



## SAFETY

### FOIL Crash Vehicles Double as Test Vehicles for Firemen

Once vehicles have been crash tested, they are typically of little use and are sold as scrap. Recently, however, several 1995 four-door Honda Accord sedans that had been crashed tested at FHWA's Federal Outdoor Impact Laboratory (FOIL) as part of a side-impact research study for the National Highway Traffic Safety Administration (NHTSA) were

used for training purposes by the Fairfax County (Virginia) Fire and Rescue Department.

FHWA and NHTSA agreed to allow the fire department to come to the FOIL and practice occupant extrication techniques on the crashed vehicles. These training exercises provided the fire department

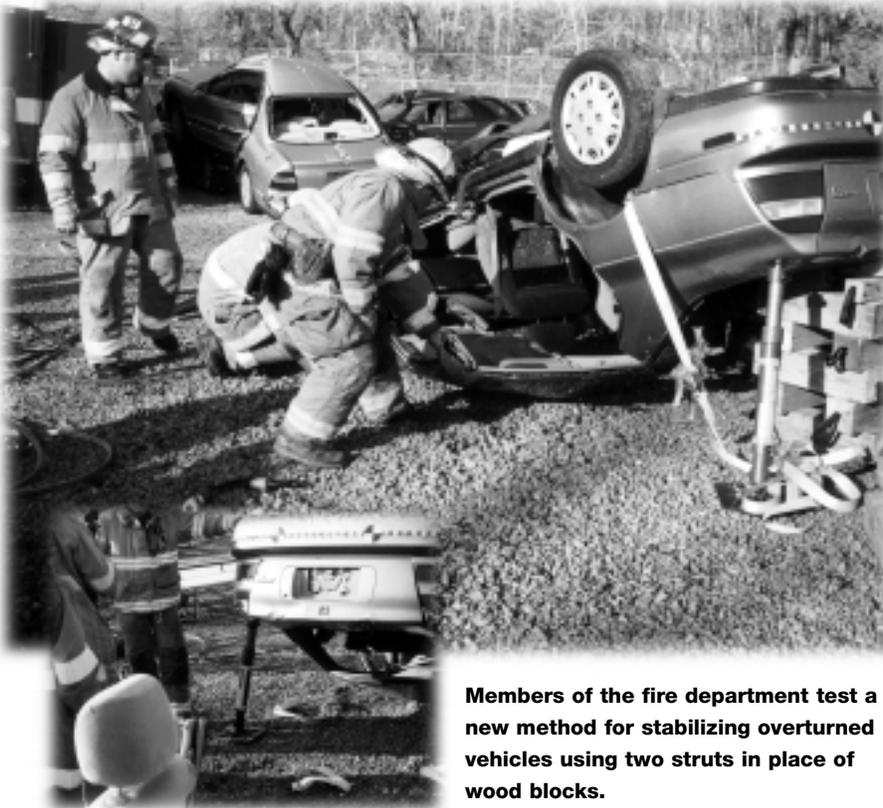
with a unique opportunity to train and hone their techniques on actual crashed vehicles without the added pressure of injured occupants. Additionally, the fire department used this exercise to test and evaluate new techniques and equipment.



As seen in the photo, the fire department was able to evaluate the functionality and efficiency of a new strut system used to stabilize an over-turned vehicle. New equipment cannot be evaluated in an actual emergency situation.

The training exercise also provided NHTSA with valuable information. During accident reconstruction, it is often difficult to distinguish between damage caused by the accident and that imparted by fire departments' extrication techniques. Representatives from NHTSA attended the training exercises and observed the fire department performing life-saving techniques. NHTSA representatives got a unique opportunity to observe the signature damage imposed by a fire and rescue team.

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**Members of the fire department test a new method for stabilizing overturned vehicles using two struts in place of wood blocks.**

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.tfhrcc.gov](http://www.tfhrcc.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).

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## Transportation Partners Announce Work-Zone Safety Week



**National Work-Zone Safety Awareness Week (April 3-7) will remind the public to take greater care while driving through work zones.**

FHWA, the American Traffic Safety Service Association (ATSSA), and the American Association of State Highway and Transportation Officials (AASHTO) signed a memorandum of understanding on December 15, 1999, to designate April 3-7 as National Work-Zone Safety Awareness Week.

FHWA Administrator Kenneth Wykle, ATSSA Executive Director Roger Wentz, and AASHTO President Thomas Warne signed the document.

By creating an awareness week, transportation officials remind the public to exhibit greater caution and care while driving through work zones. This will reduce fatalities and injuries in those areas. Organizers of National Work-Zone Safety Awareness Week will promote a common set of safety

tips for motorists, such as slowing to posted speed limits; disengaging from distracting activities (e.g., talking on cellular telephones); and noticing the location of workers. National Work-Zone Safety Awareness Week will emphasize the value of training and best practices regarding work-zone safety and will communicate to workers and contractors that delays caused by work zones frustrate motorists. This frustration often causes drivers to resort to unsafe behaviors.

