RESEARCH & TECHNOLOGY
TRANSPORTER

MAY 2001

U. S. DEPARTMENT OF TRANSPORTATION FEDERAL HIGHWAY ADMINISTRATION

SAFETY

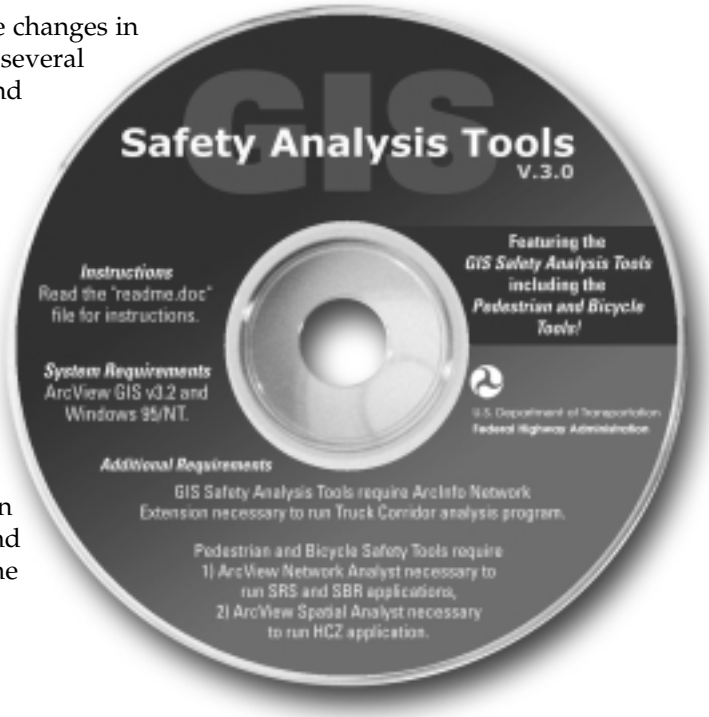
GIS Safety Analysis Tools CD-ROM Updated

The *GIS Safety Analysis Tools* CD-ROM, originally released in 1999 and updated in 2000, has been enhanced again in Version 3.0. These tools were developed and updated as part of the Highway Safety Information System (HSIS) project. Improvements were made to both the applications and the documentation. The most significant enhancements to the applications include:

- Revising several of the original Safety Analysis Tools—Spot/Intersection Analysis, Strip Analysis, Cluster Analysis, and Sliding Scale Analysis—to run using ArcView® 3.2, exclusive of ArcInfo®.
- Updating the *GIS Safety Analysis Tools* CD-ROM to provide Tool Tips for easier navigation and a graphic user interface for greater functionality.
- Updating the Help files to reflect changes in the *GIS Safety Analysis Tools*.
- Converting the aerial photo images to MrSid™ format; these images are automatically loaded if the viewer extension is available.

In addition to the changes in the applications, several improvements and additions were made to the documentation available on the CD-ROM, including:

- A revised *User Guide* which provides configuration and installation information and guidance on the use of the applications.
- A *Data Guide* which provides more comprehensive details regarding the data requirements of the various applications.
- A research report titled *Implementation of GIS-Based Highway Safety Analysis: Bridging the Gap*. This report is also available online at www.tfhrc.gov/safety and is intended to serve as an educational document for both safety engineers and GIS professionals who are interested in linking highway safety analysis and GIS capabilities.



The revised *GIS Safety Analysis Tools* CD-ROM is now available.

For more information about the *GIS Safety Analysis Tools* CD-ROM or HSIS, please contact:

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RESEARCH & TECHNOLOGY
TRANSPORTER

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 email to judy.dakin@fhwa.dot.gov.

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INFRASTRUCTURE

FHWA and Iowa Partnership Will Improve PCC

Through a cooperative agreement, FHWA is partnering with Iowa State University's new Center for Portland Cement Concrete Pavement Technology (PCC Center). Initial research will involve measuring materials-related distresses in existing pavements and evaluating composite pavement unbonded overlays.

The PCC Center focuses on improving design, materials science, construction practices, and maintenance techniques to provide longer-lasting, more cost-effective PCC pavements. Funding partners for the PCC Center include the Iowa Concrete Paving Association, the Iowa DOT, and the Department of Civil and Construction Engineering at Iowa State.

