

TRB Renews Commitment to Worldwide Involvement

The Transportation Research Board's Committee on International Activities is poised to build on TRB's growing commitment to enhancing information exchange and fostering cooperation throughout the international transportation community.

More than 1,000 delegates from some 60 foreign countries are expected to attend the 2005 TRB Annual Meeting. They will participate in over 250 sessions, attend 350 committee meetings, and deliver many of the 2,500 presentations on the program.

Because international participation in TRB activities grew steadily over the last decade, the TRB Executive Committee established a task force on International Activities in June 2002. Dr. Michael Meyer from Georgia Institute of Technology was appointed as the chair.

Two years later, the task force released its final recommendations to the Executive Committee. The committee, in turn, formally established the International Activities Committee with the mission to:

- Encourage more international participation at the TRB Annual Meeting.
- Facilitate international participation in TRB activities.
- Increase TRB involvement in international



The Chairman's Luncheon at the 2003 TRB Annual Meeting drew many international participants.

activities.

- Strengthen the international transportation resource community.

Meyer has been appointed chair of the International Activities Committee. Concurrently, he will also serve as the first International Secretary to the TRB Executive Committee.

"This is a great personal honor and is a logical extension to TRB's growing international involvement," said Meyer. "And I believe this growth is due in large part to the successful international technology scan program many of us have been privileged to participate in over the last few years."

The Joint FHWA/AASHTO International Technology Scanning Program, sponsored by FHWA, AASHTO and TRB/NCHRP, is now 12 years old. Sixty-five scans have been completed, with nearly 700 U.S. transportation

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Welcome, International Guests*continued from page 1*

officials having visited their counterparts in 30 countries. Meyer has been on several scans as a reporter and witnessed firsthand the benefits in international cooperation within the transportation community.

International Participation in the Annual Meeting

International attendance at the TRB 2004 Annual Meeting included more than 900 delegates from 62 countries. The delegates were very visible in the sessions and delivered over 560 presentations.

One session highlight included the roundtable discussions on international transportation security. Other sessions included traffic safety in Asia and Africa, and international progress on greenhouse gas production. Several focused directly on scan findings - intelligent compaction of soils in Europe and international experiences in performance-based maintenance contracting.

"We like the connection between the scan program and the TRB Annual Meeting. TRB provides an excellent vehicle for conducting special sessions that focus specifically on scan findings," noted Martine Micozzi, NCHRP Senior Program Officer. "We foster relationships and move closer to common understanding of new technologies and policies in many different areas."

International Participation in Technical Activities

Currently, nearly 60 percent of the 200 TRB Technical Activities Division committees have at least one international member. In total, about 300 seats are filled with international members.

A number of these committees already have a specific international focus. They include the committees

on International Trade and Transportation and Transportation for Developing Countries, and the subcommittees on International Rail Transit and International Aspects of Transportation Energy.

In addition, eighteen universities outside the U.S. have designated TRB representatives. A number of international experts, many from these universities, have worked with TRB as loaned staff, most recently from Switzerland, Canada, and South Africa.

TRB's Worldwide Involvement

In the last two years, TRB has sponsored more than 20 conferences outside the United States. They included the 2nd International Conference on Bridge Maintenance, Safety, and Management in Kyoto, Japan; and the International Conference on Ecology & Transportation in Lake Placid, NY.

In 2003, TRB donated complete sets of CDs of the Transportation Research Record (TRR) publication series to the World Bank to distribute to developing areas, including Russia, Turkey, Benin, Nepal, and the East Asia and Pacific region.

Strengthening International Transportation Resources

TRB disseminates its materials and information to a wide international audience. The TRB e-newsletter is e-mailed weekly to more than 15,000 subscribers, including 1,500 readers in 72 countries outside the United States.

Each e-newsletter includes a section on international research news. During 2004, over 130 items with links to further information were included in the international section.

For many years, TRB has been involved in sharing bibliographic data between the Transportation Research Information System (TRIS) database and the newly-formed "Organisation for Economic Cooperation and

Development/European Conference of Ministers of Transport (OECD/ECMT) Joint Transport Research Centre."

OECD serves as the Secretariat for the International Transportation Research Documentation (ITRD) service, publishing transportation research in four languages.

Between 15 and 20 percent of the users of TRIS Online come from outside the United States. The Research in Progress (RIP) database has about 7,750 records of ongoing or recently completed research, accessed by more than 1,000 international users monthly.

Future Plans

In speaking of next steps, Chair Meyer noted, "We have a full agenda of future efforts under consideration. We will recommend initiatives in just about every aspect of TRB operations."

One initiative the committee is considering is surveying countries to identify their top transportation needs and sharing those needs with the international community. In addition, possible seminars and symposiums involving young transportation researchers from around the world are being considered.

