



## INTERNATIONAL

### U.S. Team Studies European Highway Geometric Design Practice

An international technology exchange team of practitioners from the United States visited Sweden, Denmark, the Netherlands, the United Kingdom, and Germany to examine highway geometric design practice and learn about Context-Sensitive Design (CSD) for roads. The goal of the trip was to identify practices in these countries that, when implemented in the United States, will enhance the current procedures and ensure highway designs that address mobility and community issues.

CSD is a design approach aimed at satisfying safety and mobility needs while taking the community's interests into consideration. The CSD approach is a current practice in Europe, where several



Several European countries employ Context-Sensitive Design for their roadways, as seen in the design of a rural highway in Sweden.

highway geometric design concepts and tools are used to address design issues.



The Highway Geometric Design Tour was jointly sponsored by FHWA and AASHTO and the U.S. delegation was assembled by FHWA's International Technology Exchange Program. The delegation included members representing

FHWA, AASHTO, State Departments of Transportation, the American Public Works Association, and academia.

The delegation observed how European designers dealt with highway geometric design and project development issues, including CSD practices and procedures. They also saw how designers applied various  
*(Continued on page 5)*

The *Research and Technology Transporter* communicates FHWA research, development, and technology accomplishments, findings, information, and technology transfer opportunities. Its audience is transportation engineers and professionals in State and local highway agencies, State DOTs, Local Technical Assistance Programs, Divisions, Resource Centers, Core Business Units, academia, and the research community. The eight-page newsletter is published monthly by FHWA's RD&T service business unit. Editorial offices are housed at the Turner-Fairbank Highway Research Center. Comments should be sent to the editor at the address below. Field offices are encouraged to submit articles for publication via the appropriate agency technology leader from the editorial board listed below. The newsletter can be viewed online at [www.tfhrc.gov](http://www.tfhrc.gov). Subscriptions to the *Transporter* are free. Send your request to Judy Dakin at the address below, or send email to [judy.dakin@fhwa.dot.gov](mailto:judy.dakin@fhwa.dot.gov).

**Rodney E. Slater**  
Secretary

U.S. Department of Transportation

**Kenneth R. Wykle**  
Administrator

Federal Highway Administration

**Anthony R. Kane**  
Executive Director

Federal Highway Administration

#### Editorial Board

C. Burbank; E. Cleckley; K. Gee;  
A. Hamilton; E. Hempel; C. Johnson;  
D. Judycki; V. Miller; E. Morris;  
G. Ostensen; V. Schimmoller;  
K. Skelton; M. Vecchiotti; D. Wilken;  
L. Witman; F. Wright

Managing Editor, Martha Soneira  
Senior Editor, Jon Schans  
Editor, Kandace Studzinski  
Design, Jean Hwang  
Distribution, Judy Dakin



U.S. Department of Transportation  
Federal Highway Administration  
Turner-Fairbank Highway Research Center  
6300 Georgetown Pike, HRTS  
McLean, VA 22101-2296  
[www.tfhrc.gov](http://www.tfhrc.gov)

## INFRASTRUCTURE

### FHWA's NDE Validation Center and NYDOT Conduct Third Test on Girder

The NDE Validation Center in collaboration with the New York State DOT recently performed a full-scale structural test of a 40-year-old, severely deteriorated, prestressed box girder that had been repaired with carbon fiber laminate. This box girder was removed from service because it had deteriorated and was shipped, along with four other girders from the same structure, to TFHRC for testing. This was the third full-scale test conducted as part of the same study. Previous testing was conducted on two girders without the application of a carbon laminate repair to determine pre-repair girder strength and performance.

This is the first time that any laboratory has conducted full-scale testing of a repaired box girder that had deteriorated through its natural service life. These unique test specimens help researchers obtain realistic results that can be transferred to field applications. Researchers are testing the feasibility of using carbon laminates on deteriorated bridge structures.

