

Concrete Pavement Technology Program

developing
a new
generation of

**concrete
pavements**

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Concrete Pavement Technology Program

In 1891, a full 17 years before the first mass-produced automobile “the Model T,” America’s first concrete pavement was laid. It was an 8-foot-wide strip placed on Main Street in Bellefontaine, Ohio. Today, this road is still in service.

Ninety years later, there were 55,000 miles of concrete pavements and 160,000 miles of composite (asphalt over concrete or concrete over asphalt) pavements throughout the United States.

Chosen because of its superior durability, safety, higher reflection of light at night, and greater traction, concrete has played a major role in development and construction of our Nation’s surface transportation infrastructure — the roads, highways, streets, and airports that are key to our economic well being and prosperity. Today, more than a century after the first concrete pavement in America, concrete is still playing a central role in America’s surface transportation system.

There have been many changes since that first concrete slab was placed in 1891. Significant technical and design developments during the 1930’s and ‘40’s made concrete paving faster, less expensive, and more durable. Of particular note was the invention of the slip-form paver, which allowed placement of wide sections of continuous concrete.

Today, heavier loads, increased traffic, and higher speeds are placing greater demands on America’s overcrowded highways, roads and streets. Improvements to current concrete pavement technology are needed. To this end, the *Transportation Equity Act for the 21st Century* (TEA-21) provided \$30 million, \$5 million per year, to “carry out research on improved methods of using concrete pavement in the construction, reconstruction, and repair of federal-aid highways.”

This document describes the Concrete Pavement Technology Program, its key goals, its participants, and provides some examples of the program’s outputs.

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The Concrete Pavement Technology Program

To carry out the research specified in TEA-21, the Federal Highway Administration (FHWA) entered into a cooperative agreement with the Innovative Pavement Research Foundation (IPRF). Working together, the FHWA and the IPRF have developed an ambitious program, the Concrete Pavement Technology Program (CPTP), consisting of research, development, and technology delivery activities to improve the performance and cost-effectiveness of concrete pavements.

The CPTP has four goals:

- Reduce user delays
- Reduce costs
- Improve performance
- Foster innovation

The CPTP will produce practical and readily useable tools, guidelines, procedures, methods and software to be used in the material selection, mix design, pavement design, construction, and operation of concrete pavements.

These goals address the needs of the State highway agencies, the concrete pavement industry, and the highway user, while supporting the FHWA's strategic goals to improve the mobility, productivity and safety of the nation's highway system.

Program Outputs

The CPTP will produce practical and readily useable tools, guidelines, procedures, methods and software to be used in the material selection, mix design, pavement design, construction, and operation of concrete pavements. Examples of outputs in each goal are:

Reduce User Delays

- Develop pre-cast concrete panel method for rapid pavement construction
- Establish guidelines for selecting strategies for rehabilitating rigid pavements subject to high traffic volumes

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- Establish traffic management guidelines for reconstructing high volume roadways

Reduce Costs

- Establish guidelines for the application of life-cycle cost analysis for concrete pavements
- Establish construction guidelines for building smoother concrete pavements
- Develop comparison of costs and benefits of various design features

Improve Performance

- Utilize HIPERPAV, software designed to minimize early age cracking of jointed concrete pavement
- Establish guidelines for the design of whitetopping overlays
- Establish guidelines for optimum timing of concrete pavement preventive maintenance
- Establish guidelines for repair and rehabilitation of concrete pavements
- Establish guidelines for recycling concrete pavements
- Establish guidelines for optimum strength for concrete pavements



Foster Innovation

- Develop Workshop and produce handbook on concrete pavement design details
- Develop Workshop on concrete pavement smoothness
- Develop Workshop on concrete durability
- Participate in the *International Concrete Pavement Conference* in 2001
- Conduct field demonstrations of concrete pavement repair and rehabilitation techniques

All of the CPTP's goals and the respective outcomes of each goal are highly interrelated; for example, improving performance will not only reduce delays, but will also reduce costs.



The Partnership

The CPTP is a partnership among the participating State highway agencies, the Transportation Research Board (TRB), the IPRF and the FHWA.

State Highway Agencies –

State highway agencies are responsible for the design, construction and operation of our nation's highways. Their management and technical decisions determine the quality of the states' highway system.

