

# Concrete Pavement Technology Program (CPTP) - *CPTP Implementation*



**Virginia Concrete Conference**

**March 10, 2006 - Richmond, Virginia**



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



**Safer  
Smoother  
Quieter  
Longer-Lasting**

# Technology Transfer, Deployment & Delivery Goals for the CPTP

- **Reduce User Delays**
- **Improve Safety**
- **Reduce Costs**
- **Improve Performance**
- **Foster Innovation**

*Safer, Smoother, Quieter, Longer-Lasting*

# Focus Areas for Tailored Technology Transfer

- Advanced Designs
- Optimized Concrete Materials
- Improved Construction Processes
- Rapid Repair & Rehabilitation
- User Satisfaction

*Safer, Smoother, Quieter, Longer-Lasting*

# CPTP Product Matrix – See Handout



## Concrete Pavement Technology Program Products



PRODUCTS	ADVANCED DESIGNS	OPTIMIZED CONCRETE MATERIALS	IMPROVED CONSTRUCTION PROCESSES	RAPID REPAIR AND REHABILITATION	USER SATISFACTION
<b>GUIDELINES AND TECH BRIEFS</b>	<ul style="list-style-type: none"> <li>Cost/Benefit of Design Features</li> <li>Best Practices for Joint Sealing</li> <li>High-Performance Concrete Pavement (HPCP) Features</li> </ul>	<ul style="list-style-type: none"> <li>Guidelines to Identify Compatible Concrete Materials</li> <li>Optimized Mix Design Procedure/COMPASS</li> </ul>	<ul style="list-style-type: none"> <li>Guidelines for Construction Traffic Management</li> <li>Cover Bar Alignment Testing Using MIT Scan-2</li> <li>Case Studies of Construction Traffic Management</li> <li>Early Age Cracking/HPCP/PAV II</li> <li>Curing Best Practices</li> <li>Nondestructive Testing (NCT) related topics</li> </ul>	<ul style="list-style-type: none"> <li>Strategy Selection for Port and Cement Concrete Rehabilitation</li> <li>Precast Applications for Repairs</li> <li>Precast Applications for Rehabilitation, Reconstruction, and New Construction</li> <li>Guidelines for Fast-Track Repair and Rehabilitation</li> </ul>	<ul style="list-style-type: none"> <li>Guidelines for Texturing Concrete Pavement Surfaces</li> <li>Smoothness Requirements for Concrete Pavements</li> </ul>
<b>TEST PROTOCOLS AND DRAFT SPECIFICATIONS</b>	<ul style="list-style-type: none"> <li>Coefficient of Thermal Expansion</li> <li>Joint Sealing</li> </ul>	<ul style="list-style-type: none"> <li>Test Protocols to Identify Compatible Concrete Materials</li> </ul>	<ul style="list-style-type: none"> <li>Maturity Testing for Early Opening to Traffic</li> <li>Cover Bar Alignment Testing/MIT Scan-2</li> <li>Curing Best Practices</li> <li>NCT related topics</li> </ul>		<ul style="list-style-type: none"> <li>Profile Measurement</li> </ul>
<b>SOFTWARE</b>	<ul style="list-style-type: none"> <li>Cost/Benefit of Design Features</li> <li>Colorado Department of Transportation Worksheet for Thin White-topping Design</li> </ul>	<ul style="list-style-type: none"> <li>COMPASS—Optimized Mix Design Procedure</li> </ul>	<ul style="list-style-type: none"> <li>TOMP System (maturity system)</li> <li>Performance-Related Specifications (PRS)</li> <li>Curing Timing/HPCP/PAV II</li> </ul>	<ul style="list-style-type: none"> <li>SAPER—Strategy Selection for Portland Cement Concrete Rehabilitation</li> </ul>	