Through an Advisory Board, Research Committee, and Technology Transfer Committee, the majority of Iowa's concrete paving community participates in the PCC Center. Participation will be extended to nearby States in cooperation with FHWA's Midwestern Resource Center and the Midwest Concrete Consortium.

Other major projects being conducted by the PCC Center include:

- Developing a national, long-term plan for concrete pavement research and technology. The center's partners in this three-year project, awarded in March 2001 by the Innovative Pavement Research Foundation, include TDC Partners, ERES Consultants, and Transtec Group, Inc.
- Building a research laboratory in PCC pavements at Iowa State, to be completed in winter 2001–2002.

The PCC Center is housed and administered at Iowa State's Center for Transportation Research and Education.

For further information, contact Dale Harrington, Iowa State University, (515) 294-8103, pcconc@iastate.edu.

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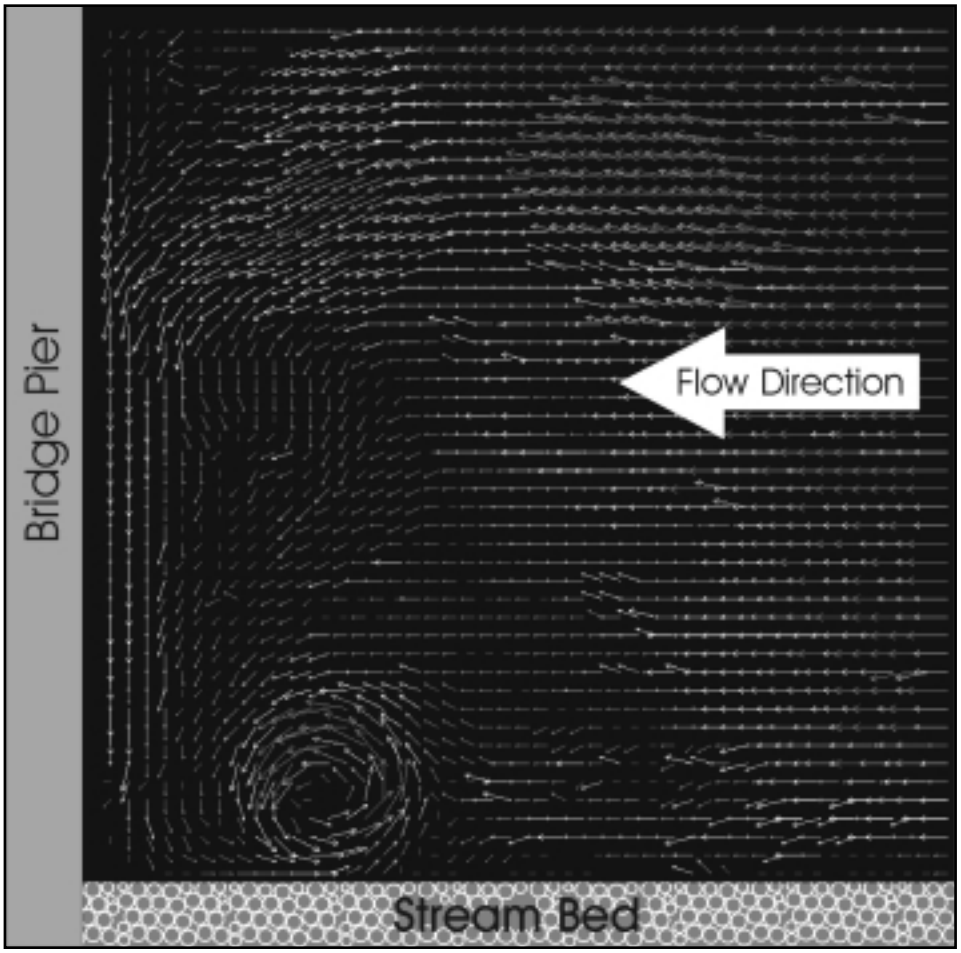
The new PCC Center in Iowa will research materials-related distresses in existing pavements.