This test represents a collaboration among FHWA teams. FHWA's High-Performance Materials Team provided their expertise in full-scale structural testing to assemble and operate the loading systems. The Geotechnical Research Team

*(Continued on page 3)*

### Testing of Box Girder Demonstrates Ability of NDE

The full-scale structural test of the severely deteriorated, prestressed box girder that had been repaired with carbon fiber laminate was also used to demonstrate innovative nondestructive evaluation (NDE) technologies. Physical Acoustics Corporation (Princeton, NJ) assessed the condition of the concrete during load testing using acoustic emission monitoring. The Virginia Polytechnic Institute (VPI) NDE team assessed the presence and quality of the adhesive bond between the carbon laminate and the concrete using infrared thermal imaging. The VPI team

also performed acousto-ultrasonic evaluation to monitor the concrete and laminate during the test.

Future tests of these box-girders will be performed in the fall to evaluate the load carrying capacity of an onsite test bridge, provide loading for a test of the Geosynthetic Reinforced Soil (GRS) abutments, and evaluate loading rating tools developed through the NDE program. Three beams will be placed on the GRS abutments to construct the bridge and will be left in place for future testing.

---

*(Continued from page 2)*

constructed the experimental abutments on which the test was conducted.

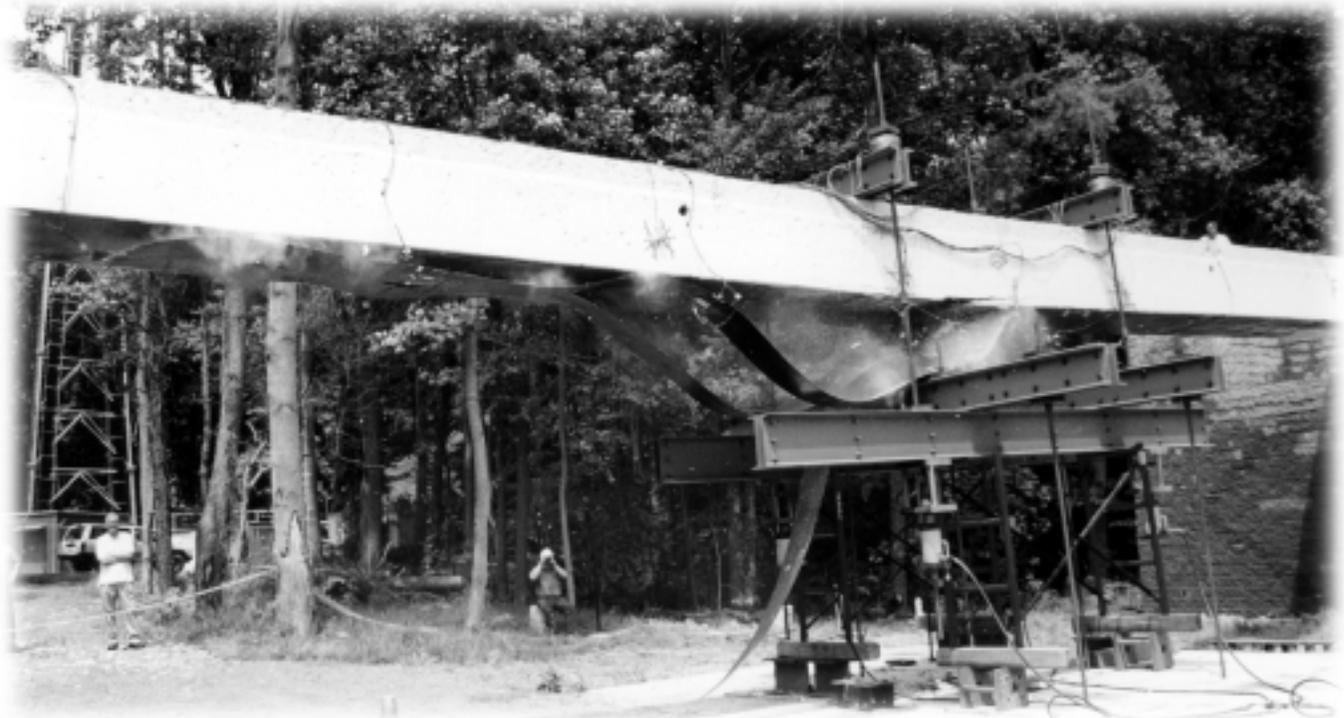
The objectives of the test were to improve researchers' understanding of bonded composite laminates in retrofitting deteriorated prestressed concrete beams and to develop design and

construction guidelines for using composite laminates to strengthen prestressed concrete box beams (for either rehabilitation or rating improvement).

