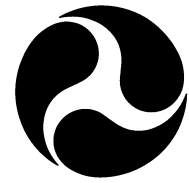


# RESEARCH & TECHNOLOGY TRANSPORTER

JUNE 2001



U. S. DEPARTMENT OF TRANSPORTATION

FEDERAL HIGHWAY ADMINISTRATION

## ENVIRONMENT AND PLANNING

### Forum Explores Future Role of Value Pricing

FHWA, in cooperation with the Eno Foundation, held a national policy forum on March 7, 2001, to discuss the long-term role of value pricing in metropolitan areas in the United States. Value pricing is proving to be an effective and viable tool to manage travel demand, reduce congestion, and improve transportation system operations and performance. Pilot projects have been implemented in several states, including California, Florida, New Jersey, New York, and Texas.

To achieve a larger role for value pricing, the group of experts at the forum envisioned long-term scenarios involving radical changes in current funding and institutional arrangements in highway transportation. It was suggested that:

- The highway network should be operated like a utility, driven by market forces, funded in capital markets, and regulated by states.
- Fuel taxes should be phased out in favor of tolls. In the longer term, a larger share of new vehicles will be powered by alternative sources of energy,



such as electricity. Those who own older gasoline-powered vehicles (usually lower income motorists) will be paying much more per mile for highway use through fuel taxes, thus subsidizing wealthier motorists who can afford the newer vehicles.

- Forum participants emphasized that it will be important to address several critical institutional issues if value pricing is to play a larger role in addressing metropolitan transportation problems. Participants had several suggestions to overcome institutional barriers:
- Level the financial playing field, eliminating discrimination in the Federal tax code against the private sector, regarding tax-exempt financing.



**Value pricing is proving to be an effective and viable tool to manage travel demand, reduce congestion, and improve transportation system operations and performance.**

- Encourage state-enabling legislation for public/private partnerships in all states, using regulation by rate of return.
- Include strong non-compete clauses in state-enabling legislation to protect private investors from unfair competition resulting from expansions of free capacity.
- Lift all tolling restrictions on existing free roads.
- Cease Federal aid for new construction and rehabilitation of freeway-standard roads, and reduce the gas tax proportionally, to encourage States to

*(Continued on page 3)*

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 managing 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).

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## New Report Provides Useful Information About Commercial Trucks with Five Axles or More

Every five years the Vehicle Inventory and Use Survey (VIUS) takes the pulse of truck operations and utilization at the national and State level. The Office of Transportation Policy Studies has analyzed the commercial vehicle data and created *Analysis of the Vehicle Inventory and Use Survey for Trucks with Five Axles or More*. This report compares the survey data for 1992 and 1997, focusing on straight trucks with one trailer, truck tractors with a semi-trailer, and truck tractors with two or more trailing units.

truck distributions; truck configurations and body types; weights, dimensions, and operating characteristics by configuration; and average and maximum payloads by body type and configuration.



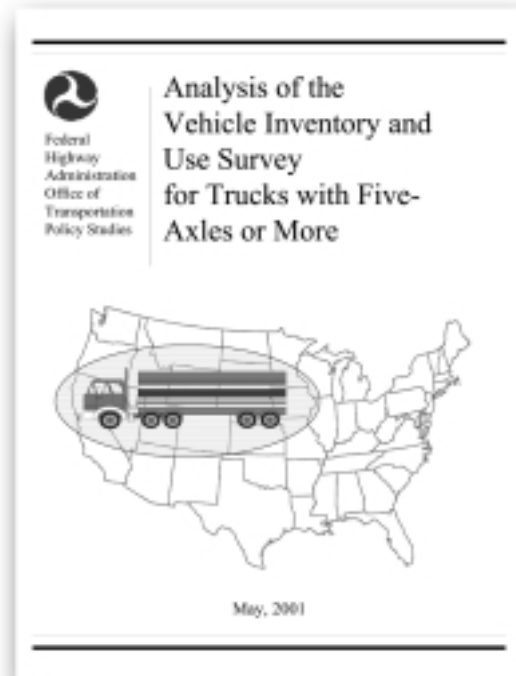
This report is used by transportation officials, researchers, and policy makers. Data is provided at the national and State

levels. For further information contact

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The report provides information on the 1.3 million commercial trucks with 5 axles or more. This is the fastest growing portion of the commercial truck fleet, increasing 21% from 1992 to 1997. More than 80% of these commercial trucks are the common "eighteen-wheeler" now seen on the road everyday. VIUS analysis has chronicled the enormous growth in the 53-foot trailer from only 17% of the fleet in 1987 to 45% of the fleet in 1997, while payload weights have remained relatively constant throughout the years.

