R&D Update from the National Airport Pavement Test Facility

Presented to: SWIFT 2009
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Manager, AJP-6312
Date: September 16, 2009
Airport Technology R&D Program

- Introduction
- Full Scale Testing
- Software
- Research Projects
- Facility Upgrades
- Up Coming Events
Acknowledgments

• Staff @ NAPTF
  – Satish Agrawal
  – Gordon Hayhoe
  – Robert “Murphy” Flynn
  – Albert Larkin
  – Navneet Garg
  – David Brill
  – Don Barbagallo
  – Qingge Jia

• Support Contractor – SRA
  – Chuck Teubert
  – Edward Guo
  – May Dong
  – Izydor Kawa
  – Lia Ricalde
  – Injun Song
  – Quing Wang

• Consultants
  – Roy McQueen
  – Dick Ahlvin
Federal Aviation Administration
Airport Technology R&D Program

• Research conducted at the FAA William J. Hughes Technical Center, Atlantic City, NJ, USA.

• Sponsor: FAA Office of Airport Safety and Standards (AAS100), Washington, DC.

• Provide support for development of FAA pavement standards (Advisory Circulars).
National Airport Pavement Test Facility (NAPTF)

FACTS:

• Fully enclosed facility for accelerated traffic testing of airport pavements.
• Full-scale pavement structures and landing gear loads with programmed wander.
•Opened in 1999.
•Total construction contract was $21M.
  – $14M from FAA
  – $7M from Boeing Co. under FAA/Boeing CRDA.
NAPTF Construction Cycle (CC)

Construction Cycle (CC) at NAPTF

- New Pavement Construction
- Non-Destructive Testing & Pavement Structure Characterization
- Post-traffic Testing
- Full-scale Traffic Tests & Pavement Evaluation
Full Scale Testing
Construction Cycle 5 (CC5) – Flexible Pavement

• Objectives
  – Determine the effect of gear interaction on low-strength subgrade flexible pavement life.
  – Study the Performance of different quality subbase materials.

• History
  – Construction Completed: July 14, 2008
  – Started Loading: August 14, 2008
  – Increased wheel load from 50k to 58k: October 7, 2008
  – Cold Weather Shut Down: November 12, 2008
  – 12,276 passes restart
  – Restarted testing on Sept 1st at 65k
Full Scale Testing
CC5 Test Plan & Profile

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September 16, 2009
Full Scale Testing
CC5 Gear Configuration

Wheel Group Two

Wheel Group One

CC5 Proposed Traffic Pattern for Multiple-Gear Tests
Assumed Tire Foot Print of 21" x 12"
Full Scale Testing
CC5 Rut Depth Measurements

The subgrade was constructed in two halves, East and West.

Load changed from 50,000 lbs to 58,000 lbs.

Improved Subbase, 47-in, East
Improved Subbase, 51-in, East
10-Wheel, 47-in, West
6-Wheel, 47-in, West
6-Wheel, 51-in, East
10-Wheel, 51-in, West

R&D Update – SWIFT 2009
September 16, 2009
Full Scale Testing
Construction Cycle 6 (CC6) – Rigid Pavement

• Objectives
  – Primary
    • The effect of concrete modulus of elasticity ($E$) on rigid pavement structural life
  – Secondary
    • Perform side-by-side comparison of Cement and Asphalt stabilized bases.
    • Perform side-by-side comparison of thickened edge isolation joint and reinforced isolation joint.
    • Develop a standard procedure for using PSPA on rigid pavement.
    • Study the required compaction requirements under rigid pavements.
Full Scale Testing
CC6 Layout and Details

