

Overview of Mechanistic-Empirical Pavement Design Guide Implementation Activities

Design Guide Implementation Team



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FHWA HQ Washington DC
*May 9, 2006***



Design Guide Implementation Team

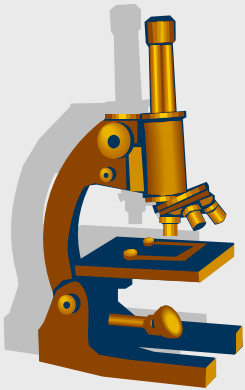
FHWA DGIT

- **Office of Pavement Technology**
 - **Gary Crawford – Concrete Team** – *Group Leader**
 - **Leslie Myers – Asphalt Team**
- **Resource Center**
 - **Chris Wagner – TST Team**
- **Division Office**
 - **John Sullivan – Division Administrator – NC**
- **Turner-Fairbank Highway Research Center**
 - **Jim Sherwood – Advanced Models Team**
 - **Eric Weaver – LTPP Team**



PURPOSE of DGIT

To **support & educate** State highway agencies and industry in development & implementation of Mechanistic-Empirical Pavement Design



*Facilitating Implementation of
Mechanistic-Empirical Pavement Design*



Educating State DOT and Industry on M-E Pavement Design

1-day workshop on
Facilitating Implementation of Mechanistic-Empirical Pavement Design
Approximately 1000 people attended

2-day workshops on
Materials Characterization of Inputs to M-E Pavement Design

Participants from:

42 States
24 FHWA Division Offices
5 Local highway agencies
30 universities
HMA and PCC industry
Consultants



Educating State DOT and Industry on M-E Pavement Design

Advanced Technology for Workshops

DGIT webcast from Connecticut DOT URL server



1-day Intro workshop:

www.ct.gov/dot/pavement101

2-day Materials Inputs workshop:

www.ct.gov/dot/pavement102

FHWA DGIT Workshops

Past Workshops

*Webcast available

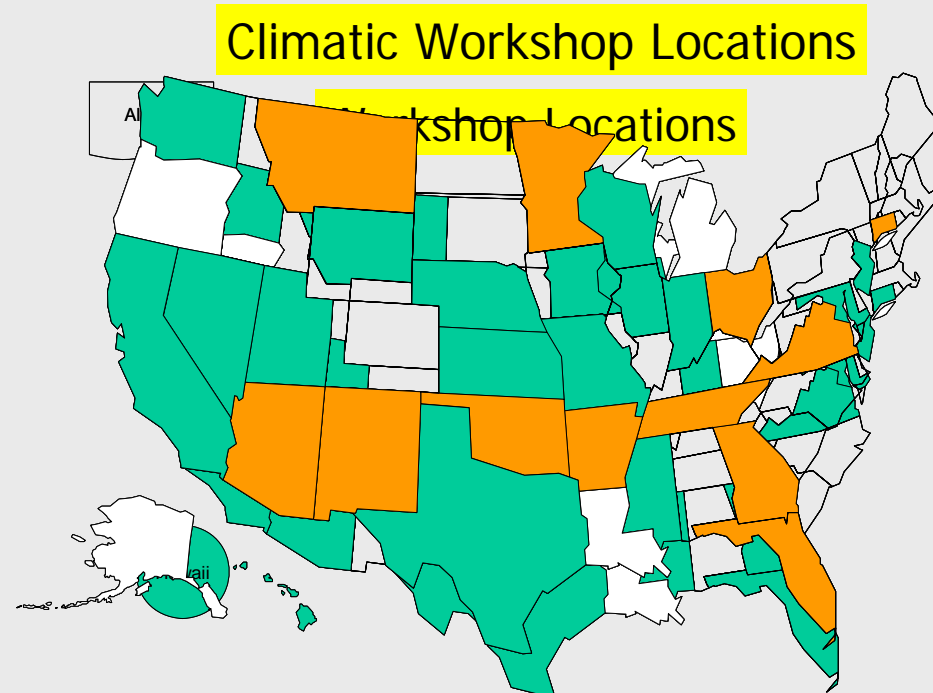
- ✓ Introduction to the DG – 8*
- ✓ Traffic – 2
- ✓ Materials – 11*

