

# Alaskan Transportation



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# Alaska's New Laserlux Van to be used in National Study.

by Clint Adler & Jamie Brownwood



*AK DOT & PF's Laserlux van—a new research tool for measuring retroreflectivity of pavement markings.*

This summer, Alaska Department of Transportation and Public Facility's (AKDOT&PF) research team received a Laserlux van from the Federal Highway Administration as a part of a study to determine the life cycle of durable pavement marking materials, including methyl methacrylate, epoxy, preformed tapes, and thermoplastic.

The Laserlux van is a 1995 blue Chevrolet Beauville equipped with:

- computer controlled data acquisition
- real-time high speed measurements
- GPS tracking system
- video camera overlay
- automatic distance measuring instrumentation
- laptop computer with custom software to operate a removable side-mounted scanning laser.

The laser and laptop work together to continuously measure and record the retroreflectivity of pavement striping at a rate of one measurement every 4 feet while the van is traveling up to 60 miles per hour.

In this case, retroreflectivity refers to the ability of the striping to reflect the light from a vehicle's headlights back to the driver. Road striping with higher retroreflectivity is more visible at night. The

*continued*

## Alaska’s new Laserlux van (continued)

study will help the AKDOT&PF and partner states determine how long durable pavement marking materials retain retroreflectivity over time. Participating states (Utah, Idaho, Oregon, Minnesota, Nebraska, Washington, Montana, North Dakota, and South Dakota) are using similar vans to collect four consecutive years of retroreflectivity data in their jurisdictions. Ultimately, the study will help provide striping that is more visible at night.

### How does it work?

Researchers aim the scanning laser at the striping at a point 10 meters in front of the van. A sensor located inches above the laser detects the intensity of the retroreflected laser signal—processed and recorded by the laptop as retroreflectivity. The Laserlux system samples pavement markings at 1/3 geometry, reading a marking at a point 10 m in front of the Laserlux. One-third geometry is equivalent to a vehicle operator looking 30 meters down the highway. At this distance, the laser scans a width of 1.1 meters and provides retroreflectivity measurements anywhere within this width.

Two people are necessary to collect data with the van—one to drive and one to operate the laptop.

However, it is nice to have three people for efficient calibration and handling of the equipment and to ensure all the information is collected correctly.

The laser mounts on either side of the van so it can safely read centerlines and fog lines. Mounting brackets are located in front of the rear tires, and data cables connect the laser to a docked laptop computer used to operate the laser. The video camera provides a “laser’s eye view” of the road on a small screen to assist



*Front seat view screen enables driver or passenger a “laser eye view” to help driver with correct alignment.*



*Jamie Brownwood, DOT engineering intern, demonstrates Laserlux graphical data logging software on the laptop docking station.*



*A receiver hitch assembly on both sides of the van provides for easy set-up and adjustment of laser.*

the driver and laptop operator with alignment and data recording.

Researchers assure accuracy of measurement by repeatedly calibrating the Laserlux system. To calibrate the automatic distance measuring instrument (DMI), the researchers drive and record the beginning and end of a precisely-measured straight section of road for 1000 feet.

