

Alaskan Transportation



Fall 2005

Volume 30, Number 3

In this issue . . .

- Roundabout Design course
- Alaska Summer Research Academy

Planning, Design, and Field Notes

- Nanotechnology Will Change Our Roads
- USLIMITS: Expert Speed Zoning Advisor

FHWA Priority Market-Ready Technologies and Innovations

- Highway Economic Requirements System, State Version
- Accelerated Construction Technology Transfer

Training

- Training and Meeting Calendar

Alaska Transportation History

- Sternwheeler Nenana memories

DOT Statewide Research & Technology Transfer Local Technical Assistance Program

Composition. Composition. Composition.

Roundabout Design Course



(continued on page 2)

Alaskan design engineers were reminded of this mantra several times during the recent Roundabout Design course in Anchorage and Fairbanks. Barry Crown, a world renowned expert on roundabouts and roundabout design, wants to ensure that U.S. designers think about composition and use a holistic approach when doing roundabout design. Barry states, "You can't just use a design guide and expect to come up with a well-designed roundabout. A design guide is just that: a guide. They are about the parts not the whole. Remember, Frankenstein was made up of good parts!"

Bridge Building at the Academy

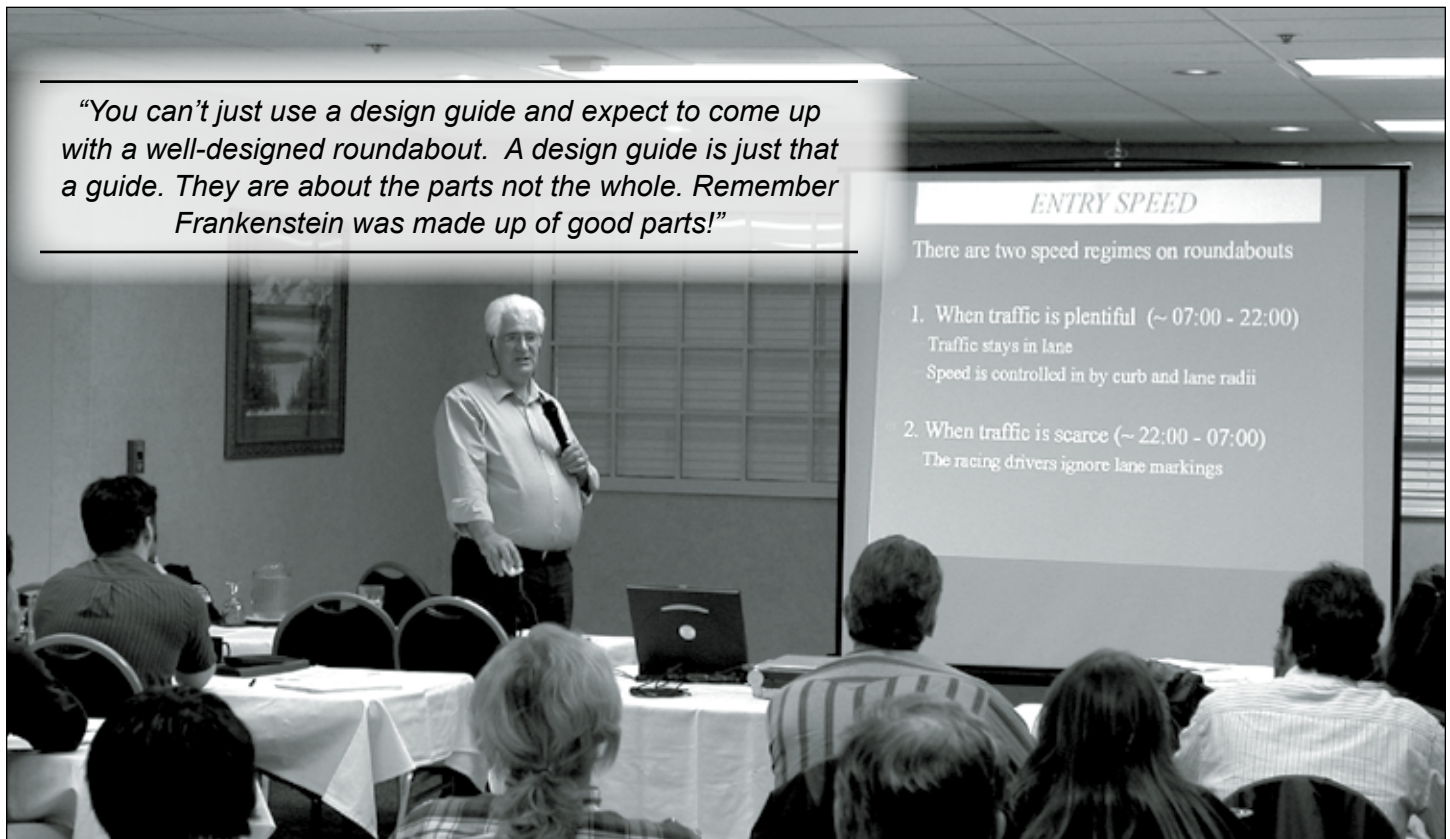
It was hot; so hot even our guest student from South Carolina got sun-burned. Five students from the Alaska Summer Research Academy (ASRA) braved the hot sun to work for two weeks at the University of Alaska Fairbanks, Georgeson Botanical Gardens. They were part of the civil engineering section of ASRA, chartered with the task of making improvements

(continued on page 4)



ASRA civil engineering student Amy Stepp (right) demonstrates to ASRA coordinator Patty Fisher, how to level and adjust a survey prism. Amy worked alongside other students to establish the bridge alignment and construct a pedestrian bridge.

"You can't just use a design guide and expect to come up with a well-designed roundabout. A design guide is just that a guide. They are about the parts not the whole. Remember Frankenstein was made up of good parts!"



Lecture was a part of Barry Crown's presentation, timed nicely with anecdotes of real-life roundabout issues and a chance to work hands-on doing design modification.

Why Roundabouts?