Researching Ways to Better Measure Scour

Researchers at the TFHRC Hydraulics Laboratory have been working on an exciting technology for measuring instantaneous flow fields around bridge pier models. Particle Image Velocimetry (PIV) uses a focused light source, high-resolution digital camera, and sophisticated computer logic to trace particle movements. This technology makes it possible to accurately measure velocity in complex situations such as flow around a bridge pier. When this technology is fully developed, researchers will be able to measure shear stresses around bridge piers that result in scour and be able to quantify the horseshoe vortex strength to explain the deep scour holes that can threaten the structural stability of bridges.



Flow vortices in front of a bridge pier are used to explain the mechanics of bridge scour.

The experimental set-up of a PIV system typically consists of several subsystems. In most applications tracer particles have to be added to the water flow. These particles have to be illuminated in a plane of the flow at least twice within a short time interval. The light scattered by the particles has to be recorded either on a single frame of film or on a sequence of frames. The displacement of the particle images between the light pulses has to be determined through evaluation of the PIV film recordings. The local displacement vector for the images of the tracer particles of the first and second frame is determined by statistical methods.

The accompanying figure shows the flow vortices in front of a bridge pier that are traditionally used to explain the mechanics of bridge scour. In the past we have not been very successful in measuring the strength of these vortices especially as they weaken with scour depth, even though we used them to explain the process.

PIV is leading-edge technology in the fluid measurement field. Commercial PIV systems are available but they are very expensive and need to be customized for unique situations. The TFHRC Hydraulics Laboratory has not opted to purchase a commercial system, but has staff who is perfecting a relatively low cost system to demonstrate the feasibility of using this technology for our bridge scour and culvert hydraulics experiments. For more information please contact, Kornel Kerenyi, (202) 493-3474, kornel.kerenyi@fhwa.dot.gov.

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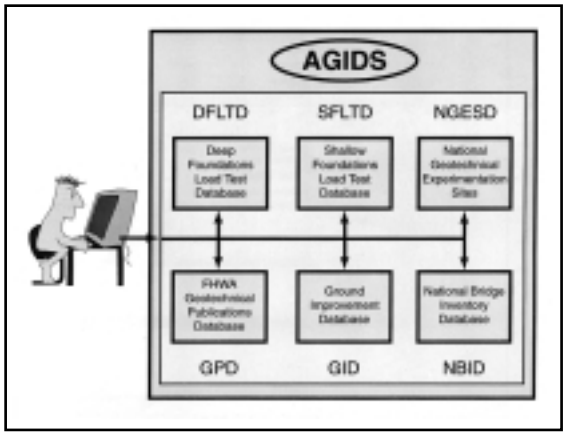
RD&T Proposes AGIDS Study

The Office of Research, Development, and Technology is proposing a new National Pooled-Fund Study on the Automated Geotechnical Information and Design System (AGIDS), provided sufficient interest is indicated by the States. The objective of this study is to develop improved procedures for the design and construction of bridge foundation retaining wall systems and other geotechnical projects through the use of Internet and database technology.

AGIDS is a geotechnical information repository and design-aid system that can be used by both practitioners and researchers to rapidly obtain high-quality data for comparative analysis purposes. The system will include a research quality database that uses specially designed modules for performing correlations, predictions, and analyses that can be used to automatically generate design solutions based on interactive user input.

The AGIDS study will involve the comprehensive integration of several FHWA databases and computer modules that were recently developed and allow geotechnical engineers to quickly and economically obtain information and evaluate design alternatives from a centrally located computer source. The effort involves the development of commonality features and the design of a user interface application for performing cross queries, correlations, and engineering analyses. These databases need to be linked through a multi-user workstation that contains an interactive system for generating design solutions from the data repositories and engineering modules. To be highly efficient, AGIDS must also be web-enabled to provide fast and economical service to potential users.



Automated Geotechnical Information and Design System.

The study is estimated to cost approximately $500,000. FHWA is prepared to contribute to the support of this study if it is approved. States interested in participating should indicate their proposed level of support at their earliest convenience. Applications for participation will continue to be accepted until next year. Questions concerning this proposed study should be directed to

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FHWA Establishes Recycling Team

FHWA has established a team to provide leadership, direction, support, and technical guidance to the transportation community for promoting the use of recycled materials. The team held its first meeting, via teleconference, March 23. A business plan is under development. The team is preparing a white paper identifying priority initiatives for recycling. It has identified important partnerships it will begin to build with the AASHTO Subcommittees on Materials and Construction, University of New Hampshire's Recycled Materials Resource Center, and industry.