Another initiative includes exploring an international shared-knowledge network on transportation research, working with the World Bank and others to create a bridging network to transmit information to developing countries.

"We will also attempt to identify international 'champions' and leaders with an interest in specific TRB objectives," said Meyer. "We want to more effectively use the TRB e-newsletter to solicit international cooperation and participation in TRB activities. We think this may lead to even more sessions at the annual meeting and greater involvement in committee work."

"The growth in international activi-

ties in TRB will continue,” noted Mark Norman, director of the Technical Activities Division at TRB. “The transportation world really has few borders, ideas flow rather freely, and TRB is an excellent vehicle for peer exchange and for fostering cooperation.”

For more information on TRB’s international activities, please contact Mark Norman at mnorman@nas.edu.

Abbreviation Key:

AASHTO	American Association of State Highway and Transportation Officials
DOT	Department of Transportation
ECMT	European Conference of Ministers of Transport
FHWA	Federal Highway Administration
IRF	International Road Federation
NCHRP	National Cooperative Highway Research Program
OECD	Organisation for Economic Cooperation and Development
PIARC	World Road Association
TRB	Transportation Research Board
TRR	Transportation Research Record

Roadway Human Factors and Behavioral Safety: Designing Roads with Drivers in Mind

A critical factor in improving highway safety is determining how drivers will react to roadway designs. “Evaluating the human factors issues associated with the operation and design of roadways is one of the key research needs we have identified over the past few years,” says Michael Trentacoste, director of FHWA’s Office of Safety Research and Development and co-chair of an international scanning team that studied that topic.

In June 2004, Trentacoste and eight transportation industry colleagues traveled to Denmark, Finland, France, The Netherlands, Norway, and Sweden to investigate how these countries incorporate human factors and behavioral safety issues into highway research, design, and operations.

The findings of this mission provide valuable information to the United States in helping to achieve a goal set by FHWA and AASHTO to reduce highway fatalities from 1.5 per 100 million vehicle-miles traveled to 1.0 by

2008.

“We have an epidemic in highway fatalities,” says Kevin Keith, scan Co-chair and Chief Engineer of the Missouri DOT. “The situation can be improved greatly, but we have to make it a priority.”

Encouraging Good Behavior

The scanning team’s goal was to learn how leading European countries plan, develop, and conduct human factors research on roadway design, and how design and traffic engineers put the results into practice.

The team observed a number of best practices, but focused on several it believes could enhance the safety and mobility of highway operations in the United States, including self-organizing roads, speed management, the use of driving simulators in roadway design, and top-down leadership on safety issues.

One concept that particularly impressed the team was the self-



This 2+1 roadway in Sweden features an alternating passing lane with a cable barrier to encourage drivers to pass safely.

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Roadway Human Factors

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organizing road, which incorporates geometric features that encourage drivers to automatically select the appropriate speed and driving behavior without depending on road signs.

In Finland and Sweden, the team viewed “2+1” roadways, designed as three-lane roads with an alternating passing lane. The design includes a cable guardrail to assure that drivers pass only when the passing lane is on their side.

The team observed drivers on a stretch of 2+1 roadway in Sweden, noting that drivers approaching the end of a passing lane did not speed up to overtake slower vehicles because they knew another passing opportunity would come up shortly.

“With this design, drivers have an expectation that they will be able to pass slower-mover vehicles when it’s their turn, so they don’t have to pass in a less advantageous way,” says Trentacoste.

In addition to enhancing safety, the 2+1 roadway design provides a less costly alternative to obtaining right-of-way for and constructing a four-lane design.