Roundabouts are relatively new to the U.S. and even newer to Alaska. In the UK they've been using roundabouts for many years and have literally thousands of them, ranging from small rural single-lane to large multi-lane freeway interchanges. Barry outlined some roundabout pros and cons:

Pros:

- Slow traffic—traffic calming
- Safest type of intersection—fewer conflict points
- Very high capacity—up to 8,000 vph
- Suitable for low-flow intersections too
- Simple to use—yield to left
- Low maintenance cost
- Aesthetic—central island can be civic feature
- Easily modifiable if circumstances change

Cons:

- Higher potential for design mistakes
- Very difficult to design for high flows
- Larger footprint increases ROW concerns

Sometimes signals are a better option, but it's difficult to generalize because it depends on other factors such as a cost/benefit analysis. Also, intersections with low turning flows would be more appropriate for a signal.



Barry Crown illustrates how small geometric changes can have a large impact on capacity. Barry is an advocate of hands-on drawing during the design process.

Geometry and Capacity

Barry and other UK designers have discovered that making minor changes to existing roundabouts can have a very large impact on traffic capacity. Barry states, "Capacity is so strongly related to geometry that it's counterintuitive—it's hard to believe." This is supported by empirical data on numerous UK roundabouts where small changes in the geometry led to large increases in the roundabout's capacity. Roundabout designers now understand that capacity and geometry are closely linked. Again this stresses the importance of composition in roundabout design.

Rodel Design Software

Participants also got to try their hand at doing some designing with the use of Rodel software. When Barry Crown developed his Rodel design software, he used empirical data from UK roundabouts. Rodel software is an empirical tool that is very sensitive to geometry and works well to predict capacity with geometric change.

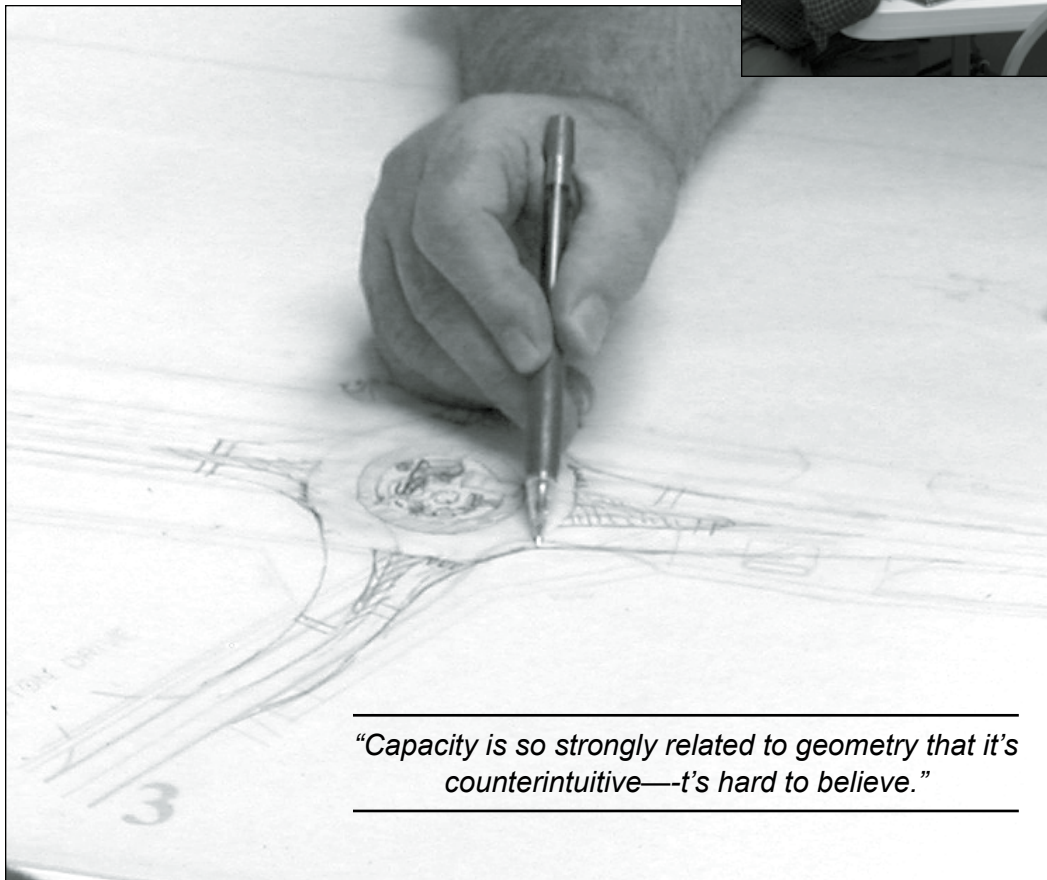
The Future of U.S. Roundabouts?

The U.S. is relatively new to roundabouts and many states departments of transportation are understandably cautious. There is a possibility of 50,000 roundabouts in the next 15 years. The cost? About 15 to 20 billion dollars. The cost of getting it wrong is even higher. Barry suggests the U.S. should use the best methods available and seek the help of genuine experts. Not him, however; he says he's retiring!



Designers worked in teams to practice making modifications to roundabout designs with the assistance of Rodel software.

Several participants reported the hands-on activity really brought the training alive and contributed to its being the best design course they'd ever attended.



"Capacity is so strongly related to geometry that it's counterintuitive—it's hard to believe."



to the garden's pedestrian path and interactive stream experience.

Civil engineering professor and returning ASRA instructor Dr. Leroy Hulsey approached garden staff over the winter, looking for a project with engineering aspects. Working with Dave Waldo of the ADOT&PF, he established a plan for an experience to include hands-on surveying and construction, interspersed with short field trips and presentations.

The Survey

Scottie Sexton and Larry Durfee of ADOT&PF, helped kick off the project by helping the group with a real survey task.

They began their job from Chena Westbase, a known elevation near the Botanical Gardens. Using a level and survey rod, they took elevations from the marker back up to the gardens—a little over a quarter of a mile. Once they established their elevation near the bridge site they took elevations back down the hill to the marker to check their work. They were within three thousandths of a foot, well within professional specifications for vertical control points.

Although the need for an elevation wasn't crucial for the current project, the group was able to establish an elevation for future construction. Also, the process is identical to what occurs on big construction jobs anywhere in the country.

The group then worked to plot the bridge alignment and to establish where it rested in relation to other attractions and structures. The team used a total station and reflective prisms to turn corners and establish curves. They did a remarkable job grasping the concept and had several opportunities to use the associated math.