Members of the team include: Jason Harrington and Michael Rafalowski, Infrastructure Core Business Unit (CBU); Connie Hill, Office of Planning and Environment CBU, Terry Mitchell and Jack Youtcheff, Research, Development, and Technology Service Business Unit (SBU); Michael Smith, Southern Resource Center; Walter Waidlich, New Hampshire Division; Bryan Cawley, North Dakota Division; and Jim Travis, Texas Division.

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New Publications Released on International Transportation Resources and Steel Bridge Fabrication

FHWA's Office of International Programs has just released two new publications. The first, *International Guide to Highway Transportation Information,* is a hard copy compilation of a multi-volume set of guides that provides highway transportation information resources for domestic and international professionals.

Information sources for member countries of the Organization for Economic Cooperation and Development (OECD) and other selected countries are included in the guides. The volumes incorporated into this document are: 1) Highway Transportation Libraries and Information Centers; 2) Web sites; 3) Document Delivery Suppliers; 4) Bibliographic and Non-Bibliographic Database Producers; and 5) Highway Transportation Associations, Organizations, and Other Professional Societies.

The second publication, *Steel Bridge Fabrication Technologies in Europe and Japan,* is the final report of an international technology scanning tour which conducted a broad overview of newly developed manufacturing techniques in use abroad for steel bridge fabrication and erection. The trip focused on the role of steel production, design, innovation, and fabrication in modern steel fabrication facilities in Germany, Italy, Japan, and the United Kingdom. The team also shared information on U.S. practice, initiatives, and research activities in these areas.

As a result of the review, the team identified six high-priority areas on which U.S. industry should focus: computer aided drawing and computer aided manufacturing; automated recording of inspection, welding variables, and geometric measurements for quality control and virtual assembly; high-performance steels and coatings; cutting and joining steel components, members, and structures; certification and contracting of steel fabrication and erection; and design innovation. Within each of these areas, the team made recommendations for further research, pilot studies, and modifications to existing procedures that will further modernize structural steel fabrication facilities in the United States.

Both reports are available online at www.international.fhwa.dot.gov and in hard copy by e-mailing the Office of International Programs at international@fhwa.dot.gov, or by calling (202) 366-9636.

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OPERATIONS

National Summit Works on ITS 10-Year Plan

The National ITS Summit met April 17–19 near Washington, D.C. to discuss the 10-year ITS Program Plan and Research Agenda. This meeting was co-sponsored by ITS America and U.S. DOT. The development of the ITS 10-year plan was requested by Congress in TEA-21.

The National ITS Summit was structured as a workshop with breakout sessions to allow for review and input to the 10-year plan and the research agenda. A framework for the document was drafted based on extensive input from the ITS community, and was available for review prior to the summit. The 10-year plan is being closely coordinated with other program planning efforts being conducted by AASHTO, TRB, and the Institute of Transportation Engineers.

As a result of the summit, a draft document was prepared. This draft will be presented and discussed at the ITS America Annual Meeting June 4–7. The final 10-year plan will be presented by ITS America, in its capacity as a Federal Advisory Committee, as formal program advice, to U.S. DOT this fall. The document is also expected to serve as the foundation for congressional reauthorization of the ITS portion of TEA-21.

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TECHNOLOGY TRANSFER

Meeting Customer Needs With Marketing Techniques

On April 10–11, FHWA's Western Resource Center hosted the pilot presentation of a new course, "Marketing Essentials: Tools, and Techniques for Successful Innovation." Twenty students participated in exploring the principles of marketing and how they apply to activities at FHWA. Attendees engaged in active discussions about customers for FHWA products and services, and how to meet their needs with different delivery styles and tools that work best for each customer type.

Prior to the class, each student completed an automated style analysis assessment to evaluate their natural and adapted work style for marketing FHWA technology. The course instructor provided each completed analysis to the students to assist in developing individual styles of response to challenges they face in their technology innovation environments.

This new course follows a well-received series of NHI marketing courses conducted nationwide from 1990–95. A 1998 FHWA field survey of technology innovation personnel indicated a continuing need for training in marketing tools and techniques, which led to this updated training course.

Team exercises provided the dynamics to develop product development strategies and action plans.

