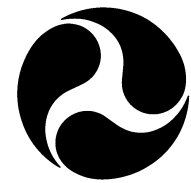


RESEARCH & TECHNOLOGY TRANSPORTER

SEPTEMBER 2001



U.S. DEPARTMENT OF TRANSPORTATION

FEDERAL HIGHWAY ADMINISTRATION

ENVIRONMENT AND PLANNING

Highway Vegetation Managers Visit Cathedral's Woodlands

Several dozen Highway Vegetation Managers from Mid-Atlantic State highway departments visited the Washington National Cathedral's Olmstead Woods on July 27 as a field exercise for their 4th Annual Roadside Vegetation Management Workshop, sponsored by FHWA's Eastern Resource Center in Baltimore, MD.

Participants in the workshop were individuals who make vegetation planting and maintenance decisions for their State's highway systems, including the choice of native grasses, wildflowers, and woody plants, which citizens of this region have come to appreciate, and the technology employed. The initiative originally grew out of FHWA's Chesapeake Bay Program commitment to provide education, and encourage and advance the use of native vegetation on public land within the Chesapeake Watershed. This return to native vegetation on our highway rights-of-way, discouraging the use of non-native invasive plants and noxious weeds and creating a desirable habitat for both the appropriate plants and animals, was the prime focus of this workshop.



Highway departments are responsible for a good deal of "green space" in our major urban areas and, although increasingly appreciated by urban dwellers, many of these areas have long been neglected. Ecologists Ellen Brewster and Ron Sims shared what they learned during the process of restoring the National Cathedral's Olmstead Woods. Participants were most interested in the ecological information, the technologies employed, and the partnerships that were built to make the restoration possible. Bonnie Harper-Lore, FHWA's Vegetation Specialist, also

related her experiences for the workshop participants.

Following the visit to the Cathedral's woodlands, the group traveled by bus to the Soldiers'

Delight Environmental Area in Owings Mills, MD. The Maryland Department of Natural Resources oversees this rare serpentine grassland, where the practice of annually burning unwanted woody



Ecologist Ellen Brewster explains the process of restoring Olmstead Woods.

species is employed to keep the native grasses healthy and viable (this method of "weeding" was practiced by Native Americans and is also practiced today by a number of State highway departments to keep grasslands healthy and productive). Jennifer Cline, Park Naturalist, was the host/interpreter at this site.

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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. Subscriptions to the *Transporter* are free. Send your request to Judy Dakin at the address below, or send e-mail to judy.dakin@fhwa.dot.gov.

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OPERATIONS

Highway Capacity and Quality of Service Committee Meets

The Highway Capacity and Quality of Service Committee's mid-summer meeting featured numerous workshops and paper sessions to advance the state-of-the-art in highway capacity and analysis.

This year, David Gibson (FHWA's Office of Operations R&D) gave a presentation on how mathematical

analytical software could be used as a prototype for highway capacity logic. John Halkias (Office of Operations R&D) was a keynote speaker, describing the future role of FHWA in traffic modeling. Gene McHale (Office of Operations R&D) gave a presentation on NGSIM (Next-Generation Simulation Project). Raj Ghaman and Henry Lieu (Office of Operations R&D), and Michael Roberson (on special training detail to the Office of Operations R&D through the Professional Development Program) hosted a poster session on the CORSIM traffic simulation model. Davey Warren (FHWA's Office of Safety R&D) contributed to the two-lane rural road activities. In addition, Dan Schierer (Office of Operations R&D) and Bill Prosser (FHWA's Office of



FHWA participants at the mid-summer meeting of the Highway Capacity and Quality of Service Committee include (from left to right): Gene McHale, Raj Ghaman, David Gibson, Henry Lieu, John Halkias, and Michael Roberson (not shown are Bill Prosser, Dan Schierer, and Davey Warren).

Program Administration) participated in the User Liaison and Modeling subcommittee meetings and other sessions.

There were active discussions on the connection between traffic simulation software packages such as CORSIM, Paramics, and VISSIM on the one side and the *Highway Capacity Manual (HCM)* analytic procedures on the other. There were also active discussions on how the level-of-service concept fit with the performance measures used by the simulation and optimization procedures.