For 1992 and 1997, the report analyzes regional



***Analysis of the Vehicle Inventory and Use Survey for Trucks with Five Axles or More* is used by transportation officials, researchers, and policy makers.**

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## Improving U.S./Canadian Border Traffic

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**I**ncreases in trade and passenger travel between the United States and Canada is exerting pressure on the shared land border, resulting in border delays, causing negative impacts on both economies. Currently U.S. DOT, through FHWA's Office of Planning and Environment, is working with Transport Canada to begin implementing provisions of a Memo of Cooperation (MOC) signed in the fall of 2000. The MOC expresses the interest of each country to enhance communication through collaborating on transportation matters of mutual interest along the border.

The overall goal of the MOC is to develop an all-encompassing North American Border/Corridor Program to address the continual increase in trade and passenger traffic between the two countries. They are working together to

establish common data collection elements, which could make U.S. and Canadian transportation systems interoperable. Developing intelligent transportation systems that work across borders is a high priority for both countries.

Border transportation MOC efforts by U.S. DOT, FHWA, and Canada include:

- International Trade Data Systems (ITDS) is developing one system that collects information for the processing of trade across U.S. borders. This system is being developed to improve trade: procedures, promotion, policy development, and statistics.
- A Detroit-Windsor International Bridge Crossing Study to determine the feasibility of a

new international bridge connecting Detroit Michigan and Windsor Ontario is underway.

- *Trade Corridors—A Report to the Canada-US Inter-Parliamentary Group* about the transportation of North American trade and the infrastructure it travels upon has been completed.
- A U.S./Canada Cross Border Truck Survey. Results will be available the first week of July and a briefing will be held on Capitol Hill the 3rd week in September.
- A U.S./Canada Cross Border Rail Survey will start upon completion of the truck survey.  
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*(Continued from front page)*

move to tolling to expand and maintain these facilities.

Participants felt that another major roadblock to expanding the role of value pricing can be concerns about equity with regard to impacts on lower income individuals. Strategies identified to overcome equity concerns included:

- Packaging of pricing strategies with transit improvements or fare reductions.
- Use of "life-line" toll credits or other compensation for low-income individuals
- Providing regular lane motorists

with toll credits, which can be used later on premium service tolled lanes, known as the "FAIR lanes" concept.

Highway user groups are concerned that tolls are a form of double taxation. Forum participants suggested that one way to address these concerns is to rebate federal and state fuel taxes paid on tolled facilities. With transponder technology, it is possible to do this without excessive administrative costs, by providing mileage-based credits on the monthly bills that motorists receive.

Some environmental groups are concerned that pricing may be a

"Trojan horse" for new highway capacity. They would prefer that all existing capacity first be priced, to recover the "true costs" of auto use. The FAIR lanes concept may be able to address their concerns. When adding a new priced lane, highway agencies can also convert an existing free lane to a priced lane. This moves closer to environmental groups' goal of universal pricing.

Eno Foundation is preparing a report on the proceedings of the forum. To get a copy, please contact Rob Ritter of Eno Foundation ([rob@enotrans.com](mailto:rob@enotrans.com)) or **Patrick DeCorla-Souza** (202) 366-4076 [patrick.decorla-souza@fhwa.dot.gov](mailto:patrick.decorla-souza@fhwa.dot.gov)

## OPERATIONS

# Road Departure Crash Warning Field Test is Initiated

U.S. DOT is planning to initiate a field operational test of advanced technology in passenger cars to help drivers avoid crashes. Specifically, the technology should warn a driver when he/she is about to drift off the road or when he/she is traveling too fast for an upcoming curve.

Using the Volpe National Transportation Center as an independent evaluator, the test will evaluate the performance of the proposed advanced safety systems and provide a means of informing transportation decision-makers and the general public about potential opportunities for improved safety. The evaluation will be based on tests performed by real drivers on real roads. The tests will be evaluating performance systems, including sensors, processing algorithms, and driver-vehicle interfaces, especially the driver's ability to easily understand and effectively use the proposed safety systems.

Another objective of the test is to accelerate deployment of advanced technologies that enhance safety by providing a substantial level of understanding of risks of all types,

including operating, crash, and liability risks. Finally, the test will apply and assess the state-of-the-art in benefits for advanced, vehicle-integrated crash avoidance systems.

The test will have two non-overlapping phases. In phase one, prototype test vehicles will be developed and tested. In phase two a field test fleet will be fabricated, the field test will be performed, and data from the field test will be evaluated.