- High Modulus Concrete
- Med. Modulus Concrete
- Low Modulus Concrete

Asphalt Base
Cement Treated Base
Full Scale Testing
CC6 Pavement Design

12 inch Concrete
Low Med. and High Modulus

6” P-403 Bituminous Base Course
P-306 Econocrete Base Course

10” P-209 Crushed Aggregate Base Course

Clay Subgrade CBR 7-8
Full Scale Testing
Construction Cycle 6

Started on June 24, 2009
Full Scale Testing
High Tire Pressure Tests

• Issues
  – As airplane weights have increased, so have wheel loads and tire pressures.
  – ICAO tire pressure limits under the ACN-PCN system are fixed.
  – Tire pressures are now crossing the ICAO limit and in the future some aircraft may not be allowed to operate at full load on some pavements.
  – A340-500/-600, 747-400ER, A380-800F, 777-300ER and new 787, A350 and 747-8 all exceed category X upper limit.
## Full Scale Testing
### High Tire Pressure Tests

**Objectives**
- To control and increase pavement temperatures of a HMA layer
- Compare rutting @ tire pressures of 218 and 240 psi with single wheel loads of 60-65 K
- Propose Changes to ICAO Tire Pressure Categories

<table>
<thead>
<tr>
<th>Tire Pressure Category</th>
<th>Current ICAO Limits Psi (MPa)</th>
<th>Proposed New ICAO Limits Psi (MPa)</th>
</tr>
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<tbody>
<tr>
<td>W</td>
<td>Unlimited</td>
<td>Unlimited</td>
</tr>
<tr>
<td>X</td>
<td>217 (1.50)</td>
<td>240 (1.65)</td>
</tr>
<tr>
<td>Y</td>
<td>145 (1.0)</td>
<td>181 (1.25)</td>
</tr>
<tr>
<td>Z</td>
<td>72 (.50)</td>
<td>72 (.50)</td>
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</tbody>
</table>
Full Scale Testing
High Tire Pressure Tests

INSULATION

HYDRONIC TUBING

CHAIRS FOR TUBING

ECONOCRETE
Full Scale Testing
High Tire Pressure Tests

INSTALLATION

2ND LIFT ECONOCRETE

FINISHING
Full Scale Testing
High Tire Pressure Tests
Full Scale Testing
Alkali-Silica Reactive (ASR) Slabs

• Objectives
  – Study the feasibility of conducting large scale accelerated Alkali Silica Reactivity in concrete slabs.
    • Develop methods to accelerate the ASR reaction.
  – Investigate the effects of ASR on the structural capacity of concrete slabs.
    • Develop plans to apply loads to the ASR affected slabs.
    • Monitor deterioration of slabs both with and without loading.
Full Scale Testing
Alkali-Silica Reactive (ASR) Slabs

- **Slab D**: 720# Cement
  - No Deicer Application
- **Slab E (control)**: 530# Cement
  - No Deicer Application
- **Slab A**: High-Alkali Cement
  - No Air Entraining Agent
- **Slab B**: 70% High-Alkali Cement
  - 30% Class F Fly Ash
  - No Air Entraining Agent
- **Slab C**: High-Alkali Cement
  - 4% Entrained Air
## Full Scale Testing
### Alkali-Silica Reactive (ASR) Slabs

<table>
<thead>
<tr>
<th>Data</th>
<th>Interior Slabs</th>
<th>Exterior Slabs</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>A</td>
<td>B</td>
</tr>
<tr>
<td>Size</td>
<td>15 x 15 ft.</td>
<td></td>
</tr>
<tr>
<td>Thickness</td>
<td>12 in.</td>
<td></td>
</tr>
<tr>
<td>Concrete Mix</td>
<td>Reactive Aggregates; High-Alkali Cement (min. 0.82% Na₂O_{eq}); 0.55 w/c</td>
<td></td>
</tr>
<tr>
<td>Air Entrainment*</td>
<td>No admixture 1.2%</td>
<td>No admixture 0.9%</td>
</tr>
<tr>
<td>Fly Ash*</td>
<td>0</td>
<td>30% Cl. F</td>
</tr>
<tr>
<td>Deicer</td>
<td>Potassium Acetate</td>
<td></td>
</tr>
</tbody>
</table>

*Both air entrainment and fly ash replacement will reduce susceptibility to ASR in concrete mixtures.