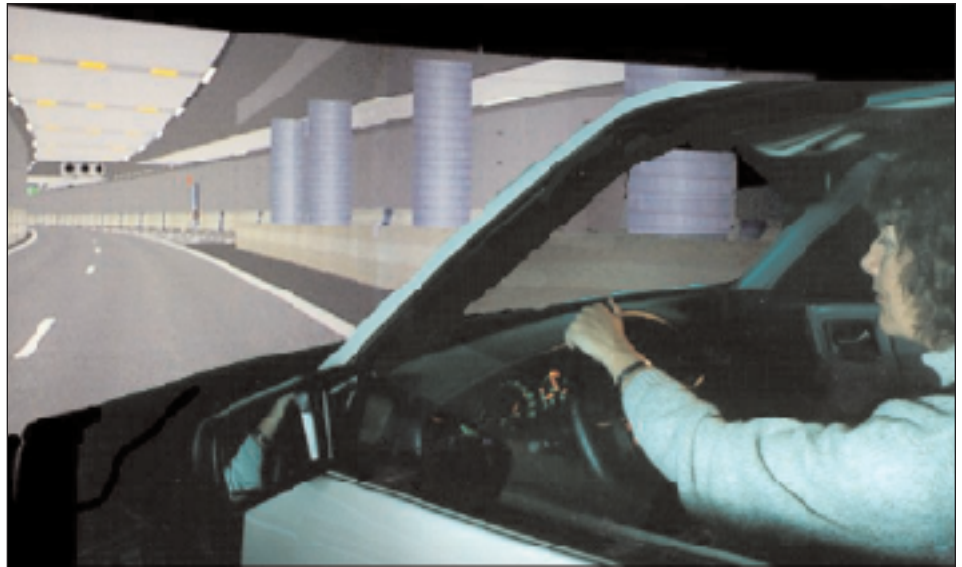
Managing Speed

Team members were also impressed by speed management techniques used in Europe and the public’s acceptance of them.

Agencies in France, The Netherlands, and Sweden have found cameras to be an effective speed management tool. In France, installation of 100 speed cameras contributed to a 20% reduction in fatalities.

In The Netherlands, cameras take photos of vehicles entering and exiting the roadway and computers calculate the travel time to determine if the motorist was speeding. The information is forwarded to a processing center, which mails speed infraction notices the next day.

“We know speed cameras can save



In Europe, designers use driving simulators to test road and tunnel designs before they are constructed.

AROUND THE WORLD

January 9-13, 2005

Transportation Research Board 84th Annual Meeting

Washington, DC
www.trb.org/meeting/

March 27–30, 2006

XII International Winter Road Congress

Torino–Sestriere (Italia)
www.aipcr2006.it

February 8-9, 2005

Road Safety & Traffic Management 2005

Intercontinental Hotel
Cairo, Egypt
www.trafficegypt.com/en/index.asp

June 29 – July 23rd

International Symposium on Highway Geometrics Design

Chicago, Illinois
Contact Ray Krammes, FHWA
ray.krammes@fhwa.dot.gov

March 22–23, 2005

Australian Roads Summit 2005

Brisbane, Australia
<http://www.acevents.com.au/roads2005/>

July 16-19, 2006

Third International Conference on Bridge Maintenance, Safety, and Management

Porto, Portugal
Contact Frank Lisle, NAS
FLisle@nas.edu

June 14-18, 2005

15th International Road Federation (IRF) World Meeting/Exhibition

Bangkok, Thailand
www.irf2005.com

September 16-22, 2007

PIARC World Congress

Paris, France
<http://www.piacr.org>

For copies of all international scan reports, visit <http://international.fhwa.dot.gov/> and click on publications.

lives, but we struggle to implement them here in the United States,” says Keith. “We saw the concept in action in Europe. When you use automated enforcement of speed, people drive slower. And when people drive slower, you have fewer fatalities.”

The challenge, Keith adds, is determining how to adapt safety solutions such as speed cameras to the United States environment. “We don’t have the answers yet,” he says.

The team learned that driving simulators are used in Europe to assist in roadway design on the premise that it’s cheaper to reject a design element in a simulator than to rebuild a road to fix design problems.

“Most driving simulation in the U.S. is oriented toward vehicle aspects rather than roadway aspects,” says Trentacoste. “We saw how roadway designs were improved when the designer got into the simulator and actually drove the road.”

A driving simulator was used to test designs for Norway’s Laerdal Tunnel, the world’s longest tunnel at 24.5 km. Results of simulator tests on lighting models showed that strategies using blue, yellow, and green lights increased driver safety and comfort, while changes in lighting every 2 km reduced driver anxiety.

Top-Down Leadership

The countries the team visited have made improving roadway safety and reducing fatalities a goal at the highest levels of government. In France, for example, road safety was a campaign issue in the national elections, and President Jacques Chirac designated it a national priority.

The Swedish Parliament passed a “Vision Zero” act specifying that the country’s long-term traffic safety goal is to achieve zero traffic fatalities, by providing clear direction to researchers and agencies responsible for highway design and operation.

The Netherlands adopted a sustainable safety vision to reduce highway fatalities that has resulted in new roadway design principles. In Finland, which

has a zero fatality goal, a National Road Safety Advisory Group that includes members from various government agencies that advise the Transportation Minister.

“When top leaders make safety a priority for the country, not just the road administration, it has a significant impact,” says Keith.

The team also saw several examples of cooperation among diverse groups involved in improving highway safety. They included Finland’s multidisciplinary teams of police officers, engineers, medical professionals, and research psychologists that investigate fatal crashes and recommend safety improvements.

There is also significant coordination among countries on highway safety research, such as the European Union’s project on human-centered roadway design research, known as “HUMAN-IST.”

U.S. Plans

The team’s plans for implementing its findings from the scanning study include convening a national symposium this spring on speed management techniques, including self-organizing roads and the use of speed cameras.

