

# Office of Bridge Technology

## Working Together for Better Bridges and Tunnels

The Federal Highway Administration's (FHWA) Office of Bridge Technology is dedicated to working together with our many partners within FHWA and in State, local, and tribal governments; industry; and academia; and among other stakeholders to provide the Nation with safe, secure, reliable, and efficient highway bridges and tunnels.

### MANAGING AND PRESERVING OUR INFRASTRUCTURE

Key components of the Federal-aid bridge program include the National Bridge Inspection Program, which encompasses the National Bridge Inspection Standards (NBIS) and the National Bridge Inventory

(NBI). The NBIS cover the minimum requirements for inspection programs, including such things as frequency of inspection and minimum qualifications for bridge inspection personnel. Highway Bridge Replacement and Rehabilitation Program (HBRRP) funds are used to improve the conditions of the Nation's existing bridges, including preventive maintenance to extend the useful life of bridges. FHWA also encourages and promotes the use of a systematic process, such as a Bridge Management System (BMS), in determining cost-effective preventive maintenance activities to extend the service life of existing bridges.

### ACCELERATING BRIDGE CONSTRUCTION

Replacing and rehabilitating aging bridges that carry heavy traffic volumes presents a unique challenge. The use of prefabricated bridge elements and systems (PBES) allows highway agencies to dramatically reduce construction time and traffic disruptions. PBES also offer higher quality because they are manufactured offsite under controlled conditions.

### INNOVATIVE BRIDGE RESEARCH AND DEPLOYMENT

The Innovative Bridge Research and Deployment (IBRD) Program provides funds to State and local highway agencies for promoting, demonstrating, evaluating, and documenting the use of innovative designs, materials, and construction methods in the construction, repair, and rehabilitation of bridges and other highway structures.

### INNOVATIVE MATERIALS

The use of **high-performance concrete (HPC)** for bridges has become a standard practice for many States. Bridges built with HPC are expected to last significantly longer than conventional bridges, which means less disruptive preservation and maintenance work will be required. Highway agencies are beginning to use **self-consolidating concrete (SCC)**, which does not require vibration to achieve full

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FHWA Infrastructure

#### MISSION

Improve the condition of the Nation's bridges and structures through innovations in technology.

consolidation. SCC has a high degree of flowability and remains stable both during and after placement. SCC helps avoid defects and voids formed from improper or inadequate consolidation of vibrated concrete. SCC also provides better quality, improved durability, and high strength.

The implementation of **high-performance steel (HPS)** is also on the rise, with nearly 40 States now using HPS in over 200 projects. The steel is easier to weld and fabricate, tougher, more corrosion resistant, and has high strength.

**Fiber-reinforced polymer (FRP)** composites have unique properties, such as corrosion resistance, high strength, light weight, and fatigue resistance, which make it very attractive for the strengthening, hardening, repair, and seismic retrofit of bridges and structures.

### ULTRASONIC IMPACT TREATMENTS

Also showing promise is ultrasonic impact treatment (UIT) of welds. UIT helps prevent fatigue cracking in welds and welded members of existing and new bridges and structures. Eliminating the fatigue cracking increases the service life and reduces the overall lifetime maintenance cost.

### LRFD & LRFR

In the area of bridge design and load rating, FHWA is working with the States to fully implement the AASHTO Load and Resistance Factor Design (LRFD) and Load and Resistance Factor Rating (LRFR) systems. LRFD and LRFR are based on technological advances in bridge engineering, sound scientific principles, and a systematic design approach to ensure safety, durability, economy, and constructibility.

### HYDRAULICS AND GEOTECHNICAL ENGINEERING

In the areas of hydraulics and geotechnical engineering, meanwhile, FHWA is developing manuals, guidelines, and training courses on such topics as hydrology, hydraulic design, stream stability, scour mitigation, and driven pile foundations.

### SEISMIC DESIGN AND RETROFIT

FHWA has funded the development of new seismic design criteria and a new manual to provide highway agencies with the state-of-the-practice in seismic vulnerability evaluation and retrofit of bridges.

### BRIDGE AND TUNNEL SECURITY

FHWA, in cooperation with the U.S. Army Corps of Engineers, is sponsoring and conducting workshops on Bridge and Tunnel Security Vulnerability for Federal and State personnel. FHWA has formed an Engineering Assessment Team for Bridge Security and Vulnerability to provide technical advice and field review on methods to prevent, mitigate, respond to, and recover from extreme events.

### STRONG PARTNERSHIPS FOR BETTER BRIDGES

The success of our many initiatives to advance the safety, security, reliability, and efficiency of the Nation's bridges and tunnels and ensure mobility depends upon strong partnerships. Working cooperatively with our many stakeholders, partners, and customers, we can strengthen and improve the bridges and tunnels of today and tomorrow.

### BRIDGE LEADERSHIP COUNCIL

The Bridge Leadership Council, which includes representatives from throughout FHWA, aims to strategically focus FHWA resources to develop and deploy a nationally coordinated program of bridge technologies.

### MORE INFORMATION

#### Web site

[www.fhwa.dot.gov/bridge/index.htm](http://www.fhwa.dot.gov/bridge/index.htm)

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