Current

- Climatic Inputs – 12
- Traffic – 3
- PMS Data Use - 1

Future

- Local Calibration





Educating State DOT and Industry on M-E Pavement Design

Climatic Considerations in MEPDG 1-day Workshop

- **Objective: Educate M/D engineers on how climatic effects are considered in mechanistic-empirical design**
 - Asphalt materials inputs
 - Concrete materials inputs
 - Soils/Unbound Granular materials inputs
- Workshop and Software Modules
- **Webcast on September 19, 2006** at CT workshop

2006 Workshop Schedule

Month

Location

February	Turner-Fairbank (Pilot)
March	Thornburg, VA
March	Nashville, TN
April	Gainesville, FL
April	Helena, MT
May	Albuquerque, NM
May	Oklahoma City, OK
June	Columbus, OH
August	Phoenix, AZ
August	Fayetteville, AR
September	Minneapolis, MN
September 19	Rocky Hill, CT + webcast

Additional Workshops

- Traffic Inputs for M-E PDG

- Three presented in 2006 by FHWA
- Purpose: educate Pavt Designers & Traffic Engineers in same forum on obtaining traffic inputs

Austin, TX

May 17-18

New Brunswick, NJ

late summer

Rocky Hill, CT + webcast

September 18

Additional Workshops

- Use of PMS Data for M-E PDG
 - One presented in 2006 by FHWA Office of Asset Management
 - Purpose: educate Pavt Designers & Pavt Managers on best utilizing PMS data as MEPDG inputs

Rocky Hill, CT + webcast September 20

Additional Workshops Planned

- Local Calibration for M-E PDG models
 - Awaiting deliverables from NCHRP 1-40 A,B
 - Planned for Spring 2007
 - Purpose: discuss Sensitivity of inputs & calibration, educate Pavt Designers & Pavement Managers

FHWA Internal Cooperation

DGIT & Office of Freight Management / Operations

Meetings & internal workshops

- Models in M-E PD that deal with truck size & weight
- Assessing impacts of raising weight limits



NHI Course 131109A

Pilot: Spring 2007

Analysis of New and Rehabilitated Pavement Performance with Mechanistic-Empirical Pavement Design Software

- Hands-on format with computers loaded with software
- Focus on user, not theory
- Objective is for audience to be capable of performing flexible, rigid, rehab designs

STATUS: awarded to Fugro BRE, University of Arkansas, & team



Technical Assistance

Mobile Labs/TFHRC

- **Local Materials Characterization**
 - Enables use of higher level inputs
- **Equipment**
 - Specification, Calibration, Use



Field & Laboratory Studies Related to M-E Design

Long-term Pavement Program (LTPP)

- Database Enhancement with E^* Data

Sensitivity Analysis of HMA E^*

- Field data from Mobile Asphalt Laboratory (MATL)
 - Testing both neat & polymer-modified Mix from 18 State projects
 - Evaluating both lab-blended mix design replicates & production samples
- Relationship between volumetric/mix properties & E^*

2006: New Jersey, Missouri, South Dakota, FL HVS

Evaluation Studies Related to M-E Design

- Coefficient of Thermal Expansion
 - TFHRC
 - Working on ruggedness and development of commercially available equipment
 - Mobile Concrete Laboratory
 - Continuing to collect CTE lab data from field State projects
- TFHRC Models Team
 - Investigating IRI models
 - Sensitivity Analysis: Concrete
 - Suggestions from Panel, Lead States group



Forum Information Chat Website

**Community of Practice NCHRP 1-40 User
Comments Online Discussion Site**

<http://www.fhwa.dot.gov/pavement/dgit/dgitdata.cfm>

- **Established as NCHRP 1- 40 User
Comments
Database**
- **Maintained by FHWA DGIT**
 - **Questions, technical issues raised
forwarded to NCHRP**
 - **Success Stories – also need positive**