FHWA is seeking to award a cost-sharing Cooperative Agreement (with a minimum

35% cost share ratio) to partners. A detailed list of operational requirements for countermeasures to be tested will be provided in the Request for Applications (RFA). This solicitation is available electronically through the Electronic Posting System (EPS) at [www.eps.gov](http://www.eps.gov) and was released on or about April 6, 2001. The planned response date for receipt of applications has been changed from May 17, 2001, to June 14, 2001. More information is available under "What's Hot" at [www.its.dot.gov](http://www.its.dot.gov).

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## Road Departure Warning Testbed (CMU)

- **Lane Drift Warning System**
  - Sensor(s) detect vehicle position in lane, lateral velocity and upcoming road geometry
  - Warning algorithm estimates danger of lane departure
  - Driver interface alerts driver if substantial risk of departure
  - 56% autonomous effectiveness estimated by CMU
- **Speed Curve Warning System**
  - Sensors are GPS + digital maps
  - Warning should include road condition
- **Performance specifications now under review**

LAPTOP SYSTEM ENABLED			
764 m	210 m	45.3 m	
6.90°	99999 m	3.50 m	
37 m	45.8 mph	1.00 m/s	

**Tests will be performed on advanced technology that helps drivers avoid road departure crashes.**



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## Improved ITS Document Library Search Engine

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The Intelligent Transportation Systems Electronic Document Library (ITS EDL) is the only online collection of its kind featuring over 1800 documents and articles written under the auspices of the U.S. Department of Transportation. Since its inception, it has become a popular source for transportation professionals from the public and private sectors, researchers, students, and the general public.

To accommodate this growing demand, we have improved the search engine and added a variety of browsing features. Users can do the following:

- Browse the catalog using an

alphabetical title listing linked to the documents.

- Conduct a profile search by document number, author, title, or any other feature of a document profile.
- Undertake a full text search by document content.
- Engage in a categorical search by major topic areas.
- Do a State search to bring up documents from a particular State.

The archives provide a listing of documents added to EDL in the last 7-days, 14-days, and 30-days. There



is a more flexible option that allows the search engine to produce any single month's additions to EDL. Try out the new search engine at [www.its.dot.gov/itsweb/welcome.htm](http://www.its.dot.gov/itsweb/welcome.htm).

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## Helping Make RWIS Happen

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The Aurora program is helping transportation agencies more effectively incorporate road weather information systems (RWIS) into their winter road maintenance tool-boxes. Under FHWA sponsored research, Aurora is developing affordable (less than \$9,000 per unit) RWIS, creating computer-based RWIS training packages specific to particular geographic regions and agencies, benchmarking the performance of RWIS forecasts, and synthesizing national road weather forecasting.

Aurora is an FHWA pooled-fund consortium of public agencies in the United States, Canada, and Europe working together to

advance RWIS technology. Members include State DOTs in Illinois, Iowa, Minnesota, New York, Pennsylvania, South Dakota, Tennessee, Virginia, and Wisconsin; provincial agencies in Quebec and Ontario; and the Swedish road authority, many of whom champion Aurora projects vital to their agencies. Universities and meteorological services in Canada, Iowa, Minnesota, North Dakota, and Sweden participate as affiliate members.

According to Lee Smithson, AASHTO's Snow and Ice Cooperative Program coordinator at the Iowa Department of Transportation, Aurora meetings are like "mini international

scanning tours." Members and affiliates meet three times a year and conduct monthly teleconferences to set and review their research agenda, discuss RWIS-related activities around the world, share their agencies' accomplishments, and learn solutions for common in-the-field problems.

Aurora welcomes new members. For more information contact Curt Pape, Aurora Program Chair, Minnesota Department of Transportation, at [curt.pape@dot.state.mn.us](mailto:curt.pape@dot.state.mn.us) or see Aurora's Web site [www.aurora-program.com/](http://www.aurora-program.com/).

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## Safety Performance of Rural Two-Lane Highways

The report *Prediction of the Expected Safety Performance of Rural Two-Lane Highways* is now available. The report introduces an algorithm for predicting the safety performance of rural two-lane highways. The algorithm estimates the effect on safety performance of roadway segment parameters including lane width, shoulder width, shoulder type, horizontal curves, grades, driveway density, two-way left-turn lanes, passing lanes, and road-



side design; and of intersection parameters including skew angle, traffic control, exclusive left- and right-turn lanes, sight distance, and driveways. The algorithm enables highway agencies to estimate the safety performance of existing or proposed highways and to compare the safety performance of geometric design alternatives.

The algorithm forms the basis for the crash prediction module of the Interactive Highway Safety Design

Model (IHSDM). The software for the crash prediction module is currently under development. Beta testing of the software will begin in early 2002. A PDF version of the report is available online at <http://www.tfrc.gov/safety/99207.htm>. For general information about IHSDM please contact Ray Krammes at [ray.krammes@fhwa.dot.gov](mailto:ray.krammes@fhwa.dot.gov) or (202) 493-3312. To order a hard copy of the report, please contact the following:  
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A new report introduces an algorithm for predicting the safety performance of rural two-lane highways.