Researchers used four 100-kip hydraulic jacks to load the girder to 60 kips before the specimen failed. During the load test, the box girder was instrumented to

measure the vertical and horizontal deflections. Concrete and carbon laminate strains were also measured. The results will be used to formulate a model to aid designers and in selecting a realistic safety factor.

*Glenn Washer*  
*(202) 493-3082*  
*glenn.washer@fhwa.dot.gov*



**Researchers at TFHRC and partners recently performed a full-scale structural test of a deteriorated, prestressed box girder that had been repaired with carbon fiber laminate.**

---

## **FHWA Sponsors HIPERPAV Software Training**

**F**HWA's Office of Pavement Technology sponsored a workshop in Austin, Texas, to teach individuals how to use HIPERPAV, a user-friendly, Windows-based computer program that provides guidance on the design and construction of concrete pavement and enables engineers to make decisions

about variables that affect uncontrolled cracking of jointed concrete pavements at an early age.

A team of trainers taught 21 participants. The participants completed the short, intensive course so that they can host their own HIPERPAV workshops

and training sessions around the country.

For more information on the team of trainers, or to set up a workshop in your area, send an email to [info@hiperpav.com](mailto:info@hiperpav.com).

*Steve Forster*  
*(202) 493-3070*  
*steve.forster@fhwa.dot.gov*

## Atlanta Develops Conforming Transportation Plan and Program

The population and development in the Atlanta region has increased dramatically over the last 2 decades. Because of this growth, the region's transportation system has contributed to air quality problems.

In the last year, under the leadership of Governor Roy E. Barnes, and with the cooperation of many area agencies and leaders, Atlanta has developed a new transportation plan and program that commits the State to addressing air quality, environmental justice, and transportation planning issues, which will place the Atlanta region on a path to resolve its long-term transportation problems.

When Atlanta was unable to demonstrate that its transportation plan conformed to Clean Air Act (CAA) requirements in January 1998, this triggered a conformity lapse that lasted for more than 2 years, severely limiting Atlanta's ability to use Federal transportation funds for both transit and highways.

Under the CAA, metropolitan planning organizations such as the Atlanta Regional Commission (ARC) must show that their long-range transportation plans and their transportation improvement programs (TIPs) conform to State air quality implementation plans (SIPs). The CAA requires each State to prepare a SIP that shows procedures for monitoring, attaining, maintaining, and

enforcing compliance with Federal air quality standards. The SIP includes a budget that sets a limit on the amount of emissions that can come from all motor vehicles. To conform, the transportation plan and the TIP must result in lower emissions than the budget.

The long-range transportation plan, the TIP and the SIP must be updated periodically. If an updated transportation plan or the TIP fail to conform to the SIP, most new highway and transit projects cannot proceed. This is called a conformity lapse. In January 1998, the ARC was unable to develop an updated, conforming transportation plan, and the Atlanta area entered a conformity lapse.

Developing a 20-year transportation plan that meets mobility needs and air quality goals is a major challenge. To help meet this challenge, the Georgia General Assembly in 1999 created, at the urging of Governor Barnes, the Georgia Regional Transportation Authority (GRTA). The GRTA is charged with combating air pollution, traffic congestion and poorly planned development in the metro Atlanta area.

The result has been a major shift in transportation and air quality planning in the Atlanta region. Under the Governor's leadership, and with the cooperation of many area agencies and leaders, the ARC developed a new transportation plan that emphasized transit,

bicycle-pedestrian facilities, air quality improvements, and highway system preservation. ARC also adopted provisions to make significant changes in land use, to increase density, and to facilitate greater use of transit.

With the approval of a new conformity determination, the Atlanta region now can move forward to implement its long-range transportation plan. FHWA and Federal Transit Administration (FTA) will continue to work closely with partners in Georgia to ensure the necessary access and mobility for everyone in the Atlanta metro area and to improve air quality for generations to come.