Therefore, the full and active participation of the state highway agencies is imperative to the implementation of new and improved technology. To ensure that the CPTP is responsive to

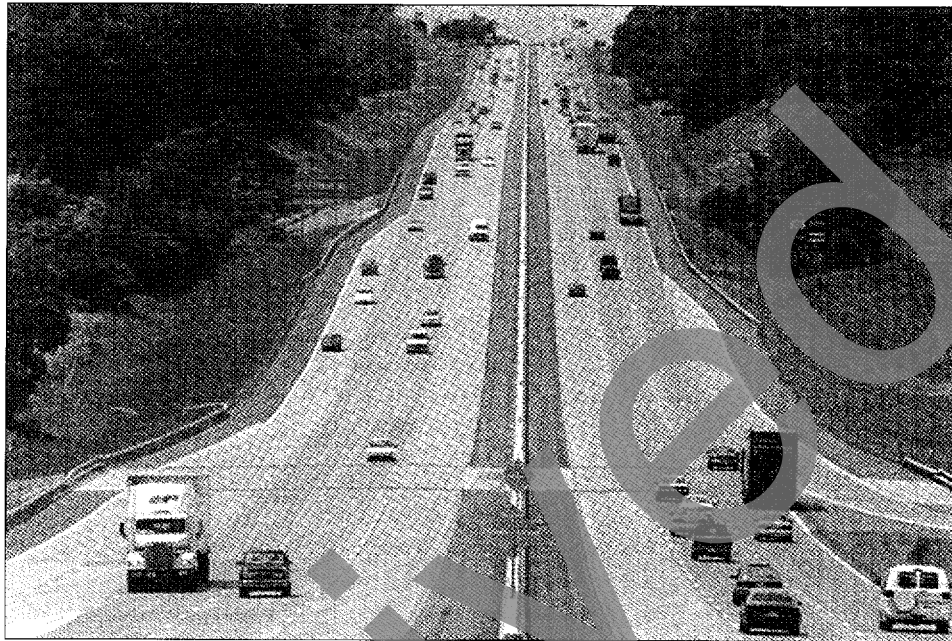
the states' needs, the TRB Committee is chaired by a state Chief Engineer and has four additional high-ranking state representatives. The American Association of State Highway and Transportation Officials (AASHTO) plays a key technology role. The AASHTO committees and their guides and specifications enable the adoption of new and improved technologies.

Transportation Research Board (TRB) – The TRB is a unit of the National Research Council, which is the principal operating agency of the National Academy of Sciences and the National Academy of Engineering. Formed by the U.S. Congress, this private, self-governing body is dedicated to the advancement of science and technology. The mission of the TRB is to promote innovation and progress in transportation through research. At the request of the FHWA and the IPRF, the TRB has formed the Committee for Research on Improved Concrete Pavements. The Committee reviews the long-range work plan of CPTP providing advice on the suitability of its overall goals, the likelihood for success of its identified tasks, and its completeness. The Committee also conducts regular progress reviews offering advice regarding course corrections, promising opportunities, and significant findings.

The Committee is an 18 member body consisting of state, industry and academia representatives with liaison members from the FHWA, the IPRF and the American Association of State Highway and Transportation Officials (AASHTO).

The TRB is a unit of the National Research Council, which is the principal operating agency of the National Academy of Sciences and the National Academy of Engineering. Formed by the U.S. Congress, this private, self-governing body is dedicated to the advancement of science and technology.





Innovative Pavement Research Foundation (IPRF) –

The IPRF is a non-profit organization formed by the American Concrete Pavement Association (ACPA), the Portland Cement Association (PCA) and the National Ready Mix Concrete Association (NRMCA) to provide objective, credible research and educational activities to enable the creation of a new generation of concrete pavements. The IPRF represents the concrete pavement industry, specifically the companies and people who construct and rehabilitate the nation's concrete pavements, as well as those who supply the materials and equipment.

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Federal Highway Administration (FHWA) – One of the FHWA's core functions is the research, development, and delivery of new and improved technology to better the design, construction, and operation of the Nation's highways. These functions are distributed throughout the FHWA's organizational structure. With the passage of TEA-21 and its mandate to carry out research on concrete pavements, the FHWA joined in a cooperative agreement with the IPRF to create and lead the CPTP. The FHWA is committed to the success of the CPTP because it contributes to the achievement of the FHWA's strategic goals and vision to create the best transportation system in the world.

CPTP Vision

The products of the CPTP will be used by the states and industry to provide better performing, more cost effective concrete pavements resulting in improved mobility, productivity, and safety for the nation.

TEA-21 funding provides a beginning for dramatically improved concrete pavements in the 21st century. However, the CPTP needs to be continued beyond 2003 so that critical research now underway can be completed, and the concrete



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pavement products can be fully implemented by the states and industry. Working with the TRB Concrete Pavement Committee, a long-range technology plan for the completion of the CPTP will be developed.

For more information contact

TRB: Neil Hawks, 202-334-3471, NHawks@nas.edu

IPRF: Robert Betsold, 703-288-8564, bbetsold@pavement.com

FHWA: Tommy Beatty, 202-366-1324, tommy.beatty@fhwa.dot.gov



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U.S. Department of Transportation
Federal Highway Administration

**400 7th Street, S.W.
Washington, D.C. 20590
Phone: 202-366-0537**



**7777 Leesburg Pike
Suite 202-S
Falls Church, VA 22043
Phone: 703-288-8564
Fax: 703-288-8566**

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