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## Pedestrian Safety Engineering and ITS-based Countermeasures Applications Received

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**P**edestrian safety is a serious problem. On average, a pedestrian is killed in a traffic crash every 100 minutes and injured every eight minutes. In 1998, 5,220 pedestrians were killed in traffic crashes in the United States and 69,000 were injured. This is approximately 13 percent of all traffic related fatalities. The economic costs of these crashes are substantial, totaling billions of dollars each year. U.S. DOT is trying to decrease the number of pedestrian and bicyclist fatalities and injuries by 10 percent, and double the number of walking and biking trips.

FHWA created a program to demonstrate and evaluate the effectiveness of a comprehensive pedestrian safety engineering and Intelligent Transportation Systems-based countermeasures program for reducing pedestrian fatalities,

injuries, conflicts and other surrogate measures. Specifically, the ITS program sought applications from local jurisdictional governments (city, county, Metropolitan Planning Organization (MPO), or other local jurisdiction). The applications were due to FHWA by April 26, 2001. FHWA anticipates making multiple awards under this Request For Applications (RFA).

Award(s) will be made to determine the effectiveness of the combined pedestrian safety engineering and ITS countermeasures program. The award will comprise two phases. Phase one primarily consists of developing a "Problem Identification and Countermeasure Selection Plan." Phase two consists of implementing the countermeasures identified in phase one and collecting data for evaluation.

The RFA was open and competi-



**U.S. DOT is trying to decrease the number of pedestrian and bicyclist fatalities and injuries by 10 percent.**

tive. The entire RFA is available on the Electronic Posting System (EPS) at <http://www.eps.gov> and on the FHWA home page at <http://www.fhwa.dot.gov>. The solicitation number is DTFH61-01-X-00018.

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## PROFESSIONAL DEVELOPMENT

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### Transportation/Academic Research Forum Will be Held June 25–27

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**T**he FHWA Universities and Grants Program is sponsoring the First Annual Transportation/Academic Research Forum from June 25–27, 2001 at the Holiday Inn Capitol, 550 C Street SW, Washington, DC. Approximately 200 participants are expected at the forum. Through the FHWA Minority Institutions of Higher Education (MIHE) Initiative, Jackson State University was awarded a \$75,000 contract to coordinate the forum.

The Transportation/Academic Research Forum is designed to involve FHWA researchers and the academic community in addressing research priorities and workforce issues of the transportation industry. Panel topics for the forum include, but are not limited to: Training, Education, and Research Programs; Meeting the 21st Century Workforce Needs; Safety Research Technology; Institutional Partnership Opportunities; University

Transportation Centers; and Growth and Demand of Cross Disciplines in Research Technology. Guided laboratory tours and demonstrations will be included at the Turner-Fairbank Highway Research Center. For further information contact Dr. Sheila Porterfield at (601) 979-3326 or [sporterf@ccaix.jsums.edu](mailto:sporterf@ccaix.jsums.edu), or *Leslie Porter* (703) 235-0536 [leslie.porter@fhwa.dot.gov](mailto:leslie.porter@fhwa.dot.gov)



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## INFRASTRUCTURE

### Full Scale Curved Girder Bridge Test Continues

The successful completion of the first bending-shear interaction test marks another milestone for the curved girder bridge project in the structures laboratory at TFHRC. This is the first in a series of tests to define the complex behavior of curved members under a combination of bending and shear loading.

This type of combined loading commonly occurs in continuous structures in regions close to the support points. The previous test series studied the effect of bending without shear, but this is the first test of its kind with the combined loading.

The failed specimen revealed some interesting results about curved

girder behavior. At ultimate capacity, there was significant buckling of both the girder web and top flange. Current design methodology predicts a reduction in bending capacity when shear is present. However, this test indicated the opposite, that the capacity actually increased. This finding should have a significant impact on the strength equations that are currently being developed to form the basis of the new Load Resistant Factor Design Specifications for Horizontally Curved Structures.

The curved girder tests in the structures laboratory are the most technically sophisticated ever performed on a structural member. The lab employs a state-of-the-art

instrumentation system to record strains, deflections, and rotations at over 1000 locations on the structure. Special computer software was developed to provide real-time computation and analysis of data, giving engineers instant feedback during testing. Because this test is performed full scale, over 600 tons of load were required to cause the girder to fail. The distorted shape of the test girder was monitored using the new computerized laser scanning system that is currently under development in the NDE Validation Center. This level of measurement is advanced beyond anything that has previously been used for structural testing.

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