**As-Built Test Results**
Full Scale Testing
Alkali-Silica Reactive (ASR) Slabs
Exterior
Interior
Full Scale Testing
Alkali-Silica Reactive (ASR) Slabs

• **Macro Changes**
  – Physical Expansion (install survey pins to measure gross length change).
  – Modulus of Elasticity (PSPA, GPR, HWD, etc.).
  – Joint gage monitoring.

• **Micro Structural Changes**
  – Presence and location of ASR cracks.
  – Presence and location of ASR gel.
  – Alteration of paste chemistry.

• **Petrography**
  – Cores at 12, 18 and 24 months will be sent to Clemson University for evaluation.
Full Scale Testing
Alkali-Silica Reactive (ASR) Slabs

Standard ASTM 1260 & 1567 Results for NJ Aggregate

Expansion, %

Age, Days

NJ-0%-FA
NJ-25%-FA
NJ-0%-CA
NJ-25%-CA
Full Scale Testing
Alkali-Silica Reactive (ASR) Slabs

Modified ASTM 1260 & 1567 Results for NJ Aggregate (KAc)

Expansion, %
0.00 0.10 0.20 0.30 0.40 0.50 0.60 0.70 0.80 0.90 1.00
0 7 14 21 28 Age, Days

- NJ-0%-FA
- NJ-25%-FA
- NJ-0%-CA
- NJ-25%-CA
Software
FAARFIELD

Federal Aviation Administration
Rigid and Flexible Iterative Elastic Layered Design

- Computer program for desktop PCs.
- Program preserves the “look and feel” of LEDFAA 1.3.
- Major changes are internal.
- Incorporates advanced structural models:
  - 3-D finite element analysis for rigid pavements and overlays.
    - NIKE3D (3D finite element analysis)
    - INGRID (3D mesh generation)
  - Layered elastic analysis (LEAF) for flexible pavements and overlays.
Software
FAARFIELD

• Key Differences from LEDFAA 1.3
  – Rigid Pavements/Overlays
    • Slab edge stresses are now computed directly using 3D-FEM.
    • Completely revised rigid pavement failure model.
    • Rewrote and improved rigid overlay design procedures.
    • Supports PCC overlay design on rubblized base.
  – Flexible Pavements/Overlays
    • Automatic base thickness design.
    • Supports HMA overlay design on rubblized base.
Software
FAARFIELD

• Key Differences from LEDFAA 1.3
  – General
    • Upgrade to MS Visual Basic.NET programming environment.
    • Aircraft library updated.
    • New function allows user to export design data to XML.
    • All user options collected on one “Options” screen.
    • External aircraft library in XML format.
    • Displays CDF values graphically.
    • Enhanced Airplane Data window now displays gear coordinates.
    • Design is now computed for constant tire contact area.
Software
COMFAA 3.0

COMFAA
Computation of ACN/PCN Federal Aviation Administration

- The new PCN methodology will use the CDF concept

- Incorporated in a new advisory circular AC 150/5335-5B “Standardized Method of Reporting Airport Pavement Strength – PCN,” replacing AC 150/5335-5A.
Software
COMFAA 3.0

1. Select External Library
2. Input k and Design Thickness
3. Select for automated PCN calculation

2. Input Concrete Strength

R&D Update – SWIFT 2009
September 16, 2009
Traffic mix can be created by adding or removing airplanes from existing Aircraft Group library or by loading an Ext text file.
Software
COMFAA 3.0 – Additional Analysis

Additional options allow edge stress and PCA center case stress calculations.