The pedestrian and bicycle committee proposed that it is not proper to use the same performance measures for cars as for pedestrians and bicycles. Walkability and bikeability

measures were proposed as alternatives. As a result, white papers are being prepared on approaches to using software as part of the

HCM development process and on how to develop validation and calibration data sets that can support both the HCM and the

NGSIM projects.
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New Innovations for Nonforgeable Temporary Handicapped Parking Placards

In the late 1990s, advanced color scanners and photographic-quality printers became widely available at low prices. As a result, it became practical to easily scan and duplicate a temporary handicapped parking placard. The Enabling Technologies Team in FHWA's Office of Operations R&D, in conjunction with the Office of Operations' disabled persons specialist, decided to initiate an effort to develop difficult-to-counterfeit parking placards.

Two projects were selected — one utilizes special inks not available for personal computers; the other utilizes specialized electronics technologies.

The kickoff meeting for the specialized inks projects was held on July 12. Chemical inks to be investigated were discussed, as was the nature of the sensing devices to detect the inks. Millicent Ford, from the Virginia Department of Motor Vehicles (DMV), provided significant input on the States' problems with procuring and utilizing parking placards. While unable to attend, Police Sgt. James B. Hogue, III, on Interagency Personnel Act loan to the Traffic Law Enforcement Services Division of the National Highway Traffic Safety

Administration (NHTSA), and David Smith, from FHWA's Office of Safety R&D, provided background information on the role of the police in enforcing placards. Peter Mills, a sensor expert with the Office of Operations R&D, provided feedback on utilizing research sensor tools in the real world. Robert Ferlis, also with the Office of Operations R&D, explained practical problems in manufacturing and utilizing special inks and paints for the roadside environment.

The briefing by Mainstream Engineering Corp., a DOT contractor, was presented by Larry Grzyll and John Meyer. It included demonstrations of Mainstream Engineering Corp.'s current equipment for detecting chemical spills, which could be adapted to the purpose of detecting counterfeit handicapped parking placards.

The major issues discussed were: designing the placards in order to minimize any changes in procurement methods or legislative standards for the DMVs, maximizing ease of enforcement for already burdened parking enforcement officials, and maximizing durability in the harsh environment of a sealed car during the summer. The initial project will last 12 months. If successful, it will lead to field tests to verify manufacturability, durability, and acceptability to law enforcement personnel.

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At the kickoff meeting for the specialized inks projects (from left: John Meyer, Millicent Ford, Robert Ferlis, David Gibson, and Larry Grzyll).

Update on IVI Field Operational Tests

Since passage of the Transportation Equity Act for the 21st Century (TEA-21) in 1998, through the Intelligent Vehicle Initiative (IVI), DOT has been conducting research on systems that collectively have the potential to reduce motor vehicle crashes by nearly 17 percent or about 1.1 million crashes annually. Research has focused on eight safety-related areas: rear-end collisions, roadway-departure collisions, lane-change and merge collisions, intersection collisions, driver impairment monitoring, vision enhancement, vehicle stability, and safety impacting systems. The Federal role is focused on two parts: (1) to ensure that safety is not compromised by the introduction of in-vehicle systems, and (2) to work toward reducing injuries and economic losses resulting from motor vehicle crashes.

There are currently five ongoing tests, of which four are considered "Generation 0" and one is considered "Generation 1." The first four tests were initiated as part of a broad agency announcement (BAA) issued in 1998. The four Generation 0 tests are:

Volvo/US Express: This is a test of rear-end collision warning systems on commercial vehicles. It involves the installation of electronically controlled braking systems (ECBS) on tractors, along with disk brakes, and a collision warning system with automatic cruise control (ACC).

Freightliner Corp.: This is a test of a roll stability advisor and roll

stability controller. The tractors and trailers on the commercial vehicles in this field operational test (FOT) have sensors warning about possible rollover. The rollover stability advisor is passive and tells the driver after the fact how close the vehicle came to rolling over during some maneuver. The rollover controller detects when the vehicle is about to reach the rollover threshold and will engage the brakes to slow the vehicle and attempt to avoid a rollover.