<b>WORKSHOPS (1-2 days)</b>	<ul style="list-style-type: none"> <li>Best Practices for Concrete Pavements (Overall—Design, Materials, Construction, and Rehabilitation)</li> <li>Best Practices for Thin White-topping and Ultra-thin White-topping</li> <li>Cost/Benefit of Design Features</li> <li>Best Practices for Joint Sealing</li> </ul>	<ul style="list-style-type: none"> <li>Concrete Materials and Mix Design</li> <li>Guidelines to Identify Compatible Concrete Materials</li> </ul>	<ul style="list-style-type: none"> <li>Best Practices for Concrete Pavement Construction—Recent Advances</li> <li>Construction on Traffic Management/Best Practices</li> <li>PRS</li> <li>HPCP/PAV II</li> <li>NCT related topics</li> </ul>	<ul style="list-style-type: none"> <li>Best Practices for Rapid Repair and Rehabilitation of Concrete Pavements</li> <li>Precast Applications for Repair, Rehabilitation, Reconstruction, and New Construction</li> </ul>	<ul style="list-style-type: none"> <li>Surface Characteristics Workshop antedated in 2006</li> </ul>
<b>PRESENTATIONS (30-60 minutes)</b>	<ul style="list-style-type: none"> <li>Long Life Portland Cement Concrete Pavement Design and Construction Features</li> <li>Best Practices for Thin White-topping and Ultra-thin White-topping</li> <li>Optimizing Pavement Joint Details</li> <li>Best Practices for Joint Sealing</li> <li>Other/customized</li> </ul>	<ul style="list-style-type: none"> <li>High-Performance Concrete for Pavements</li> <li>Concrete Durability Issues</li> <li>Optimized Mix Design Procedure/COMPASS</li> <li>Other/customized</li> </ul>	<ul style="list-style-type: none"> <li>Best Practices for Concrete Pavement Construction</li> <li>Construction Management Tools</li> <li>Construction on Traffic Management/Best Practices</li> <li>Best Practices for Curing</li> <li>Applications of HPCP/PAV II</li> <li>NCT related topics</li> <li>PRS Update</li> <li>Other/customized</li> </ul>	<ul style="list-style-type: none"> <li>Rapid Repair and Rehabilitation—Conventional Fast-Track</li> <li>Rapid Repair and Rehabilitation—Precast Pavement Applications</li> <li>Other/customized</li> </ul>	<ul style="list-style-type: none"> <li>Pavement Texturing Recommendations</li> <li>Measuring Pavement Smoothness for Acceptance</li> <li>Other/customized</li> </ul>
<b>VIDEOS</b>			<ul style="list-style-type: none"> <li>Air Void Analyzer (AVA) Testing</li> </ul>	<ul style="list-style-type: none"> <li>Ultra-thin White-topping Repair</li> <li>California Precast Pavement</li> <li>Washington State Department of Transportation Intersection Rehabilitation</li> </ul>	
<b>FIELD DEMONSTRATIONS/EQUIPMENT LOAN PROGRAM (Test equipment is available on loan from FHWA.)</b>	<ul style="list-style-type: none"> <li>Coefficient of Thermal Expansion Test (Mobile Concrete Laboratory)</li> <li>Joint Sealing</li> </ul>	<ul style="list-style-type: none"> <li>Various possibilities</li> </ul>	<ul style="list-style-type: none"> <li>MIT Scan-2</li> <li>Maturity/TOMP</li> <li>HPCP/PAV II</li> <li>Curing Best Practices</li> <li>AVA</li> <li>PRS</li> <li>NCT—various</li> <li>Mobile Concrete Laboratory</li> </ul>	<ul style="list-style-type: none"> <li>Precast Paving—Repairs</li> <li>Precast Paving—Post-Tensioned</li> <li>Fast-Track Repairs</li> </ul>	<ul style="list-style-type: none"> <li>Friction Testing (Dynamic Friction Tester, Circular Track Meter)</li> </ul>
<b>CONFERENCES, WORKSHOPS, AND FORUMS</b>	<ul style="list-style-type: none"> <li>Long Life Portland Cement Concrete Pavements Conference—2006</li> <li>CP Road Map Forum—2006</li> </ul>			<ul style="list-style-type: none"> <li>Precast Paving Forum—August 2005</li> <li>State workshops</li> <li>National conferences—2006, 2009</li> </ul>	

# Exhibit...

## Concrete Pavement Technology Program

### Mobile Concrete Laboratory



### Dowel Bar Location



### Precast Prestressed Concrete Pavement



## Concrete Pavement Technology Program

### CPTP Products for Long-Life Pavements



CPTP Stakeholders  
AASHTO  
Academia  
FHWA  
Industry  
States  
TRB



### Program Goals

- Reduce User Delays
- Improve Safety
- Reduce Costs
- Improve Performance
- Foster Innovation