ACN mode of existing COMFAA program still available
### Results Rigid 7-9-2009.txt – Notepad

<table>
<thead>
<tr>
<th>Aircraft Name</th>
<th>Gross Weight (lbs)</th>
<th>Gross Weight Percent</th>
<th>Gross Weight Feet</th>
<th>Annual Defl. 20-yr</th>
<th>6D</th>
<th>20-yr 6D Coverages</th>
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<tbody>
<tr>
<td>A300 E4 std</td>
<td>244,000</td>
<td>100.00</td>
<td>107.7</td>
<td>4.480</td>
<td>0</td>
<td>4.480</td>
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<tr>
<td>A310-100 std</td>
<td>184,500</td>
<td>100.00</td>
<td>107.7</td>
<td>3.530</td>
<td>0</td>
<td>3.530</td>
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<tr>
<td>A317-100 std</td>
<td>182,500</td>
<td>100.00</td>
<td>107.7</td>
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<td>4.480</td>
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<tr>
<td>B747-200</td>
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### Critical Aircraft

<table>
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<tr>
<th>Aircraft Name</th>
<th>Total Equivalent Coverages</th>
<th>Gross Weight (lbs)</th>
<th>Gross Weight Percent</th>
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<th>6D</th>
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<td>4.480</td>
<td>0.000</td>
<td>0</td>
<td>4.480</td>
</tr>
</tbody>
</table>

**PCN Results - B subgrade**
Software
FAA PAVEAIR

• Background
  – A joint initiative between the FAA and the National Association of State Aviation Officials (NASAO) to develop a system for sharing information to optimize the expenditure of funds.
  – An Internet (Web) based system was deemed to be the best option considering the mature status of web-based applications.
  – The FAA also has a need for system-wide dissemination and analysis of the performance of FAA sponsored pavement projects.
  – A collection of airport pavement design and evaluation computer programs has also been developed and a dedicated PMS software application would tie these programs together.
Software

FAA PAVEAIR

• Program Requirements
  – Web-based application that provides a system for easy dissemination of information for airport pavement construction, maintenance, and management.
  – Data for multiple airports available on a single server connected to the web
  – Make the complete application available for free download:
    • As a set of installation files.
    • Full source code.
    • Documentation for installation and operation.
  – Suitable for installation and use on:
    • Single PC
    • Private network
    • Intranet or Internet.
Software
FAA PAVEAIR

• **Current Status – Subject to Testing and Reviews**
  – The development phase of alpha version should be complete by September 2009
  – Testing is anticipated to continue for approximately one year
  – The release of a beta version should take place prior to September 2010
  – The first release of FAA PAVEAIR will have the same functionality of MicroPAVER version 5.3.
  – *Tentative first deployment – September 2010.*
Software
FAA PAVEAIR

• Possible Implementations
  – By the FAA for AIP projects.
  – By FAA regions for small airports.
  – By state DOT’s for GA airports (NASAO interest).
  – By consulting and engineering services companies for private or customer only access.

• Will continue support and development after initial deployment; for example include functions to comply with existing FAA GIS Standards.
Software
FAA PAVEAIR – Home Page

Welcome to PAVEAIR

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.

PAVEAIR is an EMS intended for use by airport pavement engineers, airport management, cost accounting professionals charged with determining the most accurate PCI as a basis for maintaining the safest possible airport pavement quality within acceptable cost constraints and time horizons.

Public Databases

These databases are available for public (read only) access.

Test database
ALDATA

te1
Ohio State Airport
PAVEAIROhio
Software

FAA PAVEAIR – Work Page

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<thead>
<tr>
<th>Network</th>
<th>1</th>
<th>Pike County Commissioners</th>
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<td>Apron</td>
<td></td>
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<tr>
<td>Section</td>
<td>562</td>
<td>C</td>
<td>APRON B</td>
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<td>Work History</td>
<td>848</td>
<td>9/13/2003</td>
<td>New Construction - AC</td>
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- SectionID: 562
- DateTime: 9/13/2003 12:00:00 AM
- Work: New Construction - AC
- Type: NC-AC
- Project: FAA AIR 21
- Phase: 
- Quantity: 0
- Thickness: 38.1000000001524
- ThicknessUnit: mm
- Cost: 0
- MaterialType: Asphalt Concrete
- Material: ODOT 448
- Comment: ODOT 448
- WorkCompleted: True
- MajorMR: True
- BackCalculated: 
- WorkAreaUnit: m²
- WorkLinearUnit: m
- WorkThicknessUnit: in
- WorkQuantityUnit: m³
- QuantityUnit: SqFt