Mack Trucks, Inc.: This FOT contains three elements: (1) a Truck Safety Advisory System, (2) an automatic collision warning system, and (3) a lane-departure warning system. For the Truck Safety Advisory System, they have built a database of locations where there have been many truck crashes. When a truck is about to enter one of these cells, the trucker is warned about the high incidence of crashes and is alerted to be more careful while traversing the cell. The automatic collision notification system will advise the carrier if one of their trucks has been in a collision or other incident. This is particularly important if the truck is carrying hazardous materials. The lane-departure system is a video system that looks at the lane markers and warns of lane departures.

Minnesota DOT/Specialty Vehicles FOT: The last Generation 0 FOT is the test being conducted in Minnesota of specialty vehicles, with the emphasis being on snowplows. In Minnesota, winter driving frequently involves "white-out" conditions, severely limiting driver visibility. In snowplows, a head-up display (HUD) provides an enhanced image of the road, using road markers, to tell the driver when obstacles appear and when the driver is leaving a lane (simulated rumble strips). In addition, the rear-end impact warning system tells the driver when the snowplow is getting dangerously close to a vehicle in front.

The sole Generation 1 FOT is being conducted by General Motors and Delphi Automotive Systems. It involves a rear-end collision warning system, using a HUD, to warn drivers about possible crashes.

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Radar mounted on the grill of an automobile helps prevent collisions.

Revvng Up the Pooled-Fund Process

FHWA recently reengineered the pooled-fund program to increase its already recognized value as part of the national Research and Technology Program. Of particular note are three changes:

- Eliminating the “national” and “regional” labels.
- Instituting an option for States to use the Transportation Research Board or FHWA to administer individual studies.
- Establishing a Web site for soliciting, monitoring, and reporting the progress and results of studies.

The decision to eliminate the two project labels, national and regional, was made because the labels only made a distinction as to who led a project — FHWA or a State, respectively. For clarity, projects are now referred to as “FHWA-led” or “State-led.”

The first two of the planned changes have been implemented. The last, the Web site, is being developed in conjunction with NCHRP Project 20-39(2), “Improved Transportation Research-in-Progress Data System,” and is anticipated to be launched in Fall 2001. The new Web site will include online solicitation of partners, general



study information, progress reports, and final results reports.

To learn more about the pooled-fund program, visit <http://www.tfhr.gov/site/active.htm>.

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INFRASTRUCTURE

Churilla Named Research Program Manager for Infrastructure R&D

Charlie Churilla has been appointed Research Program Manager for FHWA’s Office of Infrastructure R&D. He began serving in his new position in August.

Churilla previously served as the Office of Infrastructure R&D’s Technical Director for Pavements. In this capacity, he provided technical direction for FHWA’s pavement research program, which includes the LTPP and the asphalt and concrete pavement programs. He also worked in FHWA’s Office of Technology Applications, the Region 3 office in Baltimore, and the Eastern Federal Lands Highway Office.

He began his highway career with PennDOT in 1965 and joined FHWA in 1981. Throughout his career, Churilla has been involved with pavements in design, construction, performance evaluation, maintenance, research, technology transfer, and pavement management.

The Research Program Manager for Infrastructure position was recently established to provide support to the Director of the Office of Infrastructure R&D for policy, direction, leadership, and management of the research program and guidance of the work conducted by the eight teams in that office.



Charlie Churilla

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Pooled-Fund Evaluation Studies Impacts of Highway Stormwater and Runoff Water

In a pooled-fund evaluation and research effort, the impacts of highway stormwater and runoff water on the quality of groundwater in karst (limestone) areas have been explored. Problems similar to those caused by highway stormwater and runoff water have been found in areas of fractured rocks, especially with thin soil overburdens. Such problems have been found in many areas of the United States, including areas in and near Tampa and Orlando, FL;

Bloomington, IN; Rochester, MN; St. Louis and Springfield, MO; Philadelphia, PA; Nashville and Knoxville, TN; and Austin, TX.