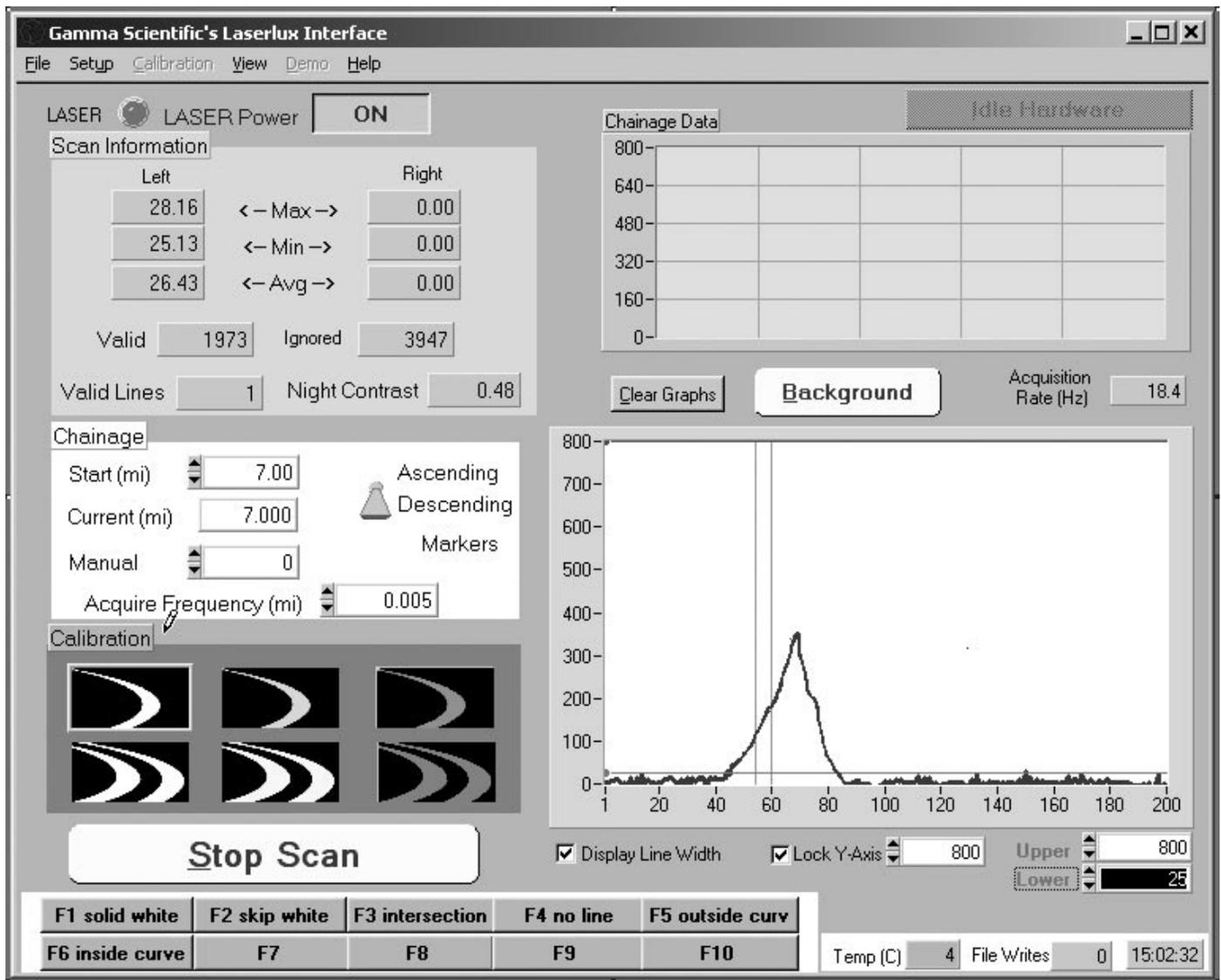
To calibrate the laser positioning, a researcher aims the laser and positions it exactly 14 cm above the road surface while everyone is seated in the van in their

duty stations. Any change in seating or significant fuel consumption will require recalibration. A standardized calibration stripe is then placed 10 meters ahead of the laser, and the operator adjusts the laser with the laptop until the retroreflectivity readings match the stripe. The laserlux van is now ready for testing.

For more information contact Alaska DOT&PF Research staff by e-mail:

clint\_adler@dot.state.ak.us

jamie\_brownwood@dot.state.ak.us



Screen shot of Lazerlux software—the Windows 98 software enables researchers to measure retroreflectivity quickly and accurately.

To see a related article on retroreflectivity see *Technology for Alaskan transportation* Winter 2002, Vol. 27 No. 4, *Pavement Markings: Microscopic Evidence of Paint Curing Process Leading to Reduced Retroreflectivity in Low-VOC Traffic Paints*, and *Making Nighttime Driving Safer*, in this issue.

