

# FOCUS

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## Shields of Steel: California Introduces New Mobile Work Zone Protection Device

In January 2001, two California Department of Transportation (Caltrans) highway maintenance workers were hit by an impaired driver whose car penetrated a work zone. One of the workers, Mark Balsi, lost a leg in the accident. From that tragic incident has come an innovation designed to significantly improve safety for workers along the Nation's highways.

"Protecting our workers and the traveling public are our highest priority," says Randell Iwasaki, Caltrans Deputy Director for Maintenance and Operations. "The accident involving Mark Balsi underscored the need for additional protection from vehicles that could penetrate the work area. The result of our research and deployment efforts was the development of the Balsi Beam, a mobile work protection system."

The system, which is carried on a tractor-trailer, is specifically intended to enhance worker safety when carrying out shoulder repair in work zones adjacent to guardrails, bridge rails, and soundwalls. Each side of the trailer consists of high-strength steel box section beams that are capable of extending an additional 4.6 m (15 ft). Using hydraulic power, each beam can rotate to either side (left or right), depending on which side of the road a protective barrier is needed. The trailer then extends to provide a 9.1-m (30-ft) secure work zone. The trailer beams act as a rigid obstacle to deflect traffic away from maintenance workers, in essence forming what Caltrans calls "shields of steel" to protect workers. The system reverses the procedure for transport. Whereas in a typical work

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The Balsi Beam acts as a rigid obstacle to deflect traffic away from maintenance workers. A patent for the device is pending.



U.S. Department  
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**Federal Highway  
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# Mobile Asphalt Lab: Technology on the Go

Over the past year, the Federal Highway Administration's (FHWA) mobile asphalt laboratory has traveled to eight States, carrying an array of testing equipment and technologies and assisting highway agencies with everything from performance testing of asphalt mixes to obtaining data inputs for the proposed *2002 Guide for Design of New and Rehabilitated Pavement Structures*, developed under National Cooperative Highway Research Program (NCHRP) Project 1-37A. "We are seeing a lot of interest by States in the Superpave performance test. States are also interested in benefiting from the lab's Superpave equipment and aggregate imaging technology," says Leslie Myers of FHWA. "We are also getting more requests to assist with calibrating material performance models to support the new Design Guide requirements."

The lab's technology includes the Superpave performance test equipment that provides data for performance prediction models of asphalt pavements. This technology is a product of the NCHRP 9-29 and 9-19 projects. The lab

also features an array of rapid materials testing technology, including the Aggregate Imaging System (AIMS) video imaging device, which can measure aggregate properties for both fine and coarse aggregates, as well as infrared detection equipment to determine saturated surface dry condition (SSDetect) and apparent specific gravity (Corelok). Conventional hot-mix asphalt tests can also be run in the lab, including volumetric testing for Superpave mixtures and density measurements. During the past year, the lab continued to refine test procedures for the Superpave performance test and to develop a support approach for helping States conduct local materials characterization for the proposed new design procedures resulting from the NCHRP 1-37A project. Lab staff have also been preparing for the new version of the HMA Spec software, developed under

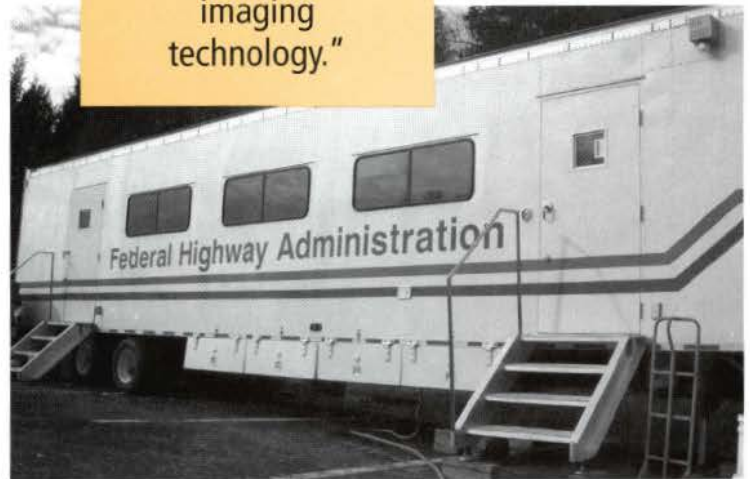
NCHRP Project 9-22, by conducting trial performance-related specifications projects with States such as North Carolina. The software generates performance specifications for the asphalt mix, based on data inputs from asphalt materials tests, traffic data, pavement structural design and construction data, and pavement management parameters. The new version of the software is expected to be ready in late spring.