*James M. Shrouds*  
(202) 366-2074  
[james.shrouds@fhwa.dot.gov](mailto:james.shrouds@fhwa.dot.gov)



### FHWA's Native Plant Handbook Temporarily Out Of Print

Copies of the first printing of FHWA's newly released handbook, *Roadside Use of Native Plants*, are no longer available. FHWA has made arrangements with Island Press, Inc. to reprint it this year. All orders received since January will be notified of the second printing.

## FHWA Releases TSIS 5.0

Over the last twenty years, FHWA has been developing and enhancing the corridor simulation model called CORSIM. What started as separate models, namely NETSIM and FRESIM, has evolved into a stable and mature product, used by thousands of practitioners and researchers throughout the world.

The CORSIM simulation is a component within the Traffic Software Integrated System (TSIS), a package of traffic analysis tools that support the setup, execution, and interpretation of the input to and output from the CORSIM simulation. TSIS is now being used routinely by many public and private agencies, mainly because of its FHWA endorsement and its traffic simulation visualization features.

The latest version of TSIS 5.0 will be released later this year. TSIS 5.0 has many improvements and added features compared to the current TSIS 4.32 version. For example, the weaving logic has been dramatically improved, and users can now model ramp meters

*(Continued from front page)* parameters used in geometric design for enhancing traffic safety and enforcing speed moderation, and considered integrating bicyclists and pedestrians in highway design.

The team concluded that designers need to devote more time to the planning process and design



**Traffic simulation could be used to develop new solutions for workzones.**

and high occupancy vehicle (HOV) lanes. Also included with TSIS 5.0 will be a new state-of-the-art graphical input processor, called TRAFED, that will simplify the creation of CORSIM data files and mitigate one of CORSIM's perceived weaknesses.

FHWA is considering reengineering or replacing the CORSIM simulation component of TSIS, primarily to take advantage of current computing technologies.

However, existing TSIS/CORSIM need not worry—FHWA will

longer sections, typically entire corridors. This long-range planning approach allows designers to have an overview and to define the needs and deficiencies of the entire system.

Researchers noted that involving the public at the earliest design stages is important in order to avoid potential conflicts and

continue to support the TSIS package, including CORSIM. Users will continue to get technical support and new program releases with bug fixes and minor enhancements.

FHWA encourages TSIS users to continue applying the model and to take advantage of its many new features and enhancements. Meanwhile, FHWA will pursue the next generation of traffic simulation software.

**Raj S. Ghaman**  
(202) 493-3270  
[raj.ghaman@fhwa.dot.gov](mailto:raj.ghaman@fhwa.dot.gov)

problems at later stages.

A more complete executive summary of the tour is available on [www.international.fhwa.dot.gov](http://www.international.fhwa.dot.gov). The team will publish a full report early in 2001.

**Hana Maier**  
(202) 366-6003  
[international@fhwa.dot.gov](mailto:international@fhwa.dot.gov)

## TECHNOLOGY MARKETING

### Information Revolution Brings Thousands of Librarians to Philly

To hone their skills as information professionals in this digital age of high-tech information technology (IT), nearly 10,000 librarians converged on June 10–15 for the Special Libraries Association's (SLA) 91st Annual Conference. Since Philadelphia was the historic site of the signing of the Declaration of Independence, Philly was an appropriate setting for this year's conference, which carried the theme, *Independence to Interdependence: The Next Phase in the Information Revolution*.

Like the Transportation Research Board (TRB) annual meeting, the SLA annual meeting is comprised of a wide variety of programs organized by groups representing different technical disciplines.

The SLA Transportation Division program was coordinated by the immediate past chair, Mary

Silva of the Arizona DOT. Included was a one-day workshop hosted by the Government Transportation Research Information Committee (GTRIC). Barbara Post of the TRB provided updates on Transportation Research Information System (TRIS), *TRIS Online*, and the TRB Research-In-Program database.

TRIS Online (Version 1.5) is now available to the public through the Bureau of Transportation

Statistics-National Transportation Library's (BTS-NTL) website: <http://ntl.bts.gov/tris>. Post reported that the TRIS database has now reached 500,000 records of published and on-going transportation research.

