- Download stored RAW data

The screenshot shows the FAA PAVEAIR web application interface. At the top, there is a navigation bar with the FAA PAVEAIR logo on the left and the Federal Aviation Administration logo on the right. Below the navigation bar, there is a "Current Database: Sample" indicator. The main content area is titled "Branch/Network Selection" and contains two dropdown menus: "Network: My Sample Airport" and "Branch: RUNWAY 9L". Below this, there are two tabs: "Create New Profile" (selected) and "Download Profile Data". The "Create New Profile Data Record" section contains several input fields: "Profile Name: Profile 1", "Profile Date: 6/17/2013", "Boeing Bump: 0.2681", "IRI (inch/mile): 159.5005", "BandPass (inch): 0.0271", and "Profile Index (inch/mile): 37.15". There is also an "Upload Profile Data file(s):" section with two file upload buttons labeled "File #1" and "File #2", each with a "Browse..." button. At the bottom of the form is a "Create Profile Record" button. The footer of the page contains links for "FAA.gov Home", "Privacy Policy", "Web Policies", and "Contact Us".

# Sharing Data

- Importing Data
  - MicroPAVER e65 files
  - Existing shapefiles will be imported
- Exporting Data
  - Tools: Database Export
  - Export to XML

FAA PAVEAIR : Member Area : Create Database Current Database: Seminar\_SC\_2016

Create Database

Database name:

Database Description:

Public  
 Private

Database Options

Would you like to import data from a MicroPAVER e65/e60 file?

No. I will enter data manually.  
 Yes. Import a MicroPAVER e65/e60 file.

MicroPAVER data upload

Choose a MicroPAVER .e65/.e60 file

No file chosen

FAA PAVEAIR : Tools Current Database: Sample

**Export Current Database to XML**

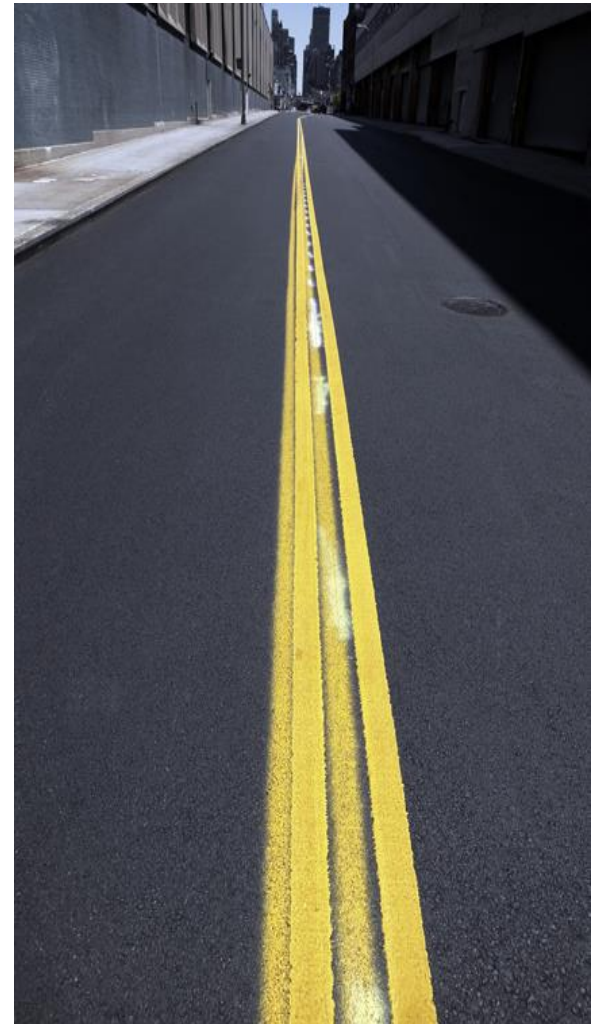
# Road Map

## Road Map: 2016 - 2018

- PCI Performance Enhancements
- Prediction Modeling Library
- Non-PCI Models
- FAA Pavement Software Conversions
  - WPF versions of COMFAA, BAKFAA, FAARFIELD, FEAFAA, ProFAA, and ProGroove

## Road Map: 2018 +

- Improved LCCA Model
- Traffic Module
- Climatic Module
- Integration of FAA applications
  - BAKFAA (Strength Evaluation)
  - COMFAA (PCN Load Rating)
  - FAARFIELD (Thickness Design)
  - ProFAA (Roughness Condition Evaluation)



# Questions and Answers