"This agreement underscores our commitment to safety, which is President Clinton's highest transportation priority," U.S. Secretary of Transportation Rodney E. Slater said. "This new safety partnership will help save lives and prevent injuries in work zones."

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## FHWA Researchers Demonstrate Geosynthetic Reinforced Soil Experiment

**F**HWA researchers demonstrated Geosynthetic Reinforced Soil (GRS) technology at the Masonry EXPO 2000 in Las Vegas, NV. The Masonry EXPO is an annual event sponsored by the National Concrete Masonry Association (NCMA). The demonstration was performed in the Las Vegas Convention Center. The GRS mass was constructed with segmental retaining wall (SRW) modular blocks. SRW technology is of value to the transportation construction community because it is an efficient solution for retention and load-bearing applications.

FHWA was invited by NCMA to demonstrate the GRS technology to the modular-block producers and related association members involved in the SRW industry. The demonstration was an encore presentation to the recently completed full-scale GRS

embankment/abutment project constructed at the Turner-Fairbank Highway Research Center (TFHRC) in McLean, VA.

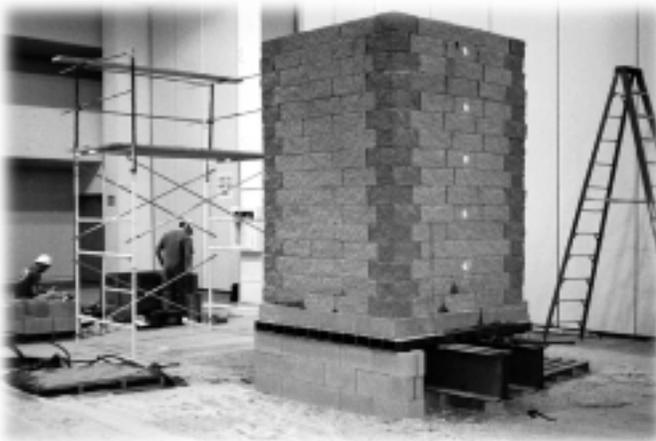
The Vegas experiment was a cooperative effort between FHWA and NCMA. FHWA researchers in the Office of Infrastructure R&D provided the technical know-how to perform the demonstration. Geotechnical researchers designed the GRS mass to support vertical load to illustrate the bearing capacity and stability of a simple GRS system. The FHWA Structures Laboratory assisted with the set-up of the load test and furnished the reaction assembly.

The GRS mass was built with alternating layers of compacted granular fill and sheets of polypropylene geotextile. The soil was compacted with a hand tamper. The modular blocks were connected to the GRS mass by

friction. Each layer of geotextile reinforcement extended between the rows of modular block. The blocks were stacked without mortar. The size of the GRS mass was 1.7 m x 1.7 m x 2.4 m (5.7 ft x 5.7 ft x 8 ft) in height. During the load test, the GRS mass was instrumented to measure vertical and lateral deformations.

The GRS mass was loaded with an equivalent stress of 1000 kPa (10.5 tsf); this is presumed to be a world record. The GRS system deformed as expected. The maximum lateral strain was 2 percent. As outlined in the current specifications, the allowable vertical stress for such structures is 200 kPa (2.1 tsf). At 200 kPa, strain was 0.4 percent; vertical settlement and lateral deformation was 10 mm (0.4 in), and 2.5 mm (0.1 in), respectively.

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This GRS mass was constructed and load tested at the Masonry EXPO 2000 in Las Vegas, NV.



This recently completed full-scale GRS embankment/abutment project, located at TFHRC, was completed in April 1999.

## Researchers Examine Recycling Materials, Techniques, and Policies in Europe

A team of recycling practitioners representing FHWA, the Environmental Protection Agency (EPA), State DOTs, the American Public Works Association (APWA), the National Asphalt Pavement Association (NAPA), and members of academia visited Sweden, Denmark, Germany, the Netherlands, and France to observe research, policies, and programs that promote the use of recycled materials in the highway environment.

The United States has used recycled materials for highway projects in the past. Most notably, researchers have used recycled asphalt pavement (RAP), reclaimed concrete pavement, coal fly ash, and blast furnace slag. The U.S. highway community wants to know more about using recycled materials in their projects and how these materials relate to the sustainability of a transportation system.

The U.S. delegation was assembled under the FHWA's International Technology Scanning Program. The panel was sponsored by FHWA, the American Association of State Highway and Transportation Officials (AASHTO) through the National Cooperative Highway Research Program (NCHRP), and the Recycled Materials Research Center (RMRC) at the University of New Hampshire. The panel included members with expertise

in materials, pavement engineering, pavement construction and recycling, beneficial use determinations, and environmental evaluation.