The team is working to identify several states willing to pursue design and implementation of a 2+1 roadway. The Missouri DOT is one agency with plans to try it.

“We’re looking for a spot where we can build one and monitor the reaction of drivers to see if it’s workable,” says Keith.

The team also plans to make roadway designers aware of the benefits of using driving simulators to solve design questions and find agencies interested in working together to demonstrate the use of simulators on design projects.

Another initiative involves sharing the European models of top-down leadership commitment to fatality reduction and improved roadway safety with key U.S. leaders. The team’s plan is to provide federal and state leaders with critical facts and information that will motivate a similar leadership commitment in this country.

Growth Opportunity

Meanwhile, Keith encourages other transportation professionals to consider volunteering in future scanning studies.

“I had never considered going on a scan,” says Keith. “When I was asked, my first reaction was that I didn’t have time.” But talking to others who had participated in scans convinced him to go. He’s glad he did because of the opportunities for growth and information exchange it provided.

“It’s well worth the effort,” he says. “I encourage anyone to take advantage of this opportunity.”

For more information on the human factors scan, contact Keith at (573) 751-3692 or keithk@mail.modot.stat.mo.us, or Trentacoste at (202) 493-3260 or michael.trentacoste@fhwa.dot.gov.

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Transportation Performance Measures: Improving Investment Decisions

In 2004, a trans-continental visit yielded a world of information on how other countries use performance measurement to get the most out of their available transportation funding. Connie Yew, co-chair of the U.S. scan team and highway engineer in the FHWA's Office of Corporate Management commented, "Our main focus was to learn about the use of transportation system performance measures to improve investment decision making." A trend toward greater public accountability has led many U.S. highway agencies to adopt performance measures—indicators that provide officials with a sense of whether their decisions are improving transportation system performance.

"There's a keen interest in many states, Minnesota included, in the application of performance measures in decisionmaking," says Randy Halvorson, scan team member and Director of the Minnesota DOT's Program Management Division. "When I got the call to be a member of the scan team, I jumped at the chance."

As a result of its journey to Canada, Australia, New Zealand, and Japan, the team discovered that the impetus for other countries to adopt performance measures was similar to that in the United States. "In every country we visited, the main reason for doing performance management is to have greater accountability and visibility to the public," says Yew.

The team found, though, that the countries use performance measures in the process of making planning and investment decisions to a greater extent than is typical in the United States.

Measuring Safety Performance

In all, the team noted 23 observations on performance measurement that it believes are of interest to the U.S. transportation community. What impressed the team most was the use of performance measures to influence governmental policy and budget determinations in the roadway safety area.

"All of us agreed that the most significant observation we made was on road safety performance measurement," says Yew.

The team learned that highway agencies in the countries it visited use a progression of steps to develop safety programs. Steps include conducting research to determine what's causing problems, benchmarking with other jurisdictions, setting targets for

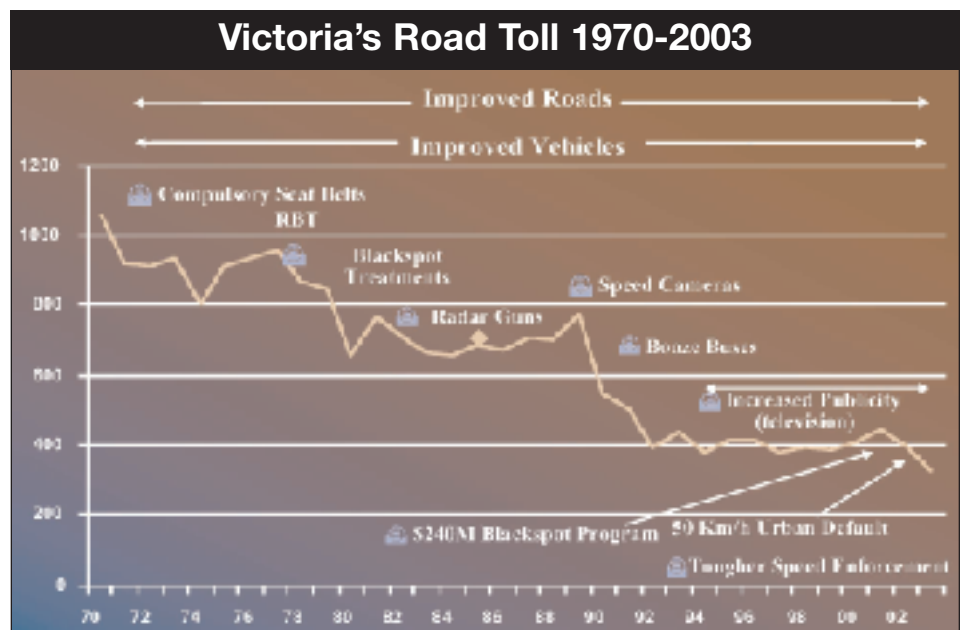
improvement, identifying strategies to achieve the targets, monitoring the effects of the strategies, and feeding the results into future planning efforts.