## Concrete Pavement Technology Program

### Continuously Reinforced Concrete Pavement



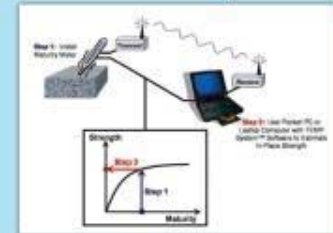
### Coefficient of Thermal Expansion



### Air Void Analyzer



### Concrete Maturity Testing



# ...and Publications

# Advanced Designs

- ▶ **Design Procedures for Whitetopping**
- ▶ **Cost & Performance Benefits of Various Pavement Design Features**
- ▶ **Optimized Dowel Bar Design**
- ▶ **Sealed & Unsealed Joints**
- ▶ **Coefficient of Thermal Expansion**

# Optimized Concrete Materials

- ▶ Tests to confirm compatibility of concrete ingredients
- ▶ Improved guidelines for developing job-specific concrete mixtures

# Improved Construction Processes

- ▶ Maturity concepts for concrete strength and opening to traffic
- ▶ **Magnetic tomography device to measure dowel bar alignment in concrete**
- ▶ Guidelines for improved curing of slipformed concrete pavements



# Rapid Repair & Rehabilitation

- ▶ **Repair & rehabilitation strategies**
- ▶ **Precast panels for full-depth repair of transverse joints**
- ▶ **Precast prestressed panels for pavement rehabilitation**

# User Satisfaction

- ▶ **Guidelines for construction traffic management for high-volume roadways**
- ▶ **Studies to better understand and define smoothness and surface texture requirements**

# **PUBLICATIONS – Available in Print and on FHWA Web Site**

- ▶ **Interim and Final Reports – Various CPTP Projects**
- ▶ **TechBriefs**: [http://www.fhwa.dot.gov/pavement/pub\\_listing.cfm?TitleStart=T](http://www.fhwa.dot.gov/pavement/pub_listing.cfm?TitleStart=T)
  - **Maturity Testing / Conc. Pavement Applications**
  - **Curing Practice / Slipformed Conc. Pavements**
  - **Use of Magnetic Tomography Technology to Evaluate Dowel Bar Placement**
  - **Concrete Pavement Rehabilitation and Preservation Treatments**
  - **Incremental Costs and Performance Benefits of Concrete Pavement Design Features**
  - **Achieving a High Level of Smoothness in Concrete Pavements Without Sacrificing Long-Term Performance**
  - **The Concrete Pavement Road Map**