Update Cancel
Software

FAA PAVEAIR – Integration

FAARFIELD
Thickness Design

BAKFAA
Strength Evaluation

FAA PAVEAIR
Web-Based PMS

COMFAA
PCN Load Rating

ProFAA
Roughness Condition Evaluation
Research Projects
Gyratory Mix Design

• Objectives
  – Establish $N_{\text{design}}$ for P-401, Plant Mix Bituminous Pavement.
  – Revise P-401 Specifications using the Superpave Gyratory Compactor.
  – Run verification testing on a variety of well performing HMA mixes.
  – In parallel with and complimentary to an FAA sponsored study being performed by ERDC at WES.
Research Projects
Gyratory Mix Design

• **Phase 1:**
  – Determine N-design equivalent to 75-blow Marshall

• **Phase 2:**
  – Validate N-design with performance tests
  – Finalize N-design

• **Phase 3:**
  – Draft Superpave specification (New P-401)
### Gyratory Mix Design

#### Well performing Mixes

<table>
<thead>
<tr>
<th>Mix Code</th>
<th>Aggregate Type</th>
<th>Nominal Maximum Aggregate Size</th>
<th>Binder Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>PG 64-22</td>
</tr>
<tr>
<td>Mix–E1993</td>
<td>Gneiss</td>
<td>12.5 mm</td>
<td>X</td>
</tr>
<tr>
<td>Mix–E1996</td>
<td>Dolomite/ granite</td>
<td>19 mm</td>
<td>X</td>
</tr>
<tr>
<td>Mix–E1997</td>
<td>Dolomite</td>
<td>25 mm</td>
<td>X</td>
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<tr>
<td>Mix-A</td>
<td>Basalt</td>
<td>19 mm</td>
<td>X</td>
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<tr>
<td>Mix-D</td>
<td>Limestone</td>
<td>19 mm</td>
<td>X</td>
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<tr>
<td>Mix-C</td>
<td>Crushed Gravel</td>
<td>19 mm</td>
<td>X</td>
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<tr>
<td>Mix-F</td>
<td>Argillite</td>
<td>12.5 mm</td>
<td>X</td>
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<tr>
<td>Mix-B</td>
<td>Diabase</td>
<td>19 mm</td>
<td>X</td>
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Research Projects
Gyratory Mix Design

$N_{\text{design}}$ Summary

<table>
<thead>
<tr>
<th></th>
<th>FAA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minimum</td>
<td>44</td>
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<tr>
<td>Maximum</td>
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<tr>
<td>Mean</td>
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<td>Std. Dev.</td>
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<tr>
<td>COV, %</td>
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</table>
Research Projects
Gyratory Mix Design
Research Projects
Gyratory Mix Design

• Phase 2: Performance Evaluation
  – Evaluate effect of $N_{des}$ on performance with respect to:

    • Asphalt content and/or gradation changes
    • Rut resistance: AMPT flow number & APA
    • Compatibility: compaction curve
    • Durability: film thickness & binder content
### Research Projects