Once a visit has been scheduled at the request of a State highway agency, the lab will travel to the State's highway construction site, where lab staff will use the trailer's equipment to test local materials. The lab's visit begins with a 1/2-day workshop on asphalt pavement technology for State department of transportation employees, FHWA Division Office and Federal Lands Highway staff, and others, such as individuals from local highway agencies, universities, and State asphalt associa-

"We are seeing a lot of interest by States in the Superpave performance test. States are also interested in benefiting from the lab's Superpave equipment and aggregate imaging technology."



This photo shows the sampling and splitting of the asphalt mixture from Iowa's US 218 project for performance testing.



FHWA's mobile asphalt laboratory onsite in Bangor, Maine.

tions. After the workshop, participants can take a hands-on tour of the lab. The lab is typically onsite for 4 to 6 weeks and hosts an open house for visitors at least 1 day per week during the visit. After the site visit and lab tests, FHWA will prepare a report for the State with feedback on the data results and present it during a final close-out workshop.

In August, the lab spent 2 weeks in Utah, assisting the Utah Department of Transportation (DOT) with Superpave performance testing. "Our technicians were not confident about using the testing equipment. After the mobile lab came and conducted training, our staff was much more confident. The visit really helped a lot," says Murari Pradhan of Utah DOT. The lab conducted Superpave perform-

ance testing on two of Utah's typical asphalt mixtures for a section of I-215. Utah's Region 2 Materials Lab carried out its own testing alongside the FHWA lab and the results were then compared. The two sets of tests produced similar results and indicated that the mix would perform well in the field.

The lab spent 4 weeks onsite in Nashua, Iowa, in July 2003, assisting with performance testing of a Superpave mix design for US 218. The mix was also tested by the Iowa DOT, Iowa State University, North Central Superpave Center, and Mathy Construction. "This gives us a great opportunity to see how the mix will perform when tested by more than one lab," says Myers. The five organizations are scheduled to meet in February to go

over the test results and look at how differences in testing equipment affected the results. Iowa DOT, for example, used simplified testing procedures to reduce the specimen preparation time. Comparing its test results to the mobile lab's and others' will help the DOT in analyzing whether it can continue to use the simplified procedures or will need to make changes. "Working with the mobile asphalt lab has put us ahead of the curve for understanding performance testing," says Mike Heitzman of Iowa DOT.

For a list of locations the mobile asphalt lab is scheduled to visit in 2004, see sidebar. For more information on the lab or to schedule a visit to your State, contact Leslie Myers at FHWA, 202-366-1198 (email: [leslie.myers@fhwa.dot.gov](mailto:leslie.myers@fhwa.dot.gov)). \*



Top: The Superpave Performance Tester is run in the mobile asphalt lab. Bottom: Superpave Performance Tester specimens are prepared using a clamped sawing device.

## 2004 Mobile Asphalt Lab Schedule

**January–February**—Paving jobs with performance testing in California with the California Department of Transportation.

**February**—Support for the asphalt materials module of the National Highway Institute 6-week Materials Course in Reno, Nevada.

**March**—On display at World of Asphalt Conference in Nashville, Tennessee.

**March–April**—Side-by-side asphalt mixture testing with the Louisiana Transportation Research Center and the Louisiana Department of Highways.

**May**—Stone-matrix asphalt paving project with the Washington State Department of Transportation.

**June**—Performance testing on stone-matrix asphalt mix paving job in Minnesota.

**July**—Nebraska Department of Transportation paving project.

**August**—Kansas Department of Transportation paving project.

**September**—Recycled asphalt pavement paving project with the New York State Department of Transportation.

**October**—Rhode Island Department of Transportation Superpave project.

**November**—Oklahoma Department of Transportation paving project.

# Choosing the Accelerated Construction Route in New Jersey

**W**hen the New Jersey Department of Transportation (NJDOT) began planning improvements to the westbound structure of the Rt. 46 Bridge spanning Overpeck Creek in Bergen County, it faced numerous challenges. The bridge is located next to the New Jersey Turnpike and is only about 8 km (5 mi) west of the George Washington Bridge leading into New York City, so minimizing the impact of construction on the traveling public and completing the work as soon as possible was vital.