# INTERNATIONAL CONFERENCE ON LONG-LIFE CONCRETE PAVEMENTS

October 25 and 26, 2006 – Chicago, Illinois

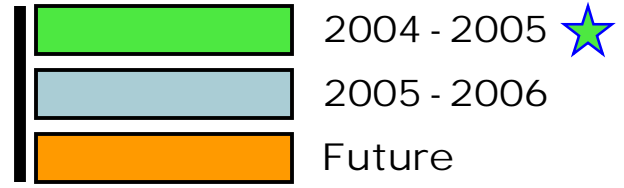


Organized as a part of  
**CPTP Implementation Activity**

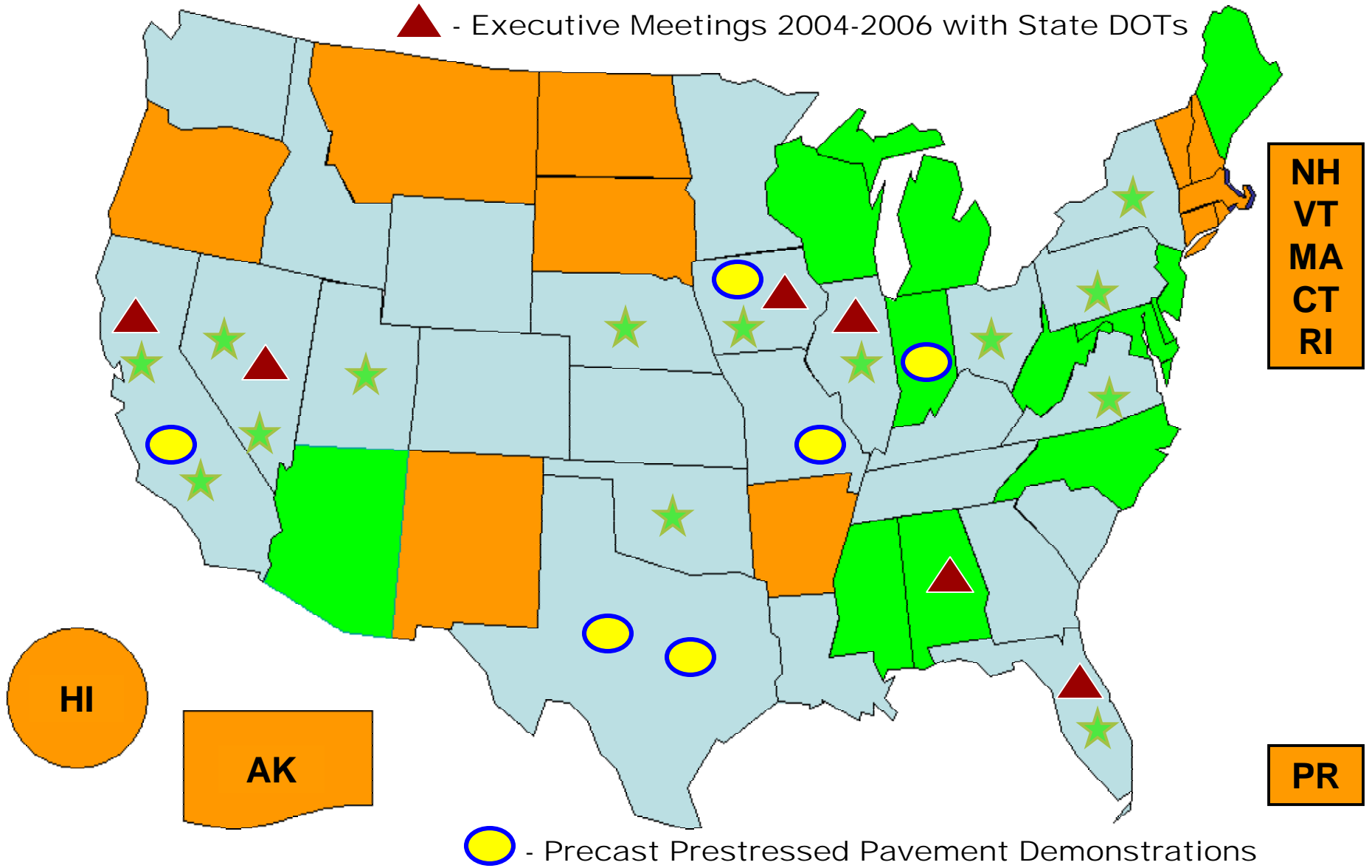


*Information available on FHWA Web site –*  
<http://www.fhwa.dot.gov/pavement/concrete/2006conf.cfm>