In the Australian state of Victoria, for example, use of this comprehensive process to develop and monitor safety actions has resulted in a dramatic drop in annual roadway fatalities from more than 1,000 in the early 1970s to less than 400 today.

"When you look at the data, you can see that every time they intercept with some kind of strategy, such as a seat-belt law or speed enforcement, they get a significant drop in fatalities," Yew says.

Over the years, Australian transportation officials have used a variety of enforcement, engineering, and education strategies to reduce fatalities, and coordinated with other organizations, such as law enforcement, on joint safety targets.

"The reason this topic was particularly important to me was that we were in the process of developing our first statewide comprehensive highway safety plan in Minnesota," says Halvorson. "I came back more



Transportation officials in Victoria, Australia, monitor the effectiveness of roadway safety strategies in reducing fatalities.

Credit: VicRoads

ous about safety, you need to mix behavioral and infrastructure strategies like they do in Australia.”

Common Framework

Another key observation the team made was the importance of a common framework for performance measurement. In the countries the team visited, performance measurement efforts are related to a broader set of goals defined by a legislative body or public visioning process.

These goals lead to identification of transportation system-specific performance measures that often are tied to target values to be achieved in the future. Strategies and investment actions are chosen on their effectiveness in achieving desired performance outcomes, as well as on political considerations.

“A performance measure by itself is worthless unless it is connected on the front end to strategic outcomes and on the back end to investment decisions,” Halvorson says.

The team also learned how agencies use performance measurement to educate elected decisionmakers and the public on transportation issues, a process that Halvorson has seen work in Minnesota.

When the Minnesota DOT exceeded a snow- and ice-removal target known as “Return to Bare Pavement,” it had the performance measurement data to show the public why it was reducing its snow- and ice-control budget.

“When you use performance measures, it can change the nature of the public discussion and debate,” Halvorson says.

Leadership Commitment

The team observed that in countries where performance management was most successfully institutionalized within transportation agency operations, top management was committed to the process.

“Top management commitment is essential to getting performance measurement past its infancy and keeping it going over time,” says Yew.

All of the countries visited use performance measures commonly used in the United States, such as road network congestion, safety, mobility, travel time, and trip reliability. Environmental measures also are common, but the scan team noted that agencies find them the most challenging to relate to transportation system performance.

One surprising observation for the team was the lack of measures in other

countries linked to transportation system security, although transportation officials in Queensland and New South Wales said they were considering incorporating security indicators into performance management in the future.

“What we discovered is that security is basically an American issue,” says Halvorson. “They have no security-related performance measures in other countries, so we’re on our own here.”

Lessons for the United States

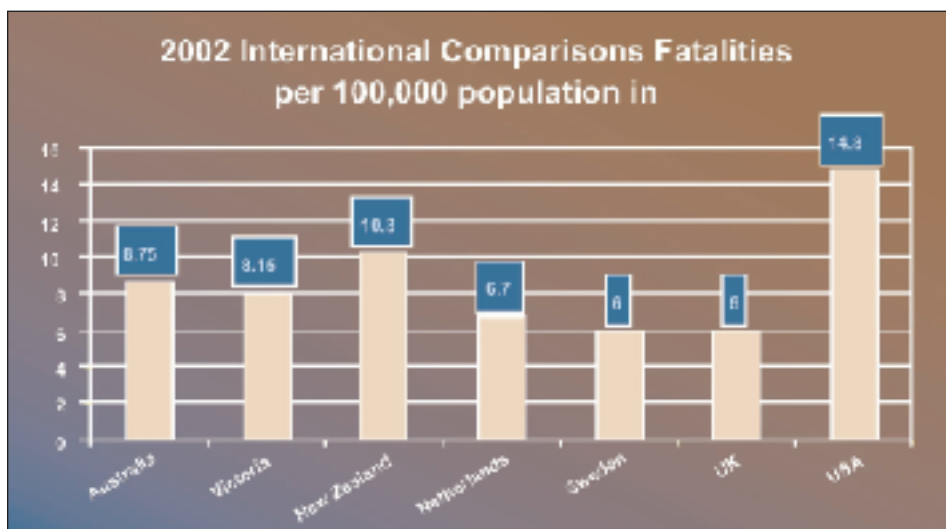
The scanning team lists the following among its top lessons learned from the scanning study:

- Safety is viewed as a strategic use of performance measurement that has resulted in a significant decline in fatalities.
- Meaningful performance measurement is a product of extensive outreach, discussion, and collaboration with partners.
- Performance measurement is most relevant when linked to decisionmaking, especially resource allocation.
- Before-and-after studies should be part of performance management. “In almost all of the countries we visited, once they implemented a strategy, they went back and studied its effect to determine whether they achieved their goal,” says Yew.
- Performance management is an evolving area of opportunity, and although the U.S. transportation industry is advanced in many areas of performance measurement, it still has much to learn.