Lead States Group

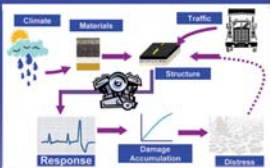
- Publish “Status Surveys”
- Post State Implementation Plans
- Identify Sensitivity Analysis studies
 - ❖ Texas, Arkansas, Iowa, FHWA, etc.
- Develop & distribute Technical Briefs
- Participate in DGIT Workshops
- Provide clearinghouse for information
- “Lead by Example”

Lead States Group circulars:

Lead States Group for the Implementation of Mechanistic-Empirical Pavement Design

Our mission is to promote and facilitate the refinement, implementation, and evolution of Mechanistic-Empirical Pavement Design procedures in conjunction with AASHTO, NCHRP, and FHWA activities.

www.fhwa.dot.gov/pavement/dgit/leadstates/index



U.S. Department
of Transportation
**Federal Highway
Administration**

The Role of a Lead State

Each Lead State will further Mechanistic-Empirical Pavement Design by demonstrating the following attributes:

- Leads by example, as one of the first States to pursue implementation of the design guide and obtain upper management support.
- Champions implementation. Becomes an expert in the implementation process.
- Knows the political, funding, and internal hurdles that need to be addressed.
- Compares pavement design/analysis technologies to determine which is most advantageous for a given project.
- Focuses on advanced technologies and refinements.
- Shares results—both successes and challenges—with highway community.
- Shares funding success stories.
- Develops short- and long-term plans for implementation.

The Role of FHWA

FHWA, through its Design Guide Implementation Team (DGIT), will provide:

- Full partnership with state members.
- Funding (including meeting and member travel) and technical support.
- Division office sponsorship of training and committee activities in the lead states.
- Central data repository.
- Newsletter and information posting on the web.
- Committee secretariat.
- Coordination with LTPP and other research efforts.

Focus of the Lead States Group

The Lead States will work together to:

- Provide an example of successful implementation and develop a model implementation plan.
- Serve as a liaison for NCHRP, AASHTO, FHWA, and industry activities.
- Identify gaps in the knowledge base and new research needs.
- Share information, utilize national lessons learned, and avoid duplication of effort.
- Provide a vehicle for working in cooperation across State lines.
- Serve as a resource for States at any stage of implementation.

Lead States and Points of Contact

FHWA DGIT, Leslie Myers, Gary Crawford, Chris Wagner, Jim Sherwood - dgit@fhwa.dot.gov

NCHRP Liaison, Ed Harrigan - 202-334-3232

Arizona, Paul Burch - 602-712-8085

Florida, Bruce Dietrich - 850-414-4371

Kentucky, Clark Graves - 859-257-4513, Paul Looney - 502-564-3280

Maryland, Peter Stephanos 410-321-3100, Tim Smith - 410-321-3110

Minnesota, Dave Van Deusen - 651-779-5564

Mississippi, Bill Bartis - 601-359-7649

Missouri, Jay Bledsoe - 573-751-3634, John Donahue - 573-751-3002

Montana, Dan Hill - 406-444-3424, Jon Watson - 406-444-7260

New Jersey, Robert Sauber 609-530-3861, Tom Bennert - 732-445-2485

New Mexico, John Tenison - 505-827-9811, Bryce Simons - 505-827-5191

Pennsylvania, Dan Dawood - 717-787-4246, Clint Beck - 717-783-6146

Utah, Tim Biel - 801-965-4859

Virginia, Mohamed Elfino - 804-328-3173, Thomas Tate - 804-328-3129

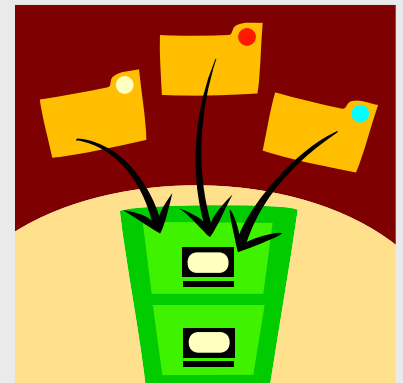
Washington, Linda Pierce (Chair) 360-709-5474, Jeff Uhlmeier - 360-709-5485