# CPTP Workshops, Presentations Equipment Demonstration & Loan



▲ - Executive Meetings 2004-2006 with State DOTs



○ - Precast Prestressed Pavement Demonstrations

# Precast Prestressed Concrete Pavement Demonstration Projects



← Pilot project  
2002 in Texas

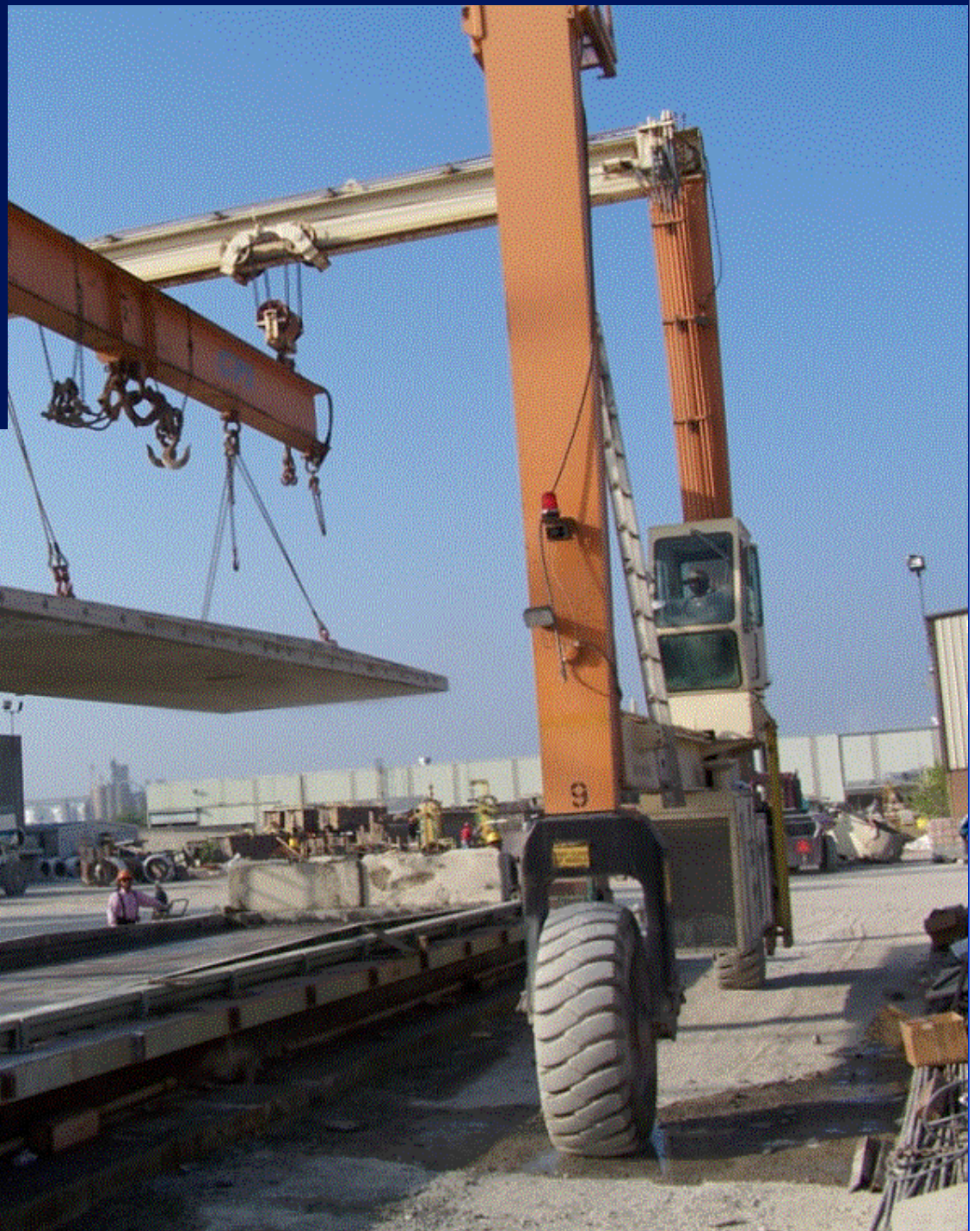
Missouri →  
DOT Project  
December  
2005



# *Texas DOT – Completed Pilot Project*



*Missouri DOT  
Precast Panels –  
Fabrication in  
Memphis, TN*





# *Precast Prestressed Concrete Pavement Projects - Completed and-or Planned*

- ▶ **Texas – Frontage Road**
- ▶ **California – Night-Time Lane Addition**
- ▶ **Missouri – Pavement Rehabilitation**
- ▶ **Iowa – Bridge Approach Slab**
- ▶ **Indiana – Vertical Clearance @ Underpass**
- ▶ **Texas – Weigh-in-Motion Scale**
- ▶ **Future State DOT Demos – Additional Applications of this Proven Technology**

# **CPTP Implementation Activities**

- ▶ **DOT Executive Meetings**
- ▶ **Best Practices Workshops**
- ▶ **Selected Presentation Topics**
- ▶ **Conferences on Whitetopping & Long-Life Pavements**
- ▶ **TechBriefs & Project Reports**
- ▶ **Exhibits at Meetings & Conferences**
- ▶ **Precast Prestressed Demonstrations**
- ▶ **Demonstration & Loan Program for New Testing Equipment**