Thorton DePriest sets up his instrument (a level) as part of the survey task for the ASRA 2005 civil engineering project at the UAF Georgeson Botanical Gardens. Inset: Chena Westbase survey monument



Austin Henry consults his field notes when a discrepancy was found on the elevation job. Scottie Sexton, left, and Larry Durfee, both of AK DOT, help Austin backtrack. Turns out it was an error in arithmetic, not in the shoot; first-hand experience for the ASRA group on the importance of good field notes.



Everett Jorgenson takes careful notes as Thorton DePriest calls out coordinates while using the "total station" for turning corners to ensure the bridge approach is correct.



The survey crew: Back row from left: Erik Olson, Everett Jorgenson, Bobby Burgess (UAF), Austin Henry, Larry Durfee (DOT), Thorton DePriest. Front: Amy Stepp, and Scottie Sexton(DOT)

"It's just like a real job, said Scottie. "They blew turning a corner and we got off by two feet. It happens, but these kids are really getting the process" They were able to make the necessary adjustments to get back on track.

Setting the Bridge Abutments

The crew then set up construction stakes and calculated cut and fill for the abutment pads. The level was used again while digging the abutment on the high bank and building up the pad on the low bank. They used D1 as fill on both abutments and compacted before setting the large 12x12 timbers for the abutments.

The group wasn't afraid of getting their hands dirty. Shovels, picks, and a hand compacting tools were used to dig, backfill, and compact. The warm weather made this task a chore and the kids went through a cooler of Gatorade.

(continued)



Grant Matheke, of the UAF Georgeson Botanical Gardens, gave each of the participants a chance to operate a small John Deere excavator to help dig a waterline trench. Operating is Thorton DePriest, the first student to help with the dig. Don't be fooled. The crew dug the abutment foundations by hand.

After the site survey and construction staking, the crew dug and backfilled for the bridge abutments. D1 was used as fill and was carefully compacted to avoid settling. Gatorade was popular during this afternoon.



Dr. Leroy Hulsey looks on as the second abutment is set into place. The group used the level and rod to ensure a well-placed abutment. A four-foot hand level was used to check work and to level the abutment.

Bridge Assembly

Putting it all together was a blast. The group got to see their efforts turn into an actual structure. The bridge beams were prefabricated by Georgeson Botanical Garden staff. The sanding, staining, placement, and assembly was the task of the ASRA civil engineer cohort.

A special thanks to Jan Hanscom and the rest of the staff at the UAF Georgeson Botanical Garden for their exceptional support of ASRA and their overall vision of creating a remarkable site for the community.

Information about the garden can be found at: www.uaf.edu/snras/gbg/



The bridge starts to take shape as the laminated beams are set in place and the layout is checked.

From left: Everett Jorgenson, Eric Olson, and Amy Stepp work to fasten the bridge deck with a screw gun using coated deck screws. They used spacers and took measurements as they progressed to ensure a uniform fit.



The bridge crew. Back: Dr. Leroy Hulsey (UAF), Amy Stepp, Bobby Burgess (UAF), Austin Henry, Everett Jorgenson. Front: Erik Olson, Grant Matheke (UAF), and Thorton DePriest. Not shown because he was the photographer: Dave Waldo.



Nanotechnology Will Change Our Roads

By Bob Brooks, Derived from the article "Small Science Will Bring Big Changes to Roads" by Tom Kuennen Better Roads, July 2004

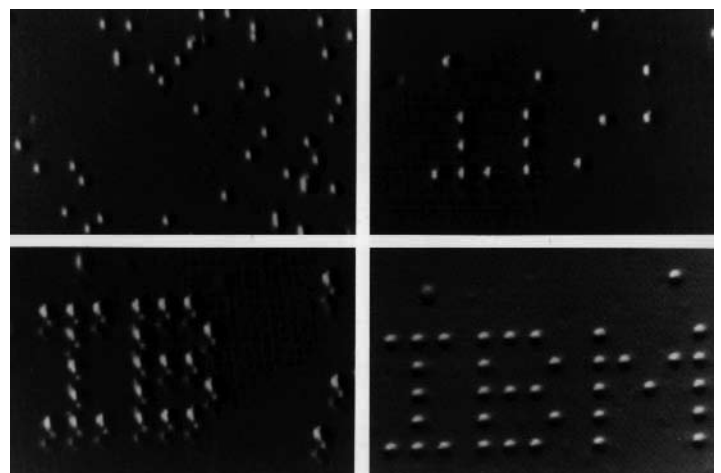
After many years of progress in other industrial sectors, nanotechnology is now finally making its way into the transportation industry. This progression into our industry promises to bring about revolutionary and profound changes to the materials and construction practices with which we are all familiar. Nanotechnology occurs on a truly miniature scale, in the world of atoms and molecules. In scientific terms, that scale is one billionth of a meter, called a nanometer. At this scale, atoms and molecules exhibit very different properties than those we are familiar with in our everyday world. Nanotechnology marks that boundary line between our familiar world and the world of quantum mechanics.

Research into nanotechnology will not only result in the miniaturization of our machines but will also lead to a much better understanding of the physical interactions between common construction materials like aggregates and asphalt binder or Portland cement. Through research being conducted by the Federal Highway Administration's Advanced Infrastructure Research program, the feasibility of Cyberliths or smart aggregates being used as wireless sensors embedded in concrete or soil is being studied. In addition, common problems like alkali-silica reactivity in concrete are being investigated, and even a better understanding of the hydration process of cement grains is emerging. Additional research being done in the private sector is looking at autonomic (spontaneous) healing in structural polymers. This type of research could someday lead to guardrail that heals itself after being hit or concrete or asphalt pavement that heals its own cracking. Microsensors, also known as MEMS (Micro-Electro-Mechanical Systems), are already being used on the Golden Gate Bridge and are providing real-time monitoring of stress at any point along with its impact on the bridge as a whole.