# Making Night Driving Safer

By Jim Mearkle, P.E., Reprinted from  
*Transportation Trailblazer*, Colorado State University

In the United States, almost one-half of all traffic fatalities occur during darkness. However, only one-fourth of all travel takes place during those same hours. This shows that driving at night is more difficult and more dangerous. Overhead lighting is one way to make driving at night safer, but the annual cost is too high to use it everywhere. Instead, retroreflective materials are used.

Signs and pavement markings are made to reflect light from the headlights back toward the driver's eyes. This is called retroreflectivity. Retroreflective materials use small glass beads or tiny prisms to reflect light back toward its source.

Older drivers find retroreflectivity especially helpful. Starting at age 20 or so, our night vision becomes less acute with time. The average 33-year-old requires about twice as much light to see at night as a 20-year-old driver, and a 46-year-old person needs twice as much as a 33-year-old. So, as the population of the United States gets older, retroreflective signs and pavement markings will become more important.

### Federal Standards are Coming

Congress has mandated that the Federal Highway Administration develop minimum retroreflectivity guidelines for signs and pavement markings. The exact impact on local highway departments will not be clear until the standards are finalized, but one estimate says eight to ten percent of signs on non-state roads could be below the minimum. Starting a sign inspection program now will let you get a handle on the overall condition of your signs before the standards are in place.

### Maintenance of Signs and Markings

As the beads are worn off pavement markings by tires and snowplow blades, and weather and sunlight degrade sign sheeting, their retroreflective properties degrade until they are no longer useful at night. This can happen while the sign or stripe still looks good in the daylight. )

It is important to replace signs and markings before they are too dim to be useful to the driver. Several methods can be used to determine whether action is needed.

The most accurate method uses a retroreflectometer. These devices measure the retroreflectivity of signs or pavement markings. Unfortunately, they are expensive.

Another option is nighttime visual inspections. These should be done at least yearly. Some guidelines to follow include:

- Use an SUV or pickup to do the inspection. Since truck seats are farther back from the headlights than sedan seats, the standards for retroreflectivity will be based on large SUV's.
- Make sure your headlights are properly aimed. If headlights are aimed too low or to the left, you may end up replacing good signs. If they are aimed too high or to the right, you may keep a sign that needs to be replaced.
- Use low beams. A sign that needs to be replaced may look okay when lit by high beams.
- Be conservative. It's better to replace a sign too soon than to leave up a bad sign and have a crash as a result. If the inspector is young, remember that signs and markings will not look as bright to older drivers.
- Document your inspection process and findings. This will help defend against lawsuits.

Good maintenance of traffic control devices will make your roads safer and reduce your risk of liability. This includes replacing signs and pavement markings as their retroreflectivity fades with time.

Visit the following website for more information on retroreflectivity:

<http://safety.fhwa.dot.gov/programs/retroref.htm>  
(Reprinted with permission from Cornell Local Roads Program, spring 2(103))

# Planning, Design, and Field Notes

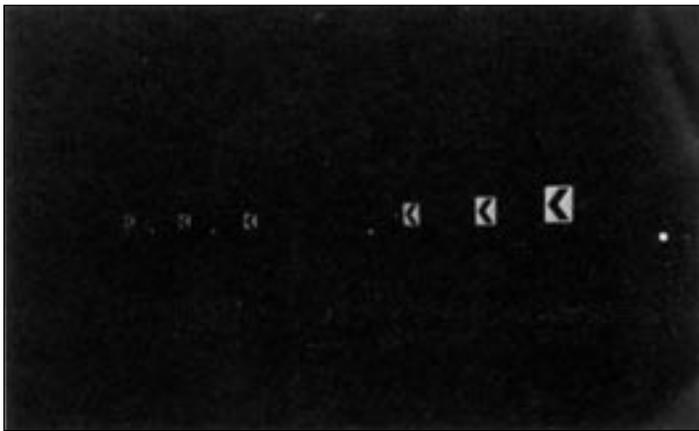
2003