Wisconsin, Laura Fenley (Co-Chair) 608-246-5455



Pooled Fund Efforts

- Implementation Plans
 - ❖ Washington, California, Texas
- HMA Input Data Gathering
 - ❖ New York, Kansas
- Equipment Buy for States
 - ❖ Simple Performance Tester for obtaining HMA inputs



NCHRP Projects

- 1-41 Reflective Cracking in HMA (Texas A&M)
- 1-42A Top-Down Cracking in HMA (U.Florida)
- 9-38 Fatigue Endurance Limit in HMA (NCAT)
- 9-30A Calibration of Rutting Models (AAT, ARA)
- 1-40 Technical Assistance in MEPDG (ARA, ASU)

MEPDG Scheduled Releases

- Version 0.8
 - ❖ Increased Climate Data
 - ❖ Corrected HMA Rehabilitation analysis
 - ❖ December 2005
- Version 0.9
 - ❖ Fix identified errors in AC module
 - ❖ Recalibrated PCC & AC Models
 - ❖ Available May 2006
- Version 1.0
 - ❖ Professional AASHTOWare version
 - ❖ 2008 - 2009?

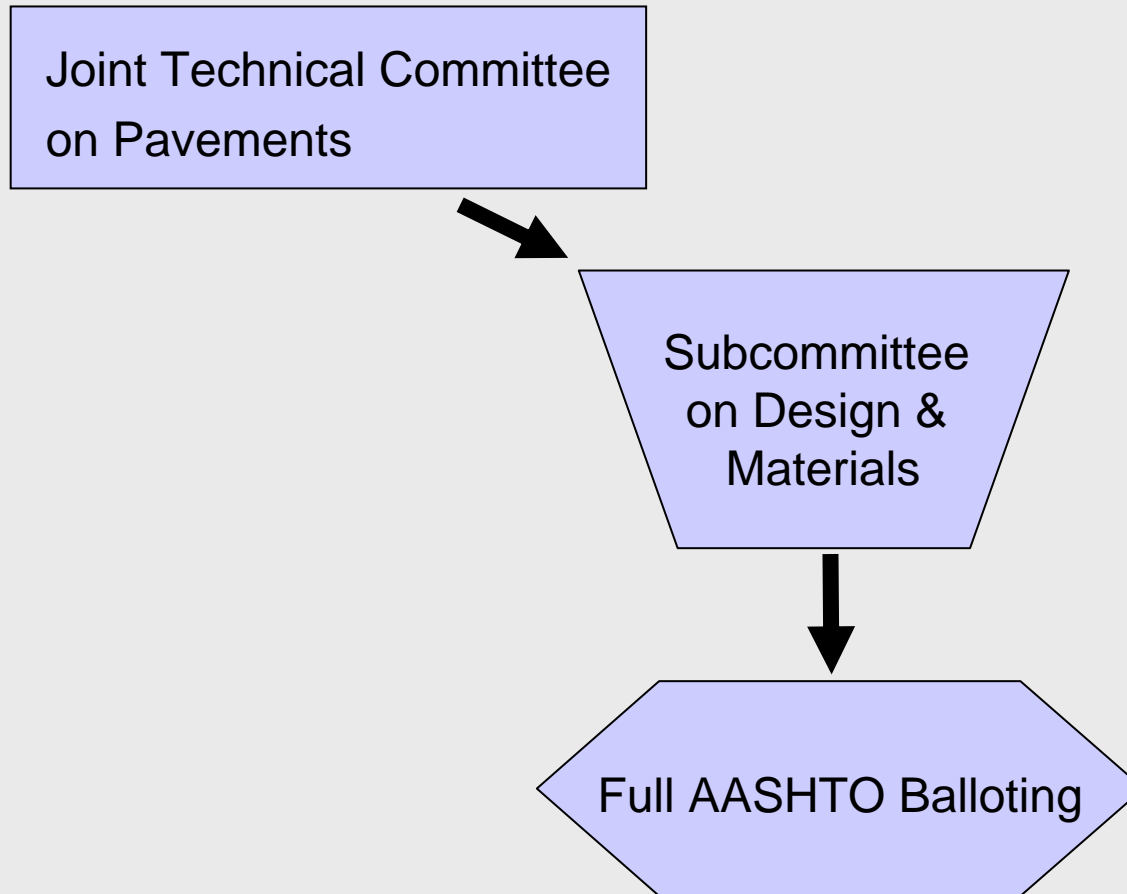
EICM Climatic Model Updates

From Applied Research Associates:

www.ara-tracker.com/eicm version 3.1

- ❖ Allows user to import & evaluate MEPDG files in EICM stand-alone program version
- EICM source code open Summer 2006
 - ❖ Peer review & inclusion in other applications

AASHTO Implementation

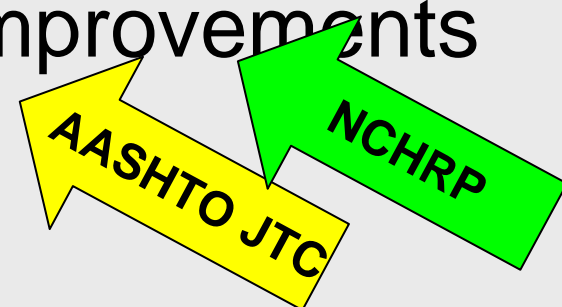
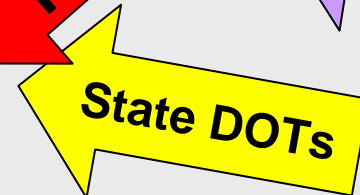
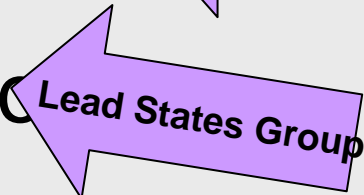
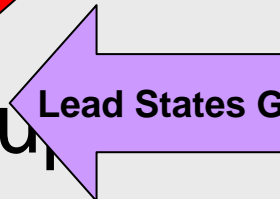
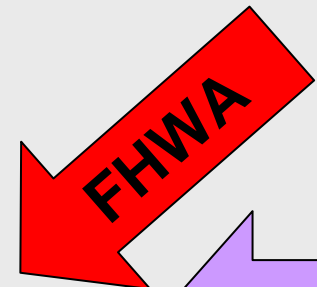


Interim Guide – after February 2007 ?

