

The Future of Research and Development – An Industry Perspective



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Administration – Pavement
Working Group
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Gary L. Mitchell, P.E.
Vice President
Airports and Pavement Technology



CELEBRATING 50 YEARS OF LEADERSHIP AND
SERVICE

A Look at the Past

- FAA – Test Center
- Full scale testing – LEDFAA  FAARFIELD
- IPRF
 - Applied Research
 - Solve Issues
 - Development Best Practices



The Future

AIRPORT PAVEMENT 10-YEAR R&D PROGRAM



MARCH 18, 2013

FAA 10-year R&D Plan

Airport Pavement Design

- Project No. 1: Extending Design Life to 40 Years for Airport Pavements
- Project No. 2: Semi-Accelerated Full-Scale (SAFS) Rigid Pavement Test
- Project No. 3: Validated Reflection Cracking Model for HMA Overlay Design
- Project No. 4: Failure Criteria for Top-Down Cracking in Rigid Airport Pavements
- Project No. 5: FAARFIELD-Based ACN/PCN Methodology
- Project No. 6: New LCCA Integrated Design Procedures

Airport Pavement Materials

- Project No. 1: Advanced Characterization of Paving Materials
- Project No. 2: Use of Additives and Nanoparticles to Improve Performance of Airport Pavement Materials
- Project No. 3: Use of Data and Results from Airport Pavement Instrumentation and Field Testing Studies

Airport Pavement Evaluation

- Project No. 1: Improvements to FAA Airport Pavement Software Programs
- Project No. 2: Development of New Roughness Standards for In-Service Airport Pavement
- Project No. 3: Pavement Surface Profile Data Collection, Processing, and Analysis
- Project No. 4: Nondestructive Pavement Testing

Design Project No. 1: Extending Design Life to 40 Years for Airport Pavements

- Support a 40-year design life
- Many examples exceed the 20-life
- LCCA must be included in design procedure
 - Different maintenance requirements
 - Define maintenance vs. rehab
- Pavement Life should consider structural and functional life
 - Should be tied to PMS
 - Prediction models based on PMS data
 - Include functional criteria in design procedure

Design Project No. 4: Failure Criteria for Top-Down Cracking in Rigid Airport Pavements

- Agree research is needed
 - Agree with looking at joint spacing as mitigation
 - Effects of residual stresses
- Industry concerns
 - Higher strengths in pavement design
 - Effects for top-down cracking on thinner slabs
 - Material issues
 - More cement
 - High strength with normal construction practice
 - Early-aged uncontrolled cracking
- CC6 results
 - No effects on fatigue life
 - Need to look at thinner slabs with increase strength
 - More research is needed

Design Project No. 5: FAARFIELD-Based ACN/PCN Methodology

- Doesn't really effect the construction industry
- My be some advantage for rigid pavements in term of load carrying capacity
- Best with what we have
- PCN Methodology need to catch up

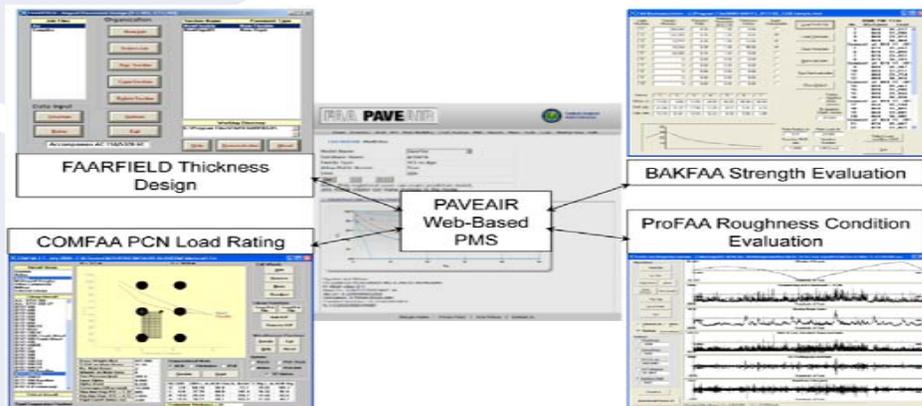
Design Project No. 6: New LCCA Integrated Design Procedures

- AAPTTP has done the ground work
- Standardize and provide guidance
- Part of design procedure
- Needs to be fair to asphalt and Concrete industries

$$PW = C + \sum_{i=1}^m M_i \left(\frac{1}{1+r} \right)^{ni} - S \left(\frac{1}{1+r} \right)^z$$

Evaluation Project No. 1: Improvements to FAA Airport Pavement Software Programs

- FAARFIELD
 - Top down cracking modeling
 - Functional pavement condition
 - Effects of slab size
- COMFAA – new PCN Procedure
- PAVEAIR as a clearinghouse



Evaluation Project No. 3: Pavement Surface Profile Data Collection, Processing, and Analysis

- Industry High Priority
- California Profilograph
 - Old technology
 - Cumbersome
 - Misused
- IPRF has done the groundwork
- Many Engineers don't understand PI use
- Agree with profile data collection – known smooth
- Contractor input – new criteria must be doable



Evaluation Project No. 4: Nondestructive Pavement Testing

- Automated PCI data collection
- Industry support of NDT for QC/QA - vetted
- Potential
 - Maturity meters
 - Seismic (PSPA, Impact Echo)
 - Will never eliminate all cores



Potential Other Research

- General Aviation Airports
 - 30,000 pounds or greater
 - FAARFIELD often yields 8 – 10 inches
 - Panel sizes – 10 to 15 feet
 - Two Florida airports – 6 inch whitetopping
 - Loadings to 90,000 pounds
 - PCI's in the 90's – 10 years of service
- Document use of thin pavements
- Evaluate effects of base and panel size
- Is FAARFIELD too conservative?



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Other Potential Research

- Full-depth reclamation
 - Common practice under flexible pavement
 - In-place mixture of cement into base
- Evaluate performance of in-place mixture of cement
 - Document use of soil -cement
 - Recycle materials in-place
 - Compared to P-304, 306, 401, etc.
 - Guidance on in-place mixture vs. pug mill

Thank You!



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