Walter Finch of the National Technical Information System (NTIS) spoke on the proposed closing of NTIS, which has

*(Continued on page 7)*



**(Left to right) Librarians Velma Mackall (FHWA-TFHRC Library), Clara Smith (DOT's Nassif Library), and Janice Bain-Kerr (BTS' National Transportation Library) enjoy the information exchange during SLA 2000.**

## TECHNOLOGY MARKETING

*(Continued from page 6)*

created a great stir throughout the IT community. Cynthia Sparkman, Chris Berendes, and Janice Bain-Kerr (BTS) gave updates on the NTL, which contains over 5,300 full-text documents and houses TRIS Online. Future plans are to link to full-text documents on TRIS. George Ostensen of FHWA's Midwestern Resource Center gave a presentation on the current status of the surface transportation system. Among other things, he discussed "raising the bar" on performance, FHWA restructuring, and linking and leveraging IT to improve the system.

SLA's week-long meetings also

included marketing and web publishing information—topics often overlooked by other similar programs. SLA 2000 turned out to be a great information forum for revolutionizing IT and equipping librarians with the proper knowledge management skills.

Next year, the librarians will meet in San Antonio, TX.

**Zachary Ellis**  
(202) 493-3193  
[zac.ellis@fhwa.dot.gov](mailto:zac.ellis@fhwa.dot.gov)



**George Ostensen, Director of FHWA's Midwestern Resource Center discussed the current status of the surface transportation system at the Special Libraries Association's 91st Annual Conference.**

## Plug Into the Technology and Innovation Network

Leveraging technology and innovation—one of the five guiding principles of FHWA's strategic plan—is a broader and more inclusive process than technology transfer, focusing on the delivery of good practices, services, and products. One of the key issues in FHWA's recent reorganization was the desire to strengthen the agency's technology deployment efforts by developing a broader, more effective means of leveraging technology and

innovation within the agency.

As a first and important step toward that goal, FHWA has formed a new working group, composed of staff from the Core Business Units, Service Business Units, Resource Centers, and Division offices. The group—known as the Technology and Innovation Network—has three key goals:

1. Recommend priorities and develop a technology deployment strategy.

2. Coordinate communications, outreach and marketing activities.
3. Coordinate the measurement and evaluation of the agency's technology and innovation program.

This network should help FHWA get its message out more accurately and efficiently.

**John McCracken**  
(202) 493-3422  
[john.mccracken@fhwa.dot.gov](mailto:john.mccracken@fhwa.dot.gov)



U.S. Department of Transportation

**Federal Highway Administration**

Research, Development, and Technology  
6300 Georgetown Pike  
McLean, VA 22101-2296

Official Business  
Penalty for Private Use \$300

HRTS

FIRST CLASS  
POSTAGE & FEES PAID  
FEDERAL HIGHWAY  
ADMINISTRATION  
PERMIT NO. G-66

## PROFESSIONAL DEVELOPMENT

### NHI Instructor Development Course Redesigned

The Instructor Development Course for the National Highway Institute has been revised. The course, which previously took 3 days, has been extended to 4.5 days.

The biggest addition in the content of this course is the introduction of a second presentation. The second presentation allows the participant to practice using all of the adult learning techniques and methods taught in the class. It also serves as a performance evaluation.

An NHI master trainer observes and evaluates the participants against a set of competency skills

during the second presentation. If the participant passes the second presentation, the person becomes a "Conditionally NHI Certified Instructor."

This change was made to better support the individual in the certification process and enhance the quality of our instruction. The final step in the certification process is obtained through direct observation by an NHI master trainer of a live classroom presentation. This should be accomplished within one year after attending the NHI Instructor Development Course. Certification can also be awarded through a

consistent demonstration of outstanding presentations.

The Instructor Certification Program is designed to ensure consistent instructional quality and to encourage the use of learner-centered training methods particularly suitable for adult learners. Since the start of the Program 18 months ago, 70 instructors have been certified. A successful pilot of this course was held July 24–28 in Fort Worth, TX.

*Rick Barnaby*  
*(703) 235-0520*  
*rick.barnaby@fhwa.dot.gov*