Contamination problems have been qualitatively dealt with through the control of land usage, diverting of water away from sink-holes, and the use of detention — filtration basins to remove contaminants. Indiana, Minnesota, and Texas are among the States that have applied such control

measures. An experimental detention-filtration basin has been evaluated adjacent to the I-40/I-640 interchange in Knoxville, TN. Analyses have shown that a vegetated detention basin with a peat filter outlet removed 80+ percent of the organic and heavy metal contaminants that could be attributed to the highway runoff water.

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Recent Study Shows Highway Effects on Vehicle Performance

Most considerations of fuel consumption and air contaminant emission rates are related to the estimated vehicle population, average speed, and miles traveled by the vehicles in a given area. A study was recently completed that indicated that road grades and curves, pavement conditions, and variations of speed are significant factors as well.

The main product of the recent study is a model, "Highway Effects on Vehicle Performance" (HPP), a computer program that calculates estimated fuel consumption and exhaust emission rates and the amounts of each for a given highway segment for one or more vehicles (traffic) as determined by the user for highway geometric factors and idling or speeds, and accelerations (external loads, also gears), and presents the

results, including cumulative results, in both pictorial and numerical forms. Thus, one can implement the model to estimate the effects of highway geometry and pavement and/or traffic conditions.

Essentially, the model combines external loads from all sources, namely rolling resistance, aerodynamic drag, accelerations (inertia), grades, curves, and vehicle idling, with essentially engine/vehicle maps that provide the rates of fuel consumption and air contaminant emissions for the conditions of the external loads and engine speeds, and gears or vehicle idling, as appropriate. (Internal energy losses for the vehicle could be considered.) For most evaluations, a warmed-up vehicle is said to have external or road loads for various speeds and accelerations on a straight,

flat, smooth highway with no ambient wind.

Laboratory dynamometer tests and highway tests have been performed at several locations to establish the relationships for modal models or modifications of traffic models based on numerous tests of 1970–1997 vehicle model performances. To supplement the actual measurements, validated simulation models have been created to permit estimates of post-1997 vehicles and conceivable vehicles for future years.

A CD-ROM has been prepared that contains study results and additional information. To obtain the CD-ROM, you may contact Bob Kogler from FHWA's Office of Infrastructure R&D:

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MARKETING/OUTREACH

NTPAW 2001: Exploring New Territories

FHWA public affairs and marketing staff members participated in the 2001 National Transportation Public Affairs Workshop (NTPAW) held in Juneau, Alaska, on August 4–7. Thirty-six state DOTs were represented at this annual meeting sponsored by the American Association of State Highway and Transportation Officials (AASHTO) Administrative Subcommittee on Public Affairs. FHWA joined State DOT public affairs and transportation association members in sessions keyed to State issues. A preview of TEA-21 reauthorization defined roles for State public affairs professionals to assist in preparing a strong bill for 2003. A consent-building training workshop discussed methods for successful project implementation in the public sector.

Educational sessions included discussions of Web issues and graphic arts, opportunities to hear about Transportation Research Board programs in public involvement, and an overview of AASHTO's Transportation and Civil Engineering (TRAC) Youth Engineering Outreach Program, dedicated to raising awareness of transportation and civil engineering careers among pre-college students. Additional breakout sessions covered voter initiative surprises, internal communications, and legislative relations.

NTPAW showcased its annual competition of State projects, recognizing the year's top public affairs and communications achievements in radio, television,

public speaking, print, internal and external publications, and video. FHWA also presented its annual Technology award to Florida DOT for "SunPass," its innovative electronic toll collection system. Criteria for this FHWA award include originality, effectiveness, and presentation of a new and innovative technology or approach.