“There’s still an attitude in our country that if we didn’t invent it here, it can’t be any good,” Halvorson says. “But there’s so much we can learn in a lot of different areas from what other countries are doing. That’s why I find international scans so valuable.”

Scan Benefits

The team developed recommendations on activities to enable the U.S. transportation community to benefit from what it learned during the scan.



The countries the scanning team visited compared their safety performance measures with those in other jurisdictions, and researched the reasons for any significant differences.
Credit: VicRoads

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Transportation Performance Measures

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They include developing and disseminating a document on how Australian transportation and safety agencies use performance measures to implement roadway safety programs. The goal of the report is to help the U.S. transportation industry and safety leadership explain to the public and elected officials the effectiveness of enforcement tactics on driver behavior.

Other strategies call for initiating a data exchange and warehousing consortium for benchmarking performance among participating states, conducting research on the monetary value of investing in different performance measure categories, and developing a training course on performance measurement for transportation professionals.

For more information on the scan, contact the co-chairs: Douglas McDonald, (360) 705-7054, macdond@wsdot.wa.gov; and Connie Yew, (202) 366-1078, connie.yew@fhwa.dot.gov.

BRIDGE PREFAB SCAN TECHNOLOGY HELPS FLDOT BEAT HURRICANE IVAN

From William Nickas, FLDOT:

“Yes, Hurricane Ivan did a real job on Florida, including a downed section of I-10. We just used the self-propelled modular transporters (SPMT) technology to lift and shift and then to lift and barge to a crane that lifted a 265 ton span over a downed section of I-10. As a result of the scan, I knew how and what was needed to get the job done. Also it was scan team member Harry Capers' invitation to NJDOT that introduced me to the firm that provided the SPMT!!”

For more on the Bridge Prefab Scan, see TranScan Number 8, Fall 2004 or visit FHWA's Web site www.fhwa.dot.gov/bridge/prefab/pbesscan.htm

Implementing Scan Findings Intelligently

“E”uropeans have over a decade of experience in intelligent compaction for soils and asphalt.

Once our scan team saw it, we knew we wanted it in the United States. It was a matter of making our case with the DOTs and industry. And this forum is a great start in doing just that,” said Chris Dumas of the FHWA at the recent Intelligent Compaction (IC) Strategic Forum.

Dumas co-chaired the Bridge and Embankment scan that visited several countries in Europe in search of ways to improve bridge and soils construction practices. The scan team identified intelligent compaction as one of the leading technologies for implementation in the United States.

This led to the IC Strategic Forum at the National Center for Asphalt Technology (NCAT) at Auburn University on December 14-15, 2004. More than 40 U.S. engineers, contractors, and roller manufacturers, including 11 representatives from state DOTs, met to discuss the emerging technology for both soils and asphalt. The forum featured two demonstrations of the equipment being used on Alabama DOT projects.

The United States is really starting from scratch in developing a market for IC, Bob Horan, forum coordinator for the FHWA, told forum attendees. “We need to get equipment to the United States, build demonstration sites, have roundtable discussions on the technology, and develop a comprehensive evaluation plan.”

Defining IC

What is intelligent compaction? While the definition is still evolving, it's the roller, not the operator, that collects and processes rolling operation data, makes decisions from this data, adjusts the energy input accordingly, and

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University of Texas at Austin

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FHWA

records the results.

The operator's job? To roll the correct pattern and look at the screen to see if compaction has been obtained.

IC basically adapts a vibratory roller by automatically controlling the energy of a roller's drum. Each roller manufacturer's system is slightly different, but they all react to changes in the stiffness of the soil and the asphalt.

After the IC Strategic Forum's opening remarks, attendees went into the field to witness real-world applications. The first demonstration was by the Ammann Group's single drum roller with ACE (Ammann Compaction Expert) for soils/aggregate base compaction. The second was Bomag's tandem drum roller with Asphalt Manager for asphalt compaction.

"I was impressed with the ease of operation and the screen the operator uses to determine the compaction effort," said Larry Michael, Maryland State Highway Administration's hot mix asphalt team leader. "I think it would be relatively easy to implement. I would really like a roller in Maryland for next summer's work."

After the demonstrations, attendees heard detailed presentations from Bomag and Ammann, along with Dynapac, Sakai, and Caterpillar. All are in the process of introducing some form of IC to American engineers and contractors.

Technology Benefits

In addition to recording the rolling operation, the new technology offers contractors and DOTs ease in training new operators, adjusting to new asphalt mixes, and shortening the time needed to compact soils and asphalt.