These microsensors may in the future be reduced to the size of a dust particle, Smart Dust, and be used to coat an entire structure to provide a smart sensor network. High-performance, high-strength steels have already been developed through the use of nanotechnology and more are on the way. This technology has the potential to solve even mundane problems like dirty signs. Coatings that mimic the properties of the lotus leaf—to which nothing sticks—may well lead to

signs that shed dirt and never need washing, freeing up time for more important activities. "A future in which cracked bridges and potholes repair on their own, guardrails realign automatically after impact, bridges adjust their shapes to control movement caused by winds, and metal structures self-clean to avoid corrosion are among the advances in highway technology under forecast by scientists," the FHWA reported in the summer of 2003. The federal government is taking a lead role in this effort with the passage of the 21st Century Nanotechnology Research and Development Act. "Nanotechnology is going to change America on a scale equal to, if not greater than, the computer revolution," said Senator Ron Wyden (D-Oregon). Nanotechnology is now starting to make its impact on construction materials, especially porous materials like concrete and hot mix asphalt. Much research is being done on concrete, with the goal of better understanding the hydration process to produce stronger and more durable concrete mixes. The addition of nanoscale silica fume, an industrial byproduct of glass manufacturing, has proven to be a big improvement in durability of concrete structures exposed to deicing salts.

Another area of study involves controlling alkali-silicate reaction (ASR) in concrete mixes. This occurs between alkalis from cement and a reactive form of silica from some aggregates, which can damage



Smallest Writing. This famous set of images, now about 10 years old, helped prove to the world that people indeed can move atoms. The series shows how 35 atoms were moved to form a famous logo. Photo: IBM Research

Planning, Design, and Field Notes

2005

concrete. One goal of this research is to develop a test for ASR potential in aggregates.

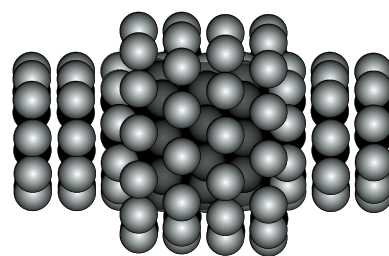
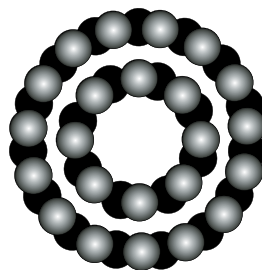
Self-healing materials are another area of research that holds great promise. This essentially involves the creation of materials that are able to rejoin themselves after being cut or broken. Structural polymeric materials with the ability to autonomically heal cracks have already been developed.

This is accomplished by incorporating a micro-encapsulated healing agent and a catalytic chemical trigger in an epoxy matrix. As a crack develops, the embedded microcapsules are ruptured, releasing the healing agent into the crack plane through capillary action. Upon contact with the embedded catalyst polymerization, the joining together in a chain-like structure, occurs and the crack faces are bonded. Other methods of accomplishing the same sealing of cracks are under investigation as well. These methods could be used in HMA as well as concrete.

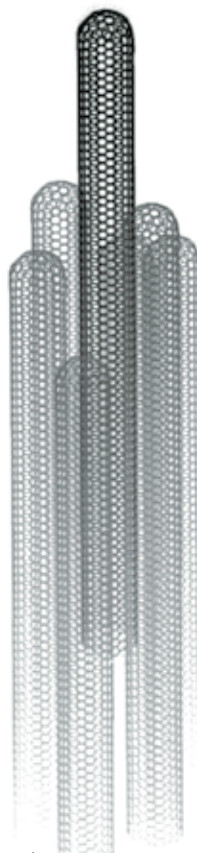
Plastic coatings have been developed that mimic the "lotus effect." The lotus leaf, or water lily leaf, has a unique property that repels water and dirt on its surface. On current no-stick products, particles of dirt are just moved around by moving water. But in the "lotus effect," surface dirt and grime are collected by water and are rinsed off. The potential to eliminate sign washing is obvious. This technology has already made its way into an exterior house paint product.

Nanotechnology is also being used to develop new low-carbon high performance steels (HPS) that have improved strength and weldability. A new high-performance stainless steel has been developed that can produce components that are thinner and lighter than those made from aluminum and titanium. This new stainless steel is currently being used for medical equipment.

Another area of FHWA-funded research are the so-called "smart aggregates." These are miniscule sensors that can be mixed into HMA or concrete and can perform a variety of tasks. A data reader mounted on a car or truck passes over the sensor and powers it and collects the sensor data onto a PC. These "smart aggregates" are designed to withstand the harsh environment of being embedded in a concrete or asphalt mix and have a lifespan of 50 years. In HMA or concrete, "smart aggregates" can monitor and report on processes that contribute to deterioration and cracking. On structures, they might monitor vibrations and loads that can weaken a structure.



Above: only several atoms wide, a simple sleeve bearing is proving to be a difficult challenge for nanotechnology. One of the biggest problems is an old one, friction.



left: Nanotubes. All-carbon nanotubes (here with diameters of 1.2 nanometers) are promising for applications ranging from new structural materials that are stronger and lighter weight to electronic components for new supercomputers to drug delivery systems.

These sensors can also be used to monitor traffic conditions and report on congestion or changing environmental conditions such as fog and ice formation. The Golden Gate Bridge has been fitted with an array of 200 small sensors, each with an accelerometer that measures movement from sources such as traffic, wind, or seismic loads. By correlating all the sensor readings, a three-dimensional picture is created.

Carrying this approach one step further, the Department of Defense is working on a sensor system that would be about the size of a printed period. These sensors could be distributed over a potential battlefield to give a three- or four-dimensional real-time visualization of the battlefield conditions. In the near and not-so-near future, nanotechnology has the potential to change the way we do business in ways that cannot even be imagined now.



USLIMITS: Expert Speed Zoning Advisor

From *Illinois Interchange*, summer 2005, by Davey Warren, Federal Highway Administration



USLIMITS is a web-based expert advisor system designed to help practitioners determine appropriate speed limits in speed zones. It turns the subjective decisionmaking process of current speed zon-

ing practice into an user friendly, logical, and objective approach for setting credible, safe, and consistent speed limits. The benefits of USLIMITS are:

- increased likelihood of similar roads zoned with similar speed limits
- appropriate speed limits for road and traffic characteristics
- consistent speed limits within states and between states
- increased acceptance and compliance with speed limits by motorists
- reduced spread in speeds leading to reduction in accidents
- tool for educating the public and responding to concerns
- supports integrity of enforcement
- all users benefit immediately from update

USLIMITS is based on other expert speed zone advisors, collectively known as XLIMITS, developed for many of the Australian state road authorities.

USLIMITS is the next generation in this series, specifically developed to be used over the Internet. The logic used in these past versions has been streamlined and revised to include elements of speed limit setting philosophy used in the United States, such as posting in 5 mi/hr multiples.