NJDOT evaluated several construction alternatives, ranging from partial replacement of the bridge deck and bascule span to total replacement of the westbound superstructure. It was estimated that total replacement of the westbound superstructure would take 12 months and cost \$10 million. Looking to reduce the construction time, NJDOT decided to consult with the American Association of State Highway and Transportation Officials' Technology Implementation Group (TIG) and the Federal Highway Administration's (FHWA) Accelerated Construction Technology Transfer (ACTT) team. The ACTT initiative promotes the use of innovative technologies and techniques to accelerate the construction of major highway projects (see July 2003 *Focus*). "We were hoping they could help us find solutions to the bridge design and identify cutting edge ways to build the bridge as soon as possible," says Gary Toth, Director of Project Planning and Development at NJDOT. "Minimizing the impact of the construction on the public is crucial."

An ACTT team composed of representatives from TIG, FHWA, and industry met with NJDOT in July 2003, toured the bridge, and received an overview of the project. The team then

presented its findings to New Jersey in October. These included considering various scheduling options for accelerating construction, such as closing the westbound lanes for work and detouring traffic during the evenings, on weekends only, or at all times during a 1- to 2-month total closure. The team recommended total closure to reduce construction time to 6 weeks. The team also presented numerous technology options for speeding up the work, including the use of preconstructed composite units of lightweight high-performance concrete (HPC) in beams and the deck or the use of steel beams and lightweight HPC for the deck, with polymer concrete for joint closures. Another deck option was to use fiber-reinforced polymer composites.

After considering the team's recommendations, New Jersey has decided not to replace the entire superstructure or use road closures, but to use prestressed, precast HPC for a new bridge deck to expedite construction. New Jersey will also replace some of the bridge's secondary steel beams, while maintaining the bascule span steel girders. Work to replace the bridge deck is expected to begin next year and last 3 months, at an estimated cost of \$3 million. The improvements will be carried out while maintaining two lanes in the westbound direction at all times.

"It was very helpful for us to have the ACTT team come in," says Toth. New Jersey has also decided to call upon the ACTT team's help for a much larger \$250 million project, the reconstruction of the I-295/I-76/Rt. 42 interchange in 2008. This major north-south route is "probably the most traveled section of highway in New Jersey," says Toth, carrying about 175,000 cars a day. "If we can get in and out faster, it will be a

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## 2004 Concrete Bridge Conference: Building a New Generation of Bridges

**M**ake plans now to attend the 2004 Concrete Bridge Conference (CBC), to be held May 17-18, 2004, in Charlotte, North Carolina. Sponsored by the National Concrete Bridge Council (NCBC), American Concrete Institute, and the Federal Highway Administration (FHWA), the conference will feature 18 technical sessions on state-of-the-art topics, with an emphasis on rapid bridge construction and high-performance concrete applications. The first CBC, held in 2002 in Nashville, Tennessee, drew more than 300 bridge engineers. "The Concrete Bridge Conference has quickly become a premier national venue for the exchange of ideas and information on all aspects of concrete bridge design, materials, and construction," says Jerry Potter of FHWA's Office of Bridge Technology.

The conference will also feature exhibits showcasing the latest industry products and services. In addition, a conference proceedings will be provided to all attendees following the event. The conference is being held in conjunction with the 2004 Post-Tensioning Institute Technical Conference and Exhibition. Those registering for the CBC can attend both events.

For more information, contact Shri Bhide at the Portland Cement Association, 847-972-9100 (email: sbhide@cement.org) or Jerry Potter at FHWA, 202-366-4596 (email: jerry.potter@fhwa.dot.gov). Information is also available online at [www.nationalconcretebridge.org/cbc](http://www.nationalconcretebridge.org/cbc). \*

# FHWA Construction and Project Management Team: Reach for Your Tool Box

**N**ow here to provide technical assistance to highway agencies and others and to deliver a tool box of ready-to-implement technologies is the Federal Highway Administration's (FHWA) new Construction and Project Management Technical Service Team. The team was created to support technology deployment and to better serve a range of transportation customers. Team members represent more than 75 years of combined expert experience.