"There is no doubt that the implementation of intelligent compaction will help to improve the overall compaction and construction process," said Chris Connolly, Bomag Americas. "Providing documentation to contractors as proof that they have successfully constructed their lift of material is invaluable."

Is the technology difficult to work with? "Equipment manufacturers are prepared to help the contractor to



The Amman Compaction Expert (ACE) for intelligent soil compaction.



The roller operator's console with O.K. zone clearly marked.

implement this technology," said Connolly. "The benefits empower the contractor to reach higher quality goals."

Was the forum a success? Yes, said Roland Angeregg, Ammann Group, who conducted the soils demonstration effort.

"I have done approximately 10 U.S. demonstrations of IC for soils," he said. "And this forum was by far the best way to show the equipment's capabilities. It was a great opportunity to meet so many knowledgeable people in the

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Implementing Scan Findings Intelligently *continued from page 9*

field of compaction, especially intelligent compaction. We look forward to advancing this technology and realizing the many benefits of IC. It is encouraging to see the various agencies coming together in search of a common goal."

Future Plans

The future looks positive for bringing European technology to the United States. And the timing is just right with the introduction of the Mechanistic-Empirical Pavement Design Guide that focuses on stiffness requirements for pavement sections.

"We spent a lot of time on Superpave mixes over the last 15 years," noted John D'Angelo of FHWA. "We really need to focus our future efforts on improving the construction operations. IC is really promising and we look to help it evolve."

To help the effort to introduce and study IC technology in the United States, FHWA and state DOTs may form an Intelligent Compaction Technical Working Group (TWG).

The TWG would be made up of members from all aspects of the U.S. highway industry, including equipment manufacturers, contractors, materials suppliers, and state and FHWA personnel. The TWG concept has been used successfully in the past to help implement other concepts, including Superpave.

Forum attendees agreed to run organized field evaluations of IC technology next summer, possibly through a pooled fund program.

DOT representatives from North Carolina, Minnesota, Wisconsin, and Louisiana would like to cooperate on projects that build full embankments and pavement sections. NCAT is developing a work plan for the FHWA that will assess the use of IC on thin hot mix overlays which uses over 70% of the hot mix production in the country.



Bomag Asphalt Manager for hot mix intelligent compaction.

Equipment Availability

The major hurdle is equipment availability. All of the manufacturers pledge more equipment availability in summer 2005 for DOT and contractor evaluations.

"From Caterpillar's viewpoint, it's really a chicken and egg issue," noted Paul Corcoran. "We develop the products, but will the customer buy it? And the customer says they will buy it—if you make it. This meeting clearly will help us in our decision to bring equipment to market."

Another trip to Europe is in the works as well. The International Technology Scanning Program sponsored by FHWA, AASHTO, and TRB/NCHRP has partially funded a return trip to obtain more detailed information from government agencies and to visit the roller manufacturers' testing facilities.

"You know there are no limits to what we can learn from around the world," said Jay Winford, a Louisiana road and bridge contractor. "This is really the way to identify and move technology. I have never been on a scan, but I can really see the benefits. How can I sign up?"

For more information on the forum

and copies of the presentations, contact Bob Horan of Salut, Inc., at bhoran@salutinc.com.

SCAN BENEFIT SNAPSHOT

Soil Nailing

Soil nailing involves strengthening an excavated slope by installing closely spaced steel bars in the slope as construction proceeds from the top down. This process creates a soil mass stable enough to retain the ground behind it safely and keep it from collapsing. It allows construction of steeper walls in smaller areas, saving right-of-way procurement and construction costs as well as time. More than 500 soil nail walls have been completed in the United States with an estimated \$100 million savings in construction costs alone.

International Conference on New Methodologies and Modeling Tools for Roads

Note: Under NCHRP Project 20-36, staff members of state DOTs are provided financial support to participate in international activities. This report was developed by Colorado DOT's Jake Kononov.

Organized by the Italian Society of Highway Infrastructure (SIIV), the International Conference on New Methodologies and Modeling Tools for Roads was held in Florence, Italy, in October 2004. The intent of the conference was to examine new strategies and analytical tools for the design and management of transportation facilities on regional, state, and national levels.

The conference focused on managing roads and traffic, safety restraint system, pavements, safety analysis, simulation tools, tire-pavement interaction, and road safety intervention. Some of the findings in the areas of road safety, traffic operations, and highway design may be relevant to the U.S. design practice as well as research efforts.

Highway Design Standards

Evaluation of design consistency in the United States is generally less institutionalized at state DOT levels than in Europe. The Italian Road Design Standard requires an evaluation of design consistency through the evaluation of a design speed profile.