Data Input and Output

USLIMITS calculates the appropriate speed limit for a section of road by considering the following information input by the practitioner:

- density of surrounding development (e.g., high density, low density, hamlet, or rural), desired levels;
- frequency of roadside access (e.g., number of residential driveways, commercial, industrial, shop-

ping, and special activity properties, and the number and type of intersecting roads);

- road function (e.g., traffic movement vs. access to abutting properties);
- road characteristics (e.g., paved width, divided or undivided, lane width and number of lanes, sight restrictions);
- freeway conditions and important high-speed road characteristics (e.g. interchange spacing, annual average daily traffic, shoulders);
- existing vehicle operating speeds;
- adjoining speed limits; and
- any special conditions that may exist on the road section (e.g., adverse alignment, pedestrian and roadside activities, high crash rates etc.).

The output includes a recommended speed and concerns that might require further investigation.

USLIMITS is currently in beta testing. The only requirements to run USLIMITS are a computer with a web browser and access to the Internet. To use the full functionality of USLIMITS, including the capability to save and revise projects, a username and password is required. However, anyone can try USLIMITS by entering "guest" as the username and password. Guests cannot save projects or view the more detailed speed zoning report.

For More Information

For additional information about this effort or to set up an account to access USLIMITS, contact:

Davey Warren

FHWA

Phone: 202-366-4668

Email: davey.warren@fhwa.dot.gov

USLIMITS is the intellectual property of ARRB Transport Research.

For more information about developing computer-based expert systems for speed limit setting, contact:

Michael Tziotos

ARRB Transport Research

AUSTRALIA

Phone: 011+61 39881 1555

Email: info@arrb.com.au.webapplication

FHWA Priority Market-Ready Technologies and Innovations 2005

Highway Economic Requirements System, State Version

Problem: Transportation agencies need planning tools that help contain improvement costs while enhancing system performance

In the past, transportation agencies have had to rely on engineering applications for long-range planning and programming. However, many agencies are beginning to focus on system performance rather than simply on dollars spent or miles improved. This transportation asset management approach has created a demand for planning tools that incorporate economic factors, especially user benefits and costs, in addition to traditional engineering considerations. Because existing engineering software packages were not designed specifically for managing transportation assets, they did not adequately address these agencies' changing needs.

To address this problem, the Federal Highway Administration (FHWA) developed the Highway Economic Requirements System, State Version (HERS-ST) from the national-level HERS program that FHWA has used since the early 1990s.

Solution: HERS uses engineering and economics to improve system performance

The concept of adapting the national-level HERS model for state use began when the State of Oregon recognized that HERS had great potential for state-

wide planning and created a version of HERS to meet their needs. FHWA then launched a HERS-ST pilot program to gauge state interest. The response was very positive—14 states are using HERS-ST.

What is HERS-ST?

HERS-ST is a user-friendly Microsoft Windows application that helps transportation agencies plan and schedule highway work and determine future highway system needs. This software uses engineering principles to simulate future highway conditions and performance levels and identify deficiencies. The program then applies economic criteria to select the most cost-effective mix of improvements for systemwide implementation.

How Does it Work?

HERS-ST accepts highway-section records input in the Highway Performance Monitoring System format. For each highway section, the model predicts future condition and capacity deficiencies, identifies alternative improvements to correct each deficiency, and determines a benefit-cost ratio for each potential improvement. To calculate benefits, the analysis considers the value of travel time, safety, vehicle operating costs, emissions, and highway agency costs. The model identifies the most economically attractive improvement for each section and then determines the improvements to be implemented by comparing the benefit-cost ratios. HERS-ST can optimize highway investment, given funding constraints or performance objectives specified by the analyst. The software allows users to view the analysis output spatially in a built-in geographic information system (GIS) view. HERS-ST users also can create customized charts and reports.

Successful Applications: Quantifying the Impact of Highway Investments

HERS-ST can help a state maximize the return on its highway investments. Transportation agencies can

Putting It in Perspective

Transportation agencies need resources for:

- Long-range planning
- "What if" analyses
- Governmental Accounting Standards Board (GASB) 34 compliance
- Congestion management
- Needs assessment
- Data management
- Legislative decision support

FHWA Priority Market-Ready Technologies and Innovations 2005

use HERS-ST to estimate the impact of investment strategies on future system performance. HERS-ST will provide decisionmakers with information about the impacts of current and future highway improvements on agencies, highway users, and the environment.

In 2003, FHWA provided free on-site briefings and workshops on HERS-ST for nine States. In 2004, this on-site assistance will be expanded to include implementation support for states that need help to set up and run HERS-ST. FHWA can provide help with assembling the program input data, adjusting the software's various parameters and controls, understanding the output generated, and creating customized reports.

Benefits

- Improves system performance
- Enhances customer satisfaction
- Combines engineering and economics to maximize return on investment

Additional Resources

FHWA will release a new version of the software in January 2004, along with a new user's guide and technical report. To learn more about HERS-ST, visit