The team's tool box of technologies includes design-build contracting, which assigns both design and construction responsibilities to one firm, allowing some construction work to begin before the design is completed. Starting in 1990, States had evaluated the design-build method through FHWA's Special Experimental Project Number 14 (SEP-14). New regulations released by FHWA in December 2002 now allow the use of design-build contracting for transportation infrastructure projects that are part of the Federal-aid highway program. The team is also focusing on technologies to improve work zone traffic flow and safety, as well as additional alternative contracting methods that aid in accelerating construction projects and reducing work zone accidents.

Headquartered in FHWA's Resource Center office in Atlanta, Georgia, the team also has technical specialists located across the country (see sidebar on page 6). "This structure allows the team to provide unified and coordinated assistance nationwide," says team leader Rob Elliott.

The team's goals for 2004 include further developing and deploying the construction/project management tool box, which will include:

- Tools and processes that improve contract administration and support innovative contracting methods. This includes such strategies as design-

build contracting, accelerated construction, lane-rental, and use of warranty specifications.

- Technologies that improve quality construction and maintenance preservation, such as quality assurance procedures and standards for construction inspection.
- Technologies that optimize safety and reduce delays in work zones.
- Tools, processes, and procedures that provide technical assistance for disaster response.

The team is also promoting tools, processes, and procedures that build technical skills in construction and project management. This includes supporting the development and teaching of National Highway Institute and FHWA courses such as Contract Administration Core Curriculum, Reviews That Get Results, Managing Construction Workmanship, and Bridge Construction Inspection.

For assistance or to obtain more information on construction and project man-

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To better serve its customers and support technology deployment, FHWA has created 10 specialized Technical Service Teams, which operate out of the agency's four resource center locations in Atlanta, Georgia; Olympia Fields, Illinois; Baltimore, Maryland; and San Francisco, California (see May 2003 *Focus*). The nine additional team's central locations and national team leaders are:

## Atlanta, Georgia

*Pavement and Materials*—Monte Symons, 404-562-4782

(email: monte.symons@fhwa.dot.gov)

*Finance*—Thay Bishop, 404-562-3695 (email: thay.bishop@fhwa.dot.gov)

## Olympia Fields, Illinois

*Operations*—Martin Knopp, 708-283-3514 (email: martin.knopp@fhwa.dot.gov)

*Safety and Design*—Patrick Hasson, 708-283-3595

(email: patrick.hasson@fhwa.dot.gov)

## Baltimore, Maryland

*Geotechnical and Hydraulics*—Peter Osborn, 410-962-0702

(email: peter.osborn@fhwa.dot.gov)

*Structures*—Shoukry Elnahal, 410-962-2362

(email: shoukry.elnahal@fhwa.dot.gov)

## San Francisco, California

*Air Quality*—Robert O'Loughlin, 415-744-3823 (email:

robert.o'loughlin@fhwa.dot.gov)

*Environment*—Donald Cote, 415-744-2650 (email: don.cote@fhwa.dot.gov)

*Planning*—Lisa Randall, 415-744-2649 (email: lisa.randall@fhwa.dot.gov)

## Construction and Project Management Team,

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agement technologies and initiatives, contact one of the team members listed in the sidebar. More information is also available at [www.fhwa.dot.gov/resourcecenter](http://www.fhwa.dot.gov/resourcecenter) (look under "Technical Service Teams," and then select "Construction and Project Management" and click "Go").

FHWA has created 10 specialized Technical Service Teams in all (see sidebar on page 5). *Focus* will be profiling additional teams throughout the year. \*

### FHWA Construction and Project Management Technical Service Team

#### Rob Elliott

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#### Jerry Blanding

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410-962-2253 (fax: 410-962-4586;  
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email: [eugene.hoelker@fhwa.dot.gov](mailto:eugene.hoelker@fhwa.dot.gov))

# LTPP Traffic Data Pooled-Fund Study Underway

The Federal Highway Administration's (FHWA) Long-Term Pavement Performance (LTPP) program continues to move forward with its Specific Pavements Study (SPS) Traffic Data Collection pooled-fund study. The study is designed to fill in gaps and improve the quality and quantity of monitored traffic data from the LTPP program's SPS-1, -2, -5, -6, and -8 projects. To date, 20 States have contributed approximately \$2.7 million to the study.

The SPS experiments were designed to learn how such factors as cumulative traffic loading affect pavements of different compositions, environmental conditions, and layer thicknesses. Answering these questions will help States design and build longer lasting, high-volume pavements.