Future courses are scheduled for the Southern Resource Center in Atlanta, GA, and the Eastern Resource Center in Baltimore, MD. FHWA employees can check the FHWA Learning and Development System (LADS) on StaffNet for availability of class offerings, logistics information, and registration.

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Western States ITS/CVO Deployment Forum Succeeds

More than 250 participants from 36 States and three Canadian provinces pondered weighty technology issues in discussions and presentations, and experienced exciting ITS/CVO innovations in the exhibit hall. Sessions were organized into three tracks: business, technical, and industry. Special presentations on issues such as the use of ITS during the upcoming Olympic Winter Games in Utah encouraged participants to explore a myriad of topics.

Participants pondered weighty technology issues at the ITS/CVO Forum.

FMCSA's Office of Research and Technology held an impromptu session to hear meeting participants' perspectives on ITS and the Commercial Vehicle Information Systems and Networks (CVISN) program. These needs included: State match for ITS funding, limited State human resources, communications cost and coverage, more ITS outreach to the motor carrier industry, incentives to motor carriers to promote technology use, need for more State and industry ITS/CVO champions, expanded ITS partnerships to include insurance industry, and standardized electronic screening enrollment criteria.

In the exhibit hall, several vendors demonstrated the latest technologies in safety information exchange, electronic credentialing, and electronic screening. The Nevada Highway Patrol, with support from HELP, Inc., demonstrated their mobile PrePass electronic screening unit. The Eaton Corporation provided rides to forum participants in their Innovations Truck and demonstrated several on-board systems including their intelligent cruise-control collision avoidance system.

By all accounts, the forum was a success. The event organizers posted an evaluation survey on the Internet. Over 87 percent of respondents rated the conference "excellent" or "good" and 83 percent said that they would attend a similar deployment forum in the future. The survey response rate was roughly 25 percent.

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PROFESSIONAL DEVELOPMENT

FHWA Shares Technology to Improve Safety

On January 11 FHWA's Safety CBU and Office of Safety Research and Development hosted delegations from Korea and the United Kingdom. The visitors were given tours and presentations focusing on roadside safety hardware acceptance and finite element modeling (FEM) issues.

Many of the Korean delegates were from the Korea Institute of Construction Technology's Highway Engineering Research Group which is responsible for developing their certification acceptance process, including developing crash-test standards. They are also designing a crash-test laboratory for testing and evaluating roadside hardware. Dr. Man-Gi Ko of KongJu National University is developing a new guardrail for use in Korea. A delegation from the Transportation Research Laboratory (TRL) participated as part of technical cooperation activities between FHWA and TRL to address finite element modeling integration into roadside safety decision making.

The delegates toured the Federal Outdoor Impact Laboratory (FOIL) at TFHRC and participated in a workshop and a tour of the FHWA/NHTSA National Crash Analysis Center (NCAC) at George Washington University in Ashburn, VA.

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Delegates from Korea and the United Kingdom visit TFHRC to learn more about roadside safety.

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HRTS

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Merchant Marine Academy Course Scheduled for May 14–25

One of the National Highway Institute's (NHI) partner organizations, the Global Maritime and Transportation School at the United States Merchant Marine Academy, has developed a new two-week intensive course for public transportation officials.

The course, "Introduction to Freight Transportation Systems and Planning," is designed to: 1) provide State DOTs and Metropolitan Planning Organization (MPO) personnel with a comprehensive overview of modal and intermodal freight transportation systems and their relationship to State and regional transportation systems; 2) provide participants with a background and understanding of the issues, concepts, and specific activities connected with regional and local freight transportation and planning as it applies to highways, rails, waterways, and ports; and 3) provide students with the ability to identify, analyze, and develop informed conclusions and recommendations on issues important to State DOTs and MPOs as they relate to the business of freight transportation and planning, related strategies, and long-term strategic planning.

The course is conducted on the waterside campus of the United States Merchant Marine Academy in Kings Point, NY, and includes field visits to intermodal freight transportation facilities in the Port of New York/New Jersey. Upcoming programs are scheduled for May 14–25 and Sept. 24–Oct. 5, 2001.

The course "Introduction to Freight Transportation Systems and Planning" will be conducted at the United States Merchant Marine Academy in Kings Point, NY.

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