#### Gyratory Mix Design

#### Phase 2 Mix Designs

<table>
<thead>
<tr>
<th>Mix Name</th>
<th>Aggregate</th>
<th>NMAS</th>
<th>Binder Grade</th>
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<td>Airport E/1993</td>
<td>Gneiss</td>
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<td>AC 20</td>
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<tr>
<td>Airport E/1997</td>
<td>Dolomite</td>
<td>25 mm</td>
<td>PG 82-22, PG 64-22</td>
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<tr>
<td>Airport A</td>
<td>Basalt</td>
<td>19 mm</td>
<td>PG 64-22</td>
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<tr>
<td>Airport D</td>
<td>Limestone</td>
<td>19 mm</td>
<td>PG 70-22</td>
</tr>
<tr>
<td>Airport C</td>
<td>Crushed gravel</td>
<td>19 mm</td>
<td>PG 64-28</td>
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<tr>
<td>Airport F</td>
<td>Argillite</td>
<td>12.5 mm</td>
<td>PG 64-22</td>
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<tr>
<td>Airport B</td>
<td>Diabase</td>
<td>19 mm</td>
<td>PG 64-22</td>
</tr>
<tr>
<td>Oceana*</td>
<td>Granite</td>
<td>19 mm</td>
<td>PG 70-22</td>
</tr>
</tbody>
</table>

* New Mix – poor performer
Research Projects
Field Instrumentation - ATL
Research Projects
Field Instrumentation - ATL

• Why
  – Current FAA design method does not consider slab curling or top-down cracking modes for rigid slabs.

• Objectives
  – Obtain in-situ data on vertical slab movements
  – Monitor slab data over an extended period.
Research Projects
Field Instrumentation - ATL

• History
  – Oct 2006:
    • Construction Completed with 64 Sensors installed
    • Initial data collected using portable data system
  – Mar 2007:
    • Permanent data collection and power generation system installed
  – Aug 2007:
    • Lightning Strike to System
  – Aug 2008:
    • Reinstalled Data Acquisition System & installed lightening suppression system
  – Jan 2009:
    • Installed New Data Acquisition System
Research Projects
Field Instrumentation - ATL

Project Location – Taxiway E

RUNWAY 26L
Research Projects
Field Instrumentation - ATL

SLAB 3
SLAB 2
SLAB 1

5' x 5' CONC. SLAB FOR FAA ENCLOSURE

PRIMARY TAXI ROUTE
SECONDARY TAXI ROUTE

TAXIWAY E

HAUL ROAD

R&D Update – SWIFT 2009
September 16, 2009
Research Projects
Field Instrumentation - ATL
Research Projects
Field Instrumentation - LGA
Research Projects
Field Instrumentation - LGA

• Why
  – Very little research has been performed on asphalt longitudinal construction joints even though they are a known maintenance issue
  – No one has instrumented the joints to evaluate the causes of cracking after construction

• Objectives
  – To measure the strains and movement of these joints to better understand the failure/cracking mode
  – Evaluate movement of joint due to environmental effects
Research Projects
Field Instrumentation - LGA

Taxiway AA
Research Projects
Field Instrumentation - LGA

- Instrumentation
  - H Bar Asphalt Strain Gages
Research Projects

Field Instrumentation - LGA

- Instrumentation Plan Submitted to Port Authority
  - Port Authority awarded the bid. Bid included:
    - Installation of FAA data collection cabinet
    - Installation of all FAA underground conduit
    - All saw cutting and coring required for gage installation

- Components
  - Similar to ATL
  - Campbell Scientific Data Acquisition System
  - Have direct power / no solar panels
  - Remote Access / no phone line

- Installed gauges on Aug. 17th
Research Projects
Field Instrumentation - LGA
Research Projects
Field Instrumentation - DIA
Research Projects
Field Instrumentation - DIA

• History
  – Work Started in 1992
  – 460 sensors installed
  – Remote access est. 1994
  – Automatic Data Collection and Periodic Site Visits from 1995 to 1999
    • Pavement Response under aircraft loads
    • Environmental parameters
    • Weather Conditions
    • Visual Pavement Inspections
    • Falling-Weight Deflectometer (FWD) Testing
    • Elevation Surveys
Research Projects
Field Instrumentation - DIA

• **Instrumentation**
  – Strain Gauges
  – Vertical Displacements
  – Aircraft Position, Speed and Acceleration
  – Environmental data
Facilities Upgrade
Pavement Testing Machine