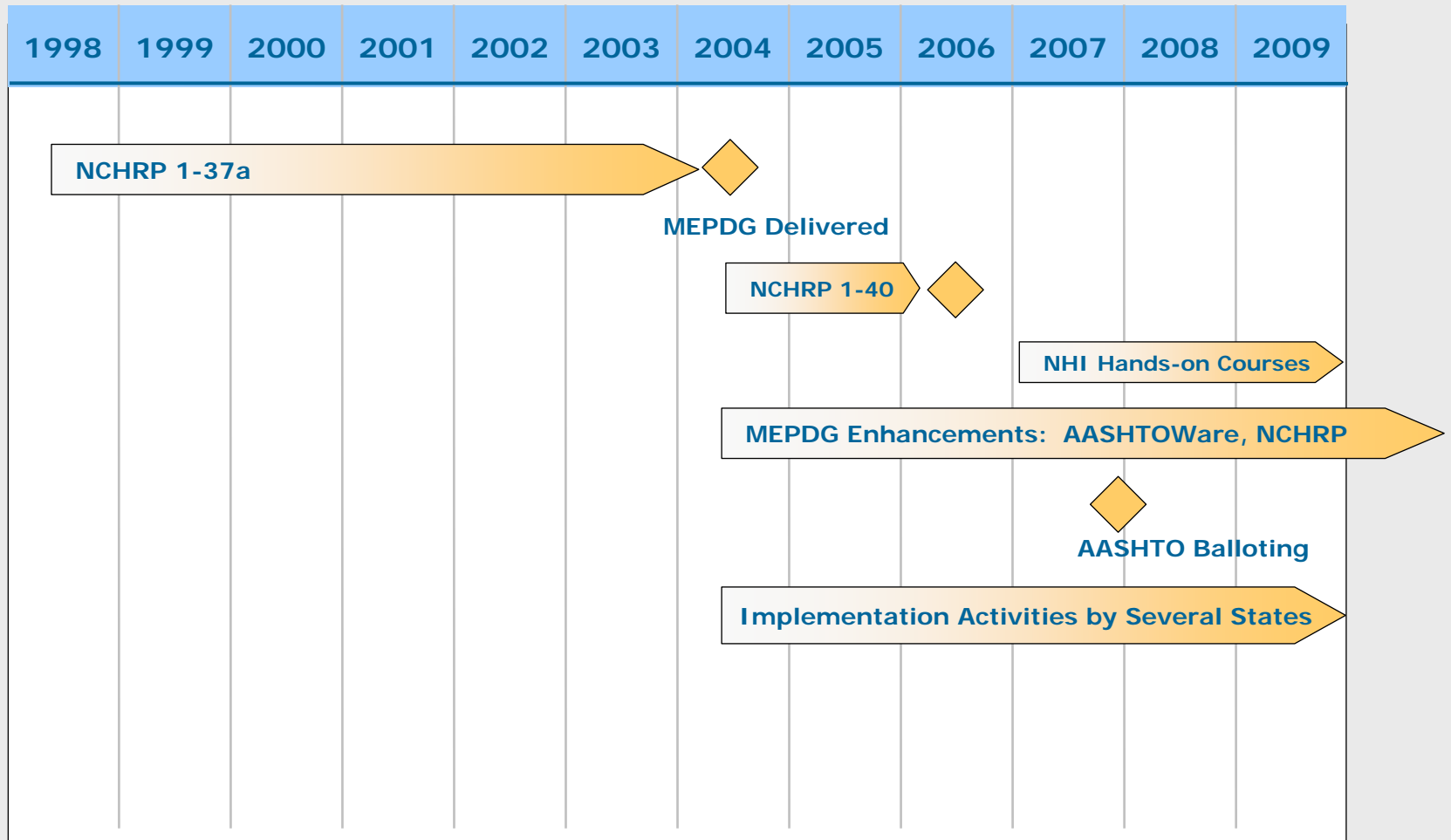
National Implementation Timeframe

4 Stages of Implementation

1. Inform & Obtain Buy-In from Small Groups
2. Build Consensus Among Organizations
3. Mass Implementation Effort
4. Planning for Future Change & Improvements



National Implementation Timeframe



What Can States Do Now?

Sensitivity Studies

- Universities (eg. University of Arkansas, KSU)
- Industry (eg. NCAT, ACPA)
- State DOTs (eg. Missouri, Pennsylvania, N.C.)

Forensic Analysis

- State DOTs (eg. “reconstruct” failed pavement cases, overweight truck impacts)

Summary

Partnership for Implementation

- **Lead States Group, AASHTO JTC**
 - **Consensus, Specification, Use, Lead-by-Example**
- **NCHRP**
 - **Coordinated research efforts to enhance M-E Pavement Design software and supporting tests**

FHWA

- **Training, Coordination, Technical Support**

How Do We Get Started?

- Get Educated
- Get Involved
- Allocate Resources
- Encourage Cross Discipline Communication
- Maintain Cross State DOT Communication?



DGIT Contact Info

Design Guide Implementation Team

dgит@fhwa.dot.gov

<http://www.fhwa.dot.gov/pavement/dgit/index.cfm>

Any Questions??

GO

GATORS