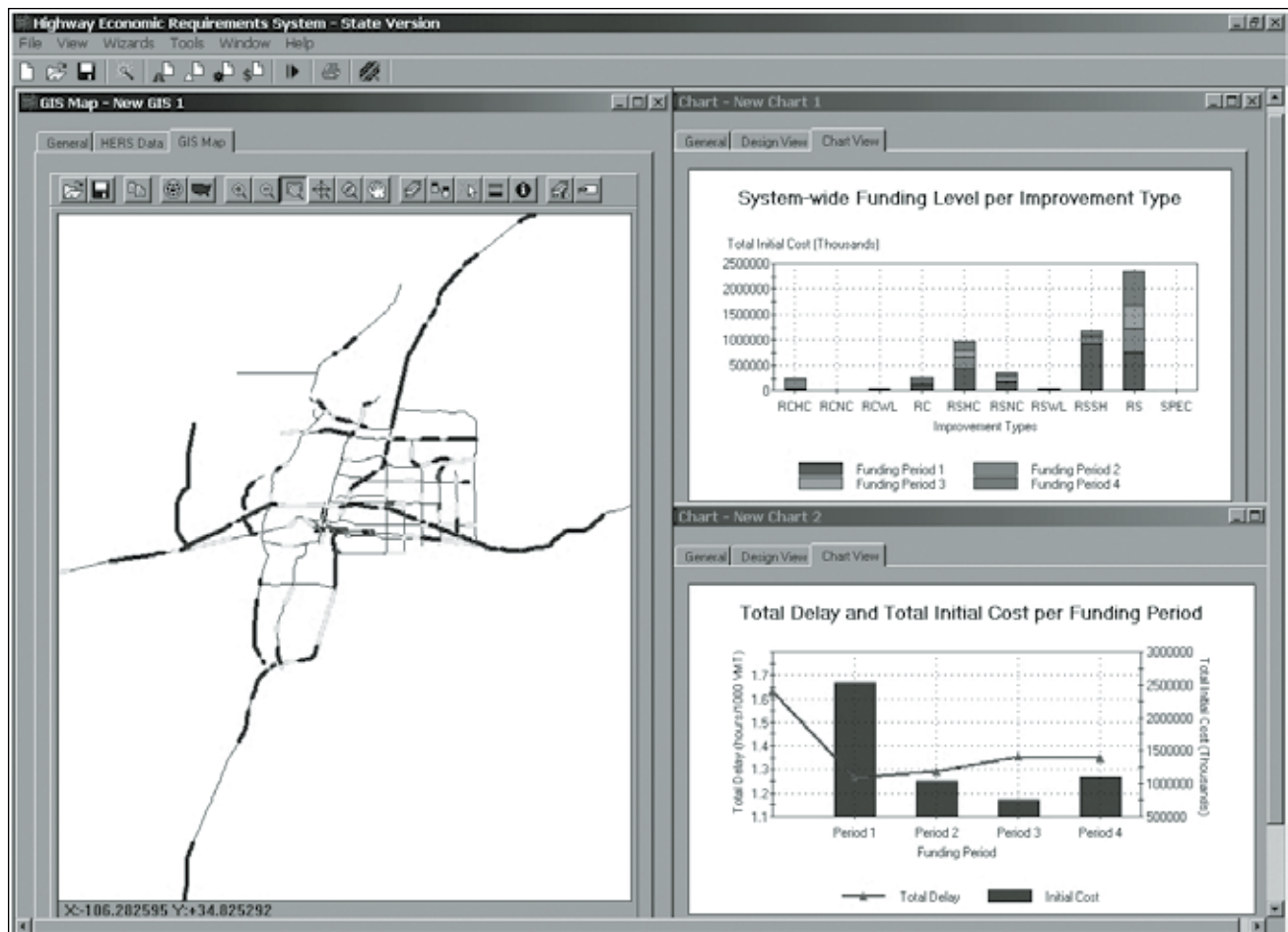
The web site hosts a HERS-ST community of practice, where visitors can post questions and comments. The new software and user's guide also will be posted on the web site.

For more information, contact:

David Winter, HERS-ST Program Manager

Phone: 202-366-4631

E-mail: david.winter@fhwa.dot.gov



HERS-ST software image

FHWA Priority Market-Ready Technologies and Innovations 2005

Accelerated Construction Technology Transfer

Problem: An aging system faces increasing traffic demand

Highway construction has intensified in recent years to address two challenges. First, the nation's highway infrastructure is aging, because much of it was built during the 1950s and 1960s and needs to be rehabilitated or replaced. Second, although highway capacity has remained virtually unchanged during the past several decades, traffic demand has increased tremendously, causing high levels of congestion. Large construction projects to improve outdated roads and bridges compound traffic problems during long construction periods. Today's motorists demand high quality roads, but they want them put in place as quickly as possible; they will not settle for a "business as usual" approach.

Putting It in Perspective

Increasing demand (1980–2000):

- Vehicle miles of travel increased by 80 percent.
- Licensed drivers increased by 31 percent.
- Lane miles increased by only 3.8 percent.

An aging system:

- Forty percent of all bridges are more than 40 years old.
- When these bridges were constructed, design life was often only 50 years.
- Most pavement designs have a 20-year life expectancy.

Solution:

Accelerated Construction Technology Transfer (ACTT) effectively reduces construction time while enhancing quality and safety on highways

ACTT aims to reduce construction time dramatically, saving money and improving safety and quality by minimizing the delays and hazards associated with work zones.

What is ACTT?

ACTT is a strategic process that uses various innovative techniques, strategies, and technologies to minimize actual construction time, while enhancing quality and safety on today's large, complex multi-phase projects. Sponsored by the American Association of State Highway and Transportation Officials' (AASHTO) Technology Implementation Group (TIG) and the Federal Highway Administration (FHWA), the ACTT process begins with a two-day workshop in which a multidisciplinary team of 20 to 30 national transportation experts works with an equal number of their local counterparts to evaluate all aspects of a project and develop recommendations for reducing construction time and enhancing safety and quality.

Key to the success is a team of experts working together in a coordinated, strategic approach to ensure that the project is completed better, faster, and safer.

ACTT skill sets include:

- Right-of-way, utilities, railroad
- Traffic engineering, safety, intelligent transportation systems
- Structures
- Innovative financing and contracting
- Worker health and safety
- Geotechnical, materials, accelerated testing
- Long-life pavements and maintenance
- Construction (techniques, automation, constructability).
- Environment and context sensitive design
- Roadway design, geometries
- Public relations

Benefits

- Reduces construction time
- Mitigates congestion
- Improves safety and quality

FHWA Priority Market-Ready Technologies and Innovations 2005

Successful Applications: ACTT workshops and Project Pegasus

In 2002, Transportation Research Board (TRB) Task Force A5T60 completed two ACTT pilot workshops in Indiana and Pennsylvania. AASHTO-TIG and FHWA have continued the effort, conducting 10 workshops through the end of fiscal year 2004 in Texas, New Jersey, Louisiana, California, Montana, Washington state, Tennessee, Oklahoma, Minnesota, and Wyoming.

In September 2003, the Texas Department of Transportation hosted an ACTT workshop for its Project Pegasus to reconstruct the I-35E/I-30 interchange and portions of the two major freeways serving downtown Dallas. Workshop recommendations included constructing the Trinity Parkway first to be used as a detour during construction, allowing the contractor to build its plant on site, improving general materials specifications, setting up a dedicated incident management system, and devising a number of traffic flow strategies. The goal is to complete the \$760 million project in four years—three years ahead of the original estimate.

