Long life Pavements for the Future

John D’Angelo
Office of Pavement Technology
Long Life Pavements for the 21st Century

Critical issues

- Pavements are the backbone of our transportation system.
- Growing expectations of the highway user for smoother ride and reduced delay and disruption.
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Critical issues

- “Just in time” delivery has increased from 10% in 1990 to over 60% in 2000.
- Of every dollar invested in highways more than 50 cents goes to pavements.
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Critical issues

*Most of the NHS pavements were constructed in the 1960-70’s.*
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\textbullet \textbf{Critical issues}

\textbullet From 1970 to 1998 average daily traffic volume has increased 130\%. Average daily loading has increased 580\%.

\textbullet Average freight loading is currently increasing at 2.7\% per year.
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Critical issues

- Over 7,000 miles of urban Interstate currently needs replacement and an additional 5,000 miles will within 5 years.
- Over 13,000 miles of the rural National Highway System (NHS), require immediate attention
Traffic
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Plan

The Long Life Pavement Technology Program would *demonstrate through actual pavement construction, innovative design practices, innovative materials, recycled materials, and improved equipment, for the rehabilitation, repair, reconstruction and building of new pavements throughout the country.*
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Plan

- Funded annually at $20 million. It would be focused on construction that would extend the life of pavement systems up to 50 years. It would be available to all 50 States and Puerto Rico and the District of Columbia. In addition to the funding for the States, an additional $5 million annually would be available for testing and evaluation, documentation, demonstration, and technology transfer.
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Key Components:

- Innovative Designs for longer life pavements – start with AASHTO 2002
- New materials and materials characterization techniques.
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Key Components:

- Less disruptive construction and maintenance technologies and technologies to reduce user delay while maintaining service and securing work zone safety.
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Key Components:

- Innovative Contracting
  - PRS & Warranties
- Pavement Evaluation Techniques
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Innovative Designs for longer life pavements – start with AASHTO 2002

- Procedures for the design/analysis of new and rehabilitated pavement systems
- Procedures for evaluating existing pavements
- Recommendations on rehabilitation treatments, sub-drainage, and foundation improvements.
Long Life Pavement

Structure Lasts 50+ years.
- Bottom-Up Design and Construction
- Indefinite Fatigue Life

Renewable Pavement Surface.
- High Rutting Resistance
- Tailored for Specific Application

Consistent, Smooth and Safe Driving Surface.

Avoids Costly Reconstruction.
Pavement appears severely distressed
Crack at inside of left wheel path
JPCP Top-down Cracking

Top of slab (crack initiation)
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- New materials and materials characterization techniques.
  - NCHRP 9-19 simple performance test
  - AASHTO 2002 procedures
  - Use of recycled materials
Concrete Modulus of Elasticity – Test Specimen and Measurement

Strain Indicator
Construction Technology

- Improved paving techniques.
  - Density
  - Smoothness
- And reduction in delays.
Construction Technology

- Improved paving techniques.
  - Night paving
  - Safety
Innovative Contracting

Performance Related Specifications are specifications that...

- Identify key Acceptance Quality Characteristics (AQC) that relate to product performance.
Innovative Contracting

PRS use mathematical models to relate AQL’s:

- To distresses and product performance
- To life-cycle cost analysis (LCCA).
- To determine one overall price adjustment for a lot.
Innovative Contracting

🌟 Warranties

🔹 Shared responsibility between the owner and builder.
🔹 Promotes innovative design and construction
🔹 Transfer responsibility for performance from owner to builder.
🔹 Sets Life Expectations
Pavement Evaluation Techniques

- We will need to improve equipment and procedures for rapid and accurate evaluation of the pavement structure.
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FHWA role in implementation

- Training
- Technical Assistance
- Field Demo’s
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🌟 FHWA role in implementation

✨ Training
  • National Design Course Train the Trainer
  • NHI Classes
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\textbullet\ FHWA role in implementation

\textbullet\ Technical Assistance
  \begin{itemize}
    \item Design Examples
    \item Materials Testing
    \item Computer Assistance
  \end{itemize}
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FHWA role in implementation

- Field Demo’s
  - Equipment Demo’s
  - Pavement Evaluations
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🌟 Results of the program

🔹 New technology on the design and construction of long life pavements delivered to the states.
🔹 Advancement in construction techniques to reduce delays during construction.
🔹 Construction of actual pavements demonstrating long life paving techniques.
Questions?