To address the discrepancy between the design speed and operating speed, an operating speed prediction model for two-lane rural roads was developed by Crisman et al. The model effectively estimates operating speeds on curves and tangents as a function of the geometric characteristics of highway alignments. The model is used in Europe with good results to evaluate design consistency of existing and proposed highways.

Interaction between horizontal and vertical alignments is largely addressed by AASHTO through qualitative guidance. However, a paper by Roos and Zimmermann offered a methodology to analyze this interaction quantitatively by focusing on changes in sight distance, partial road disappearance from view, sight distortion, sight quality, and the sight on changes in curvature.

These parameters, calculated from perspective image data by means of software, are represented by the length-reference diagram. This methodology is expected to assist practicing engineers in the evaluation of spatial aspects of alignments in the design process.

Road Safety

Safety on horizontal curves is influenced by the approach speeds. Stamataidis and Vest presented signing and striping strategy intended to reduce approach speed. Their results indicate that the most promising treatments in reducing operating speeds are flashing lights and transverse lines. These treatments typically showed speed reductions ranging from 5% to 10%.

An analysis of the over the 85th percentile speeds for these treatments showed also significant reductions ranging from 12% to 18%. This indicates that there was a greater impact for the higher operating speeds, which could be considered more important than the smaller overall reductions noted.

Transportation engineers have dealt successfully over the years with the question of highway capacity. However, the relationships among traffic volume, physical characteristics of roads, and safety is not well understood or known, at least not with the kind of precision customary in other

engineering disciplines.

This relationship is reflected by the safety performance functions calibrated for various classes of roads. A safety performance function should provide a realistic estimate of expected accident frequency per unit of traffic exposure over a unit of time for various types of transportation facilities.

Development of such estimates is a critical component in the explicit consideration of safety in highway planning and design. Indeed, if expectations are not clearly defined or well understood, then the question becomes: how is it possible to identify a deviation from the norm and then do something about it?

Kononov and Allery introduced the concept of level of service of safety (LOSS) in the framework of safety performance function and addressed the issue of problem diagnostics. LOSS reflects how the roadway segment is performing in regard to its expected accident frequency at a specific level of traffic volume. The nature of the problem, if it is present, is determined through diagnostic examination using direct diagnostics and pattern recognition techniques.

Traffic safety of roundabouts is of great interest, as this design configuration becomes more and more popular in the United States. Grana and Giuffrè identified possible correlations between crash rates and specific design characteristics of roundabouts based on the analysis of 34 roundabouts.

"Participation in this conference allowed me to learn about state-of-the-art developments in highway design, accident analysis, and traffic engineering from other professionals from around the world," Kononov stated. "Our work at Colorado DOT allows me to apply the latest methodologies in engineering of safety to numerous projects currently in various stages of planning and design."

Full conference proceedings are available at www.siiv2004.unifi.it. For more information, contact Jake Kononov, Colorado DOT, 303-757-9937, Jake.Kononov@dot.state.co.us.

SCAN FACTOIDS

Did you know?

- More than 750 public- and private-sector professionals have been involved in 65 scans since 1991 and have visited nearly 30 countries.
- Six federal agencies, 43 DOTs and 35 associations have sent representatives.
- The most visited country is Germany, followed by the United Kingdom and The Netherlands.

We encourage your comments on the technologies discussed in this issue of *TranScan*. Please send them to:

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CALL FOR SCAN PROPOSALS—2006-2007 CYCLE — SECOND CALL!!

FHWA and AASHTO are accepting scan topic proposals for the Fiscal Year 2006-2007 cycle of the Joint AASHTO/FHWA International Technology Scanning Program, cosponsored by NCHRP.

How to Submit Ideas

FHWA. Scan topic proposals may be submitted by FHWA program offices and Resource Centers with appropriate endorsements from the various program officers and associate administrators. Cross-cutting scans should be endorsed by all appropriate offices. Contact Hana Maier, FHWA's Office of International Programs, at (202) 366-0111 or hana.maier@fhwa.dot.gov for more information.

AASHTO. Scan topic proposals may be submitted by any AASHTO committee or subcommittee dealing with road transportation with appropriate endorsements by the relevant committee or subcommittee chairman. Again, cross-cutting scan should be endorsed by all appropriate offices. Contact Ken Kobersky at (202) 624-5254 or kenke@aaashto.org for more information.

NCHRP Project Panel 20-36. Other non-AASHTO or FHWA scan topic proposals (such as those from transportation industry associations or academia) may be submitted to NCHRP Project Panel 20-36. Project Panel 20-36 will evaluate such proposals and forward promising ones to the relevant AASHTO committee for consideration in making scan proposals. Contact Martine Micozzi, NCHRP Senior Program Officer, at (202) 334-3972 or mmicozzi@nas.edu.

Due Date:

The deadline for submitting scan proposals is **March 15, 2005**.