An ACTT mini-workshop focused on New Jersey DOT's plans to improve a bridge on Bergen County's Rt. 46. As a result of ACTT recommendations, work to replace the bridge deck and floor beams is under design and expected to begin early next year. The work will take only three months and cost an estimated \$3 million rather than the 18 months and \$10 million originally expected, thanks to the use of precast elements, lightweight high-performance concrete, and fiber-reinforced polymer composites, thus reducing dead load and providing for use of existing substructure.

California DOT's (Caltrans) workshop examining the \$75 million French Valley Parkway project on I-15 between Temecula and Murrieta produced recommendations including design modifications to eliminate two bridge structures, prefabrication of an entire bridge span, a dedicated incident management system, prequalification of material sources, and paving the median to serve as a detour during construction and to provide for future HOV lanes.

A Louisiana DOT workshop focused on the rehabilitation of a 40-year-old elevated section of I-20 in Monroe. Recommendations included completion of nearby projects beforehand to ease traffic flow, an aggressive incident management system with performance-based wrecker service, a smart work zone, and lane rental by the contractor for nightly closures of the mainline and certain ramps.

Montana DOT hosted an ACTT workshop in January 2004 for a \$100 million upgrade of a 50-mile portion of US-93 north of Missoula, within the Flathead Indian Reservation, home of the Confederated Salish and Kootenai tribes. Recommendations to reduce construction time from five to three years included prefabricated structural components installed at night, preapproval of tribal borrow sites to minimize inspection time, and establishment of a corridor management and communication team.

Washington State DOT hosted a workshop for a project on SR-520 between I-5 and I-405 in Seattle that will include the replacement of a 40-year-old floating bridge across Lake Washington. The project will cost between \$1.5 and \$3.4 billion, the largest ACTT project so far. Recommendations aimed at reducing construction time by one to two years include use of self consolidating concrete and designing the simple pontoons first so construction may begin while the more complex pontoons are still being designed.

A Tennessee DOT workshop for a \$160 million project on a two-mile stretch of I-40 in Knoxville produced recommendations to reduce construction time and minimize socioeconomic impacts by adjusting bridge span lengths to avoid existing foundations, installing spread footings and/or pin pile foundation under the James White Parkway before demolition, and completing Hall of Fame Drive before closure of I-40.

For more information, contact:

Dan Sanayi, FHWA Office of Asset Management
Phone: 202-493-0551
E-mail: dan.sanayi@fhwa.dot.gov

Rob Elliott, FHWA Resource Center
Phone: 404-562-3941
E-mail: rob.elliott@fhwa.dot.gov



Training and Meeting Calendar

2005

November

Writing Skills Workshop "Writing that Works"

November 1-2 in Fairbanks
November 7-8 in Anchorage

Negotiations Training

November 8 and again 9 in Anchorage
November 10 in Juneau

NHI 135056A: Culvert Design

November 15-17 in Anchorage

Effective Sediment and Erosion Control on Construction Sites

November 15 in Fairbanks
November 16 in Anchorage
November 18 in Juneau

NHI 137029A: Turbo Architecture Software Training

November 7-8 in Anchorage

NHI 380071A: Interactive Highway Safety Design Model

November 9-10 in Anchorage

Contract Administration

November 29 in Fairbanks
November 30 in Anchorage

December

Contract Administration

December 1 in Juneau

NHI 142005A: NEPA and Transportation Decision Making

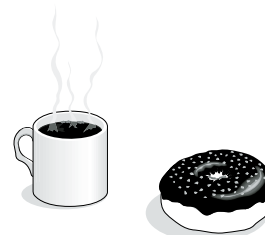
December 2, 5-6 and again 7-9 in Anchorage

NHI 142042A: Fundamentals of Title VI/Environmental Justice

December 5-6 in Anchorage

NHI 310110A: Federal-Aid Highways 101 (State Version)

December 12-13 in Fairbanks



Meetings Around Alaska

Society	Chapter	Meeting Days	Location & Contact	
ASCE	Anchorage	Monthly, 3rd Tues., noon	Moose Lodge	
	Fairbanks	Monthly, 3rd Wed., noon*	Westmark Hotel	* except Sept. and Feb.
	Juneau	Monthly, 2nd Wed., noon*	Breakwater Restaurant	* except June-Aug.
ASPE	Anchorage	Monthly, 2nd Thurs., noon*	Coast International Inn	Jennifer Gibson, 343-8130
	Fairbanks	Monthly, 1st Mon., noon	Regency Hotel	* except summer
	Juneau	Monthly, 2nd Wed., noon**	Westmark Hotel	** except June-Aug.
ASPLS	Anchorage	Monthly, 3rd Tues., noon	Sourdough Mining Co. 5200 Juneau st.	
	Fairbanks	Monthly, 4th Tues., noon	Westmark Hotel	
	Mat-Su Valley	Monthly, last Wed., noon	Windbreak Cafe	George Strother, 745-9810
AWRA	Northern Region	Monthly, 3rd Wed., noon	Rm 531 Duckering Bldg., University of Alaska Fairbanks	Larry Hinzman, 474-7331
ICBO	Northern Chapter	Monthly, 1st Wed., noon except July and August	Zach's Sophie Station	Tom Marsh, 451-9353
ITE	Anchorage	Monthly, 4th Tues., noon**	Sourdough Mining Co.	Art Johnson, 276-4245 ** except July, Nov., & Dec.
IRWA	Sourdough Ch. 49	Monthly, 3rd Thurs., noon**	West Coast International Inn	
	Arctic Trails Ch. 71	Monthly, 2nd Thurs., noon**	Zach's Sophie Station	
	Totem Ch. 59	Monthly, 1st Wed., noon	Mike's Place, Douglas	** except July & Dec.
Asphalt Pavement Alliance	Alaska	3rd Wednesday of every other month	varies	John Lambert 267-5294
PE in Government	Anchorage	Monthly, last Fri., 7 a.m.	Elmer's Restaurant	
Society of Women Engineers	Anchorage	Monthly, 1st Wed. 5:30 p.m. except July and August	DOWL Engineers	Julie Gaken, 269-0634

**For information about
T2-sponsored training,
contact:**

Dave Waldo at

907-451-5323,

david_waldo@dot.state.
ak.us

or

Simon Howell at

907-451-5482,

simon_howell@dot.state.
ak.us

or go to:

www.dot.state.ak.us

Sternwheeler *Nenana* Part of Alaska's Transportation History



Paul Nistler of Delta Junction remembers his last trip on the sternwheeler *Nenana* with the same fondness as his first. It was the same trip. Paul's first trip turned out to be the last freight run the *Nenana* made before being docked in 1954.