- Commissioned 1999
- Vehicle Weight = 1,200,000 lbs
- Max Tire Load = 75,000 lb (Per Tire)
- 16 Electric Motors - 48 HP Each
- Top Speed – 15 MPH
- Fully Programmable Load Control
- Fully Programmable Position Control
- Laser Data Communication System*
- 8 Camera Closed Circuit Video System*
Facilities Upgrade
Pavement Testing Machine

• **Purpose:**
  – Modify the NAPTF Test Vehicle to accommodate 8- and 10-wheel landing gear configurations.
  – Allow the FAA to conduct full-scale testing of future landing gear designs.

• **New Capabilities:**
  – +/- 5 degrees of steering.
  – Larger rims with redesign for tire removal/installation without bearing removal.
  – Radial tires with greater load capacity than current bias ply tires 66,500 versus 55,700 lb.
Facilities Upgrade
Pavement Testing Machine

Disconnecting Existing Modules
Facilities Upgrade
Pavement Testing Machine

Relocating Existing Modules
Facilities Upgrade
Pavement Testing Machine

Installing New Modules – Upper Section
Facilities Upgrade
Pavement Testing Machine

Installing New Modules – Lower Section
Facilities Upgrade
Pavement Testing Machine

North Carriage

South Carriage

Antonov AN-124-100

New Module Installation Completed
December 2008
Facilities Upgrade
Pavement Testing Machine

Electrical Work

Hydraulic Work
Facilities Upgrade
Pavement Testing Machine

Existing Control Cab
Facilities Upgrade
Pavement Testing Machine

New Control Cab
Facilities Upgrade
Pavement Testing Machine

• Replace Bias Ply Tires and Manufacture New Rims on Existing Load Modules (12 Sets Required).

Replace Tires/Rims

Old Modules
49x19-20 Tires
Rated Load 59,000 lb
Max. Test 65,000 lb

New Modules
52x21 R22 Tires
Rated Load 66,500 lb
Max. Test 75,000 lb
Facilities Upgrade
Materials Testing Lab

• Design Started – August 2006
• Bid Documents Completed – August 2008
• 100% design review preformed by Philadelphia District Army Corps of Engineers
• USACE to administer the construction contract
  – $1.1 million estimated construction cost
• FAA to provide construction oversight
• Projected contract award February 2009
Facilities Upgrade
Materials Testing Lab

- 120 x 48 ft building (~5500 sq ft)
- Designed for Soils, Aggregates Concrete and Asphalt testing
- AMRL Certified
- CCRL Certified
- Material Testing for others
Facilities Upgrade
Materials Testing Lab
Facilities Upgrade
Materials Testing Lab
Facilities Upgrade
Materials Testing Lab
Facilities Upgrade
Materials Testing Lab

- Concrete Aggregates and Soil
- Asphalt Lab
- Office & Meeting Room
- Material storage
- Curing Room
- Foyer & Restrooms
Facilities Upgrade
Materials Testing Lab

- Asphalt Pavement Analyzer (APA)
- Contact Pressure
  - through rubber hose
    - Up to 250-psi
    - 100-psi (standard APA)
  - through aluminum wheels
    - Up to 500-psi
    - 200-psi (standard APA)
- Variable rate of loading
Facilities Upgrade
Heavy Vehicle Simulator

• Proposed Research Using HVS
  ➔ High Tire Pressure Testing
  ➔ Warm Mix Asphalt
  ➔ Stone Matrix Asphalt
  ➔ Asphalt Overlays of PCC
  ➔ Recycled Asphalt Pavement
  ➔ Polymer Modified Binders
  ➔ Shear failure of HMA
Federal Aviation Administration

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2010 FAA WORLDWIDE AIRPORT TECHNOLOGY TRANSFER CONFERENCE

"NEXT GENERATION OF AIRPORT TECHNOLOGY"

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