Many of these countries are driven to recycle for a variety of reasons: a lack of virgin material, public opposition to aggregate mining, opposition to landfilling, high transportation costs, and high population densities. In areas of the United States, where similar conditions exist, the experiences of these European countries may offer some solutions for the United States.

The Netherlands, for example, established a sustainability policy for highway construction, which embraces the use of recycled materials. This policy contains elements that should be considered in the U.S. transportation community's overall goals for transportation sustainability, such as minimizing the use of natural materials within a market system and having the government cooperate with industry by sharing risk and profit, and by providing unambiguous technical and environmental standards.

Engineering and environmental life-cycle costs and benefits are the basis for many of the recycling initiatives in Europe. In some countries, such as Denmark, Sweden, France, and the



**Researchers toured the double drum asphalt plant in Amsterdam. The Swiss-designed Ammann facility is owned by five contractors in the Netherlands, including Vermeer Grond en Wegen BV. The plant can handle up to 70 percent RAP. The double-drum configuration means that hot gases from the lower drum (where the RAP is heated) are used as fuel to dry aggregate in the upper drum. Air quality is therefore very high.**

Netherlands, tax structures play a large role in promoting recycling in the highway environment. There are taxes on the use of natural materials in Denmark and in the Netherlands and restrictive landfill taxes and policies in the Netherlands, Denmark, and France.



In these European countries, a number of materials like RAP, blast furnace slag, crushed concrete, and construction and demolition (C&D) aggregates are high-quality and compete favorably with natural materials.

As in the United States, there is still concern that many engineering test methods do not predict true field performance, though ongoing research in Germany and Sweden with load simulators is addressing this issue.

In all of the countries, C&D aggregates are high quality and are widely used in road construction. Processing facilities can produce wide ranges of aggregate sizes for blending with natural materials. In many of the countries, foamed bitumen is



**Pictured here is a concrete crusher at the Jean Lefebvre Inc. reclaiming facility in Pontblon, France. Concrete from pavement and building slabs and construction and demolition wastes are processed and sorted into many aggregate gradations. The final product is widely used in road construction in France.**

used to treat certain recycled materials (e.g., tar pavements) for use in stabilized basecourse. However, unlike the United States, portable plants are used to treat storage piles and the material is placed up to 30 days later, provided it is stored in an uncompacted state.

A final report on the findings and observations of this tour will be available mid-2000. For more information, contact Taylor Eighmy, (603) 862-4704, [t.eighmy@rmrc.unh.edu](mailto:t.eighmy@rmrc.unh.edu).

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## TECHNOLOGY TRANSFER

### International Symposium To Be Held in July 2001

A symposium on transportation technology transfer will be held July 29 – August 3, 2001, in St. Petersburg, FL. The symposium will bring together the major transportation technology-transfer entities from around the world to exchange current practices and techniques. This gathering of transportation professionals is aimed to improve the efficiency of disseminating technical information about transportation.

George Shrieves, former director of NHI and coordinator for the conference, said, "This is a great opportunity to meet people from

other groups, from the U.S. and internationally, and for people to update their knowledge of the practice." Shrieves has been involved in hosting previous international technology transfer meetings.

The symposium is being sponsored by several international transportation entities, including FHWA's Office of International Programs, the National Highway Institute, the Pan American Institute of Highways (PIH), the U.S. Local Technical Assistance Program (LTAP), the Permanent International Association of Road Congress (PIARC), and the

Organization for Economic Cooperation and Development (OECD).

Each major entity will hold its annual meeting at this symposium. The event will be structured to provide several common meetings, where members of any organization can attend.

For more information contact George Shrieves at [gshrieve@visi.net](mailto:gshrieve@visi.net) or (757) 665-1860.

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## TRB Holds Successful 79th Annual Meeting and Exposition

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The Transportation Research Board (TRB) held its 79th Annual Meeting in Washington, DC, January 9–13. This prestigious event brought together more than 8,000 transportation professionals from around the United States and the world to discuss important transportation issues of the 21st century. Participants attended general sessions, workshops, speciality sessions, and committee meetings.



FHWA had 71 booth displays at the exposition. The booths highlighted activities and projects within the agency's Core Business Units and Service Business Units. A display featuring services of the new FHWA Resource Centers was also showcased. Products from pool-funded FHWA/industry research partnerships with Humbolt

**FHWA was the ONE-DOT coordinator for this major event, advising and helping other modal exhibitors to reflect the DOT theme for TRB, "Innovations for Transportation Excellence in the 21st Century."**

Manufacturing Co.(soil-stiffness gauge) and Instrotek ("CoreLok" airvoids measurements for asphalt samples) were on display. Exhibitors also distributed various publications, CD-ROM products,

and promotional handouts about the subject of the displays.