"I worked for a just a few weeks on the *Nenana* as an oiler," said Nistler, "I would make the rounds to the different lubrication points. There were a lot of small cups or reservoirs that would hold oil and would have a slow drip onto the area needing lubrication—I'd fill those."

The *Nenana* was built in 1933 by the Alaska Railroad. At one time, it was one of a four-vessel fleet owned and operated by the railroad. It measures 237 feet in length, has a beam of 42 feet, draws 3 feet 8 inches (loaded with 300 tons of cargo), and weighs over 500 tons.

The *Nenana* offered both passenger service (until 1949) and freight service (until 1954) to interior Alaska river villages and towns, including Fairbanks. It was built with accommodations for 52 passengers, but was licensed to carry only 16, plus a crew of 35. The boat reputedly served first-class food in a plain but comfortable surrounding (dark stained wood interior and green carpets and drapes, in contrast with the waiters' white jackets and the white-and-silver table service).

"The whole trip felt like a vacation after being in the army for three years. On the boat I had my own cabin. There were a lot of rooms since it used to carry passengers. They even fed us good" Paul said.

"I even remember saving money", Paul said with a chuckle. "We were on the boat the whole time. Nothing to spend your money on. No restaurants, no booze." Compared to the army, the wages seemed good at \$1

an hour. He made \$12 per day since he worked six hours on and six off, on continuous 24-hour shifts.

Paul remembers the ship being quiet, not like the more modern diesel vessels running freight, and it was slow going. By the time he served on the *Nenana*, they had converted the steam boilers to burn oil instead of wood. This was more efficient. Paul believes part of that decision was driven by the inability to get enough wood. The *Nenana* burned as much as one cord of wood per hour.

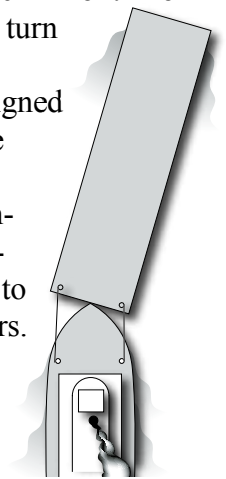
"It was interesting job," Nistler recalls, "While going up to Ft. Yukon we pushed a barge in front of the *Nenana*. If we had to make a sharp turn then the winches would help."

The *Nenana* wasn't necessarily designed to push barges. The barge rested on the pointed bow and two winch lines went to each side of the barge from the sternwheeler. The winch-powered lines pivoted the barge left or right off the bow to help direct or steer around sharp corners. As some of the corners on the Tanana River are swift and sharp this method was critical.

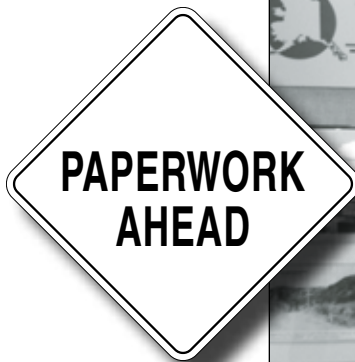
In the early days, the boat would meet oceangoing vessels at St. Michael and carry families and freight the last 1,200 miles up the Yukon, the Tanana, and the Chena River. As many as a dozen of the sternwheelers would be tied up at the docks in Fairbanks at one time.

In 1952–53, the *Nenana* was completely reconditioned and leased; however, the lease was not renewed due to a lack of profit. Her final trip up the Yukon occurred in 1954. The federal government sold the boat to Greater Fairbanks Opportunities, Inc., in 1955, which operated it as a museum piece from 1957 to 58. The boat sat unused on the riverbank from 1958 to 1965, but made one last voyage in October 1966 to its current resting place. It was partially renovated, used in the 1967 Centennial events, and placed on the National Register in 1972; 20 years later, it was extensively restored and officially dedicated as a National Historic Landmark.

Thanks to Fairbanks North Star Borough Parks and Recreation for the historic information and to Paul Nistler for sharing his memories.



Research & T2 extends a big thank you and farewell to Linda Gavin. Linda retired from the State of Alaska on September 30, 2005. Linda has worked with the state for 14 years, the past seven years with DOT in the Research and Technology Transfer Section as an admin clerk III. Linda is now looking forward to traveling and spending time with her husband, two daughters, and son. She is an avid gardener and enjoys spending time in her greenhouse.



Research & T2 welcomes Patty Smith, Linda's replacement, who has worked for DOT Construction Section as an admin clerk III since 2001. Patty moved to Fairbanks from upper Michigan in 1994. During the long winters, Patty likes to keep busy sewing, quilting, and snowmachining with her husband.

T² Center Staff

Dave Waldo, Manager & Editor, 907/451-5323,
david_waldo@dot.state.ak.us
Simon Howell, Training Specialist, 907/451-
5482, simon_howell@dot.state.ak.us
Linda Gavin, Administrative Clerk,
907/451-5320, linda_gavin@dot.state.ak.us

T² Center Advisory Board

Billy Connor, Chair, Research Manager,
DOT&PF
Chris Haigh, City of Fairbanks
Steve Boch, Federal Highway Administration
Jack Fullerton, Central region DOT&PF
Trent Mackey, Fairbanks North Star Borough
Lee Coop, Municipality of Anchorage
Don Shiesl, Mat-Su Borough
Jacob Kagak, North Slope Borough
Joe Buck, City and Borough of Juneau
vacant, Yukon Territory Government
Keith Kornelis, City of Kenai

<http://www.dot.state.ak.us>

- rest the cursor on "Programs, Plans & Projects"
- select "Research & Technology"



This newsletter is funded by the Federal Highway Administration and the Alaska Department of Transportation and Public Facilities. The material contained herein does not necessarily reflect the views of the Alaska Department of Transportation, Federal Highway Administration, or the T² staff. Any reference to a commercial product or organization in this newsletter is only for informational purposes and is not intended as an endorsement.

PRESORTED STANDARD
U.S. Postage PAID
Fairbanks, AK
Permit No. 87



*Local Technical Assistance Program
Department of Transportation and Public Facilities
2301 Peger Road M/S 2550
Fairbanks, AK 99709-5399*

Return Service Requested