The pooled-fund study will have two phases. Phase I will consist of assessing, evaluating, and calibrating the current weigh-in-motion (WIM) systems used

to collect traffic data at the SPS sites across the country. During Phase II, new WIM equipment will be installed and maintained at test sites as necessary to ensure high-quality data collection. Data would then be collected from the sites until each site has 5 years of quality vehicle weight data. A contract for the Phase I work was awarded to MACTEC Engineering and Consulting, Inc., in August 2003, and site evaluations have begun. Results from the initial evaluations were presented at the Transportation Research Board annual meeting in Washington, DC, in January. FHWA expects to award the Phase II contract this spring.

State highway agencies and industry representatives still have the opportunity to join the pooled-fund study. To learn more, contact Deborah Walker at FHWA, 202-493-3068 (email: [deborah.walker@fhwa.dot.gov](mailto:deborah.walker@fhwa.dot.gov)) or visit the LTPP Web site at [www.tfhr.gov/pavement/ltp/spstraffic](http://www.tfhr.gov/pavement/ltp/spstraffic). \*

Find out about the LTPP program's accomplishments in 2003 and plans for the future by checking out the *LTPP 2003 Year in Review* report (Publication No. HRT-04-041), now available online at [www.tfhr.gov/pavement/ltp/2003yir.htm](http://www.tfhr.gov/pavement/ltp/2003yir.htm).

The report looks at the LTPP program activities in such areas as data collection, analysis, products, field operations, and pooled-fund studies. Among other endeavors last year, the program published the report, *Key Findings from LTPP Analysis 2000-2003*, and launched DataPave online ([www.datapave.com](http://www.datapave.com)). Previously available only on CD-ROM, the new DataPave program contains the most current LTPP data for viewing and downloading. And while the SPS Traffic Data Collection pooled-fund study continued, work also began on the LTPP program's first data analysis pooled-fund study, "Effect of Multiple Freeze-Thaw Versus Deep Frost Penetration on Pavement Performance."

To learn more about the LTPP program's activities, contact Aramis Lopez at FHWA, 202-493-3145 (email: [aramis.lopez@fhwa.dot.gov](mailto:aramis.lopez@fhwa.dot.gov)). A printed copy of the report can be obtained by contacting Mary Anne Deeney at FHWA, 202-493-3463 (email: [mary.deeney@fhwa.dot.gov](mailto:mary.deeney@fhwa.dot.gov)).

# Highway Technology Calendar

*The following events provide opportunities to learn more about products and technologies for accelerating infrastructure innovations.*

## **Fourth National Seismic Conference and Workshop on Bridges and Highways**

February 9–11, 2004, Memphis, TN

The conference will provide a forum for exchanging information on current national and regional practices for designing seismic-resistant bridges and highway systems and retrofitting existing structures and highways. An International Forum will feature speakers from various countries who have implemented advanced earthquake design and mitigation technologies and approaches. A Technology Show and Information Display will also showcase innovative technologies for earthquake engineering. The event is sponsored by the Federal Highway Administration (FHWA) and the Tennessee Department of Transportation.

*Contact:* Wendy Pickering at the University of Illinois, 217-333-2880 (fax: 217-333-9561; email: fourthphseismicconf@ad.uiuc.edu; Web: www.conferences.uiuc.edu/seismic) or Paul Sharp at FHWA, 615-781-5762 (email: paul.sharp@fhwa.dot.gov).

## **Making Work Zones Work Better Workshops**

February 11, 2004, Macon, GA

February 24–25, 2004, Madison, WI

March 11–12, 2004, Charlottesville, VA

March 24–25, 2004, Fargo, ND

FHWA, along with State and local partners, is sponsoring this series of workshops to share information on new and emerging technologies and practices for reducing congestion and crashes in and around work zones.

*Contact:* Carol Keenan at FHWA, 202-366-6993 (email: carol.keenan@fhwa.dot.gov).

## **Asphalt Pavement Conference 2004: 21st Century Construction**

March 15–16, 2004, Nashville, TN

The conference will feature construction practices that are necessary to building hot-mix asphalt pavements that will last. Session topics will include paving and compaction, contracting practices, and plant operations. The conference is being held in conjunction with the World of Asphalt 2004 Show and Conference. Sponsors include the Asphalt Institute, National Asphalt Pavement Association, State Asphalt Pavement Associations, Tennessee Department of Transportation, American Association of State Highway and Transportation Officials, and FHWA.