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## FHWA Co-Sponsors Seminar on Concrete Pavement Smoothness

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On March 7, FHWA, Kansas DOT, and the Missouri-Kansas chapter of the American Concrete Pavement Association (ACPA) will sponsor a national seminar on the smoothness of concrete pavements. The seminar will be held at the Downtown Marriott Hotel in Kansas City, MO. This is the first portland cement concrete pavement (PCCP) seminar/workshop dealing solely with pavement smoothness. A similar asphalt paving smoothness seminar/workshop was held in Arizona in December of 1998.

This seminar is unique because it will be comprehensive in nature and is a partnership of State, Federal, and industry interests. The seminar will cover everything from the public's perception of pavement smoothness to the actual placing of pavement. More specifically, the seminar will discuss the public's expectations and demands for better/smooth highways.

At the seminar, representatives from Kansas will present how they developed and implemented an effective pavement-smoothness specification using incentives/

disincentives and the zero-blanking band profilograph trace. Equipment vendors will also be given the opportunity to talk about the state-of-the-art in paving equipment, grade control, and smoothness measurement.

Anyone who has responsibility for assuring pavement smoothness is encouraged to attend, especially paving contractors and State highway engineers from States that are looking to improve the smoothness levels of their pavements.

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## FMCSA Conducts "SimVal" Research

Simulators have been successfully employed in the military and commercial sectors for decades, mostly to satisfy aviation training needs. Now that low-cost, full-mission, high-fidelity commercial motor vehicle simulators are available, the Federal Motor Carrier Safety Administration (FMCSA) is seeking to validate a low- to mid-cost driving simulator for the purposes of commercial driver training, testing, and licensing. One of the primary objectives of this study is to examine how simulation-based training can enhance the training environment and improve driver performance.

The study is being conducted in two phases. FMCSA recently published the Phase 1 report that addresses the research design of the planned validation study, *Research Design: Validation of Simulation Technology in the Training, Testing, and Licensing of Tractor-Trailer Drivers* ("SimVal"). The research design reflects the input of the industry based on two peer reviews, one on the driving scenarios to be used in the study and a second on the research design itself.

One part of the research will compare training effectiveness for entry-level drivers who have been trained in a simulator versus those trained in an actual tractor-trailer. The commercial driver's license (CDL) examination will be the ultimate criterion task for providing evidence that simulation-based



**FMCSA's researchers compare training effectiveness for entry-level drivers who have been trained in a simulator to those drivers trained in an actual tractor-trailer.**

training results in equivalent or better performance on the licensing exam. Participants' driving records will then be examined during the first year following the successful completion of the CDL exam. Another aspect of the research will address the advanced capabilities of the simulator to replicate more complex driving skills, such as the operation of double and triple combination vehicles, evasive maneuvers, jackknives, and driving on black ice.

During Phase 2, researchers will conduct the 3-year empirical

validation study employing the Phase 1 research design; this phase includes a market reassessment of available full-mission truck driving simulators. The market reassessment is currently being conducted and will be completed in Spring 2000; the actual simulator validation study will begin in FY 2001.

The Phase 1 research design final report (FHWA-MC-99-060) is available from the National Technical Information Service, (703) 605-6000, order number PB2000-100587.

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## PROFESSIONAL DEVELOPMENT

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### NHI Offers New Courses

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The National Highway Institute (NHI) has two new courses available.

**International Pavement Technology Program (#13160)** is designed to provide a forum for course participants to learn and share ideas on many aspects of highway pavements. Scheduled for April 4-13 in Reno, NV, this course is intended for international pavement professionals and for engineers from government and industry in the United States. The course content comprises selected units from three NHI courses: Techniques for Pavement Rehabilitation, Pavement Distress

Identification, and Pavement Management Systems. The program is built around the needs and interests of the participants. Several of the instructors have significant experience with international pavement programs, which they will use to generate class discussion and help identify successful practices from other countries. For more information contact Pat Lees at (775) 329-4955 or [plees@nce.reno.nv.us](mailto:plees@nce.reno.nv.us).

**Intelligent Transportation System (ITS) Procurement (#13620)** is intended to heighten awareness of the challenges in procuring ITS within the traditional construction

project environment. This one-day course combines lectures with the presentation of case studies to describe the lessons learned from past ITS projects and explain how this can be incorporated to help ensure successful procurement. This seminar is a companion to but not a prerequisite for ITS Software Acquisition.

Please consult the NHI web site ([www.nhi.fhwa.dot.gov](http://www.nhi.fhwa.dot.gov)) for a course location nearest you or call the contact below.

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