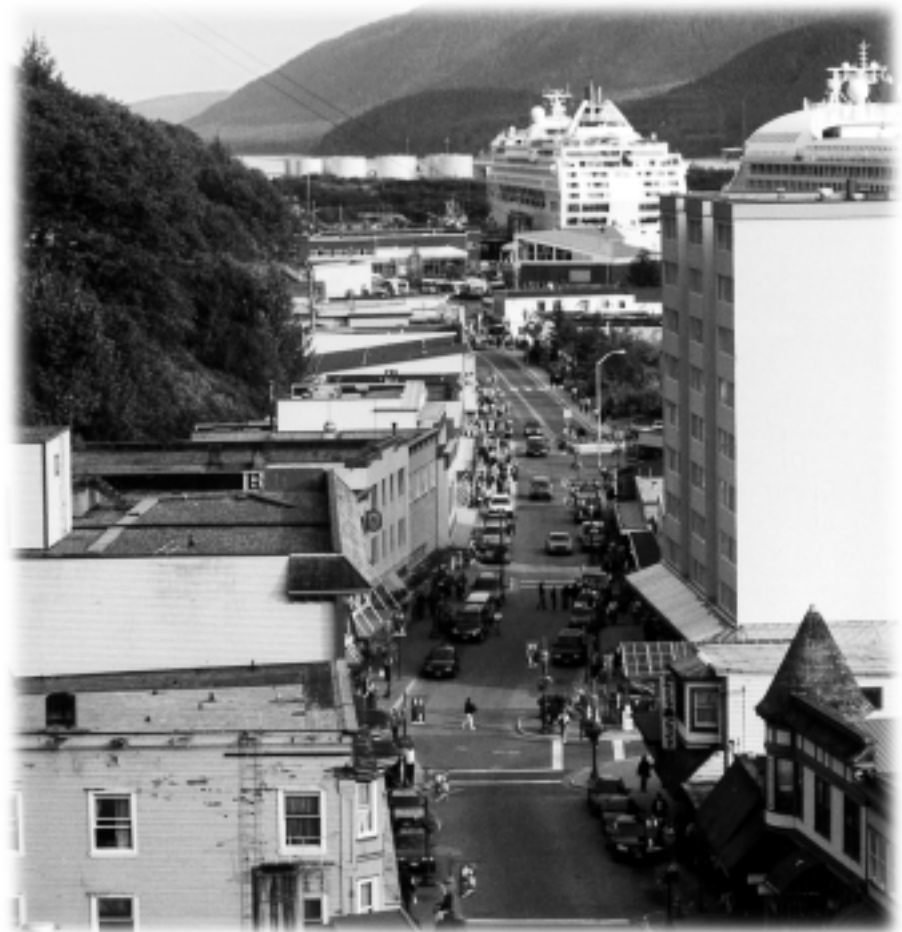
The workshop focused on the needs of the public to be well informed about transportation

projects and programs, as well as support for DOT public affairs staff to communicate effectively. Each State presented its own success stories and surprises, rallying behind a national initiative for a traveling work zone memorial exhibit.

The next NTPAW will take place in Philadelphia, PA, on August 25–28, 2002.

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Intermodal transportation is the lifeline of Alaska, showcased at NTPAW by ship, auto, transit, and trail activity in Juneau.



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SAFETY

CD-ROM Developed by FHWA Wins Prestigious Audiovisual Award

A CD-ROM developed by FHWA to help improve pedestrian safety has received one of the highest honors in audiovisual competition from the International Film and Video Festival — the Gold Camera Award for interactive multimedia.

“Safer Journey — Interactive Pedestrian Safety Awareness” is an interactive CD-ROM that takes the user through various pedestrian safety scenarios encountered on roads and streets in order to improve the level of pedestrian knowledge for all road users (including schools, driver education groups, enforcement, etc.) and people involved in advancing safety.

Every year, more than 5,000 pedestrians are killed in traffic

crashes and nearly 90,000 are injured. As safety practitioners, we must do more to integrate pedestrian safety needs into highway design and traffic operations.



The “Safer Journey” CD-ROM is one of the many products that the FHWA/NHTSA Pedestrian/Bicyclist Work Team is associated with in its attempt to create safer communities.

“Safer Journey” can be viewed online at http://safety.fhwa.dot.gov/programs/ped_bike.htm (click on “Pedestrian Information”). Additional information, or copies of the CD-ROM, can be obtained by contacting Levenson Boodlal at (202) 366-8044 or by e-mail at levenson.boodlal@fhwa.dot.gov.

You can also contact Janet Coleman from FHWA’s Office of Safety R&D:

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Explanatory signage helps pedestrians cross safely.