*Contact:* For registration information, call 800-355-6635 (fax: 800-979-3365; email: info@worldofasphalt.com) or visit [www.worldofasphalt.com](http://www.worldofasphalt.com).

## **2004 Concrete Bridge Conference**

May 17–18, 2004, Charlotte, NC

The conference will focus on high-performance concrete bridges and rapid bridge construction. The event is sponsored by the National Concrete Bridge Council, American Concrete Institute, and FHWA.

*Contact:* Shri Bhide at the Portland Cement Association, 847-972-9100 (fax: 847-972-9101; email: sbhide@cement.org; Web: [www.nationalconcretebridge.org/cbc](http://www.nationalconcretebridge.org/cbc)).

## **First International Symposium on Design and Construction of Long Lasting Asphalt Pavements**

June 7–9, 2004, Auburn, AL

The symposium will facilitate the exchange of information on materials and mix design, construction issues, quality control/quality assurance, contracting methods, perpetual pavements, and other related topics. Sponsors include the International Society for Asphalt Pavements, Asphalt Alliance, and FHWA.

*Contact:* National Center for Asphalt Technology, 334-844-6228 (fax: 334-844-6248; email: [taplecp@eng.auburn.edu](mailto:taplecp@eng.auburn.edu); Web: [www.ncat.us](http://www.ncat.us) (click on “Upcoming Events”)).

## **Structural Materials Technology: NDE/NDT for Highways and Bridges 2004**

September 14–17, 2004, Buffalo, NY

Participants will be able to learn about the state-of-the-art in nondestructive evaluation (NDE) and nondestructive testing (NDT) technologies. The event is sponsored by The American Society for Nondestructive Testing, Inc.; New York State Department of Transportation (NYSDOT); Transportation Research Board; FHWA; and the Structural Engineering Institute.

*Contact:* Glenn Washer at FHWA, 202-493-3082 (fax: 202-493-3442; email: [glenn.washer@fhwa.dot.gov](mailto:glenn.washer@fhwa.dot.gov)) or Sreenivas Alampalli at the NYSDOT, 518-457-6827 (email: [salampalli@dot.state.ny.us](mailto:salampalli@dot.state.ny.us); Web: [www.fhwa.dot.gov/bridge/smt.htm](http://www.fhwa.dot.gov/bridge/smt.htm)). \*

# FOCUS

*Focus* (ISSN 1060-6637), which is published monthly by the U.S. Department of Transportation's Federal Highway Administration (FHWA), covers the implementation of innovative technologies in all areas of infrastructure.

Its primary mission is twofold: (1) to serve the providers of highway infrastructure with innovations and support to improve the quality, safety, and service of our roads and bridges; and (2) to help promote and market programs and projects of the various offices of FHWA's Office of Infrastructure.

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## Shields of Steel, continued from page 1

zone, trucks are in the front and back of the work zone but there is no protection from vehicles in adjacent traffic lanes for workers, use of the system "lengthens out the area where workers are protected," says Iwasaki.

The system "performed exceptionally well in testing," says Cal Schiefferly, Senior Equipment Engineer in the Caltrans Division of Equipment. "We were very satisfied with the results." The device is now being used in Caltrans' District 4, which serves the San Francisco Bay area. After gaining experience in operating the device there, Caltrans plans to deploy it elsewhere in the State. The prototype device cost approximately \$217,000 to build, but Caltrans expects that cost to drop significantly when other models are produced.

A patent for the Caltrans system is pending. State highway agencies can obtain more information, as well as plans for constructing the device, by contacting Lisa Kunzman, Chief of the Caltrans Division of Equipment, 916-227-9600 (email: Lisa\_Kunzman@dot.ca.gov). \*

## Accelerated Construction in New Jersey, continued from page 4

major benefit." New Jersey will host a full, 2-day ACTT workshop on the project later this year.

For more information on the Rt. 46 project, contact Pete Kenny at NJDOT, 609-530-8072, or Kamlesh Shah at NJDOT, 609-530-5539. To learn more about ACTT or hosting a workshop in your State, contact Dan Sanayi at FHWA, 202-493-0551 (email: dan.sanayi@fhwa.dot.gov). Information on ACTT is also available at [www.fhwa.dot.gov/construction/accelerated](http://www.fhwa.dot.gov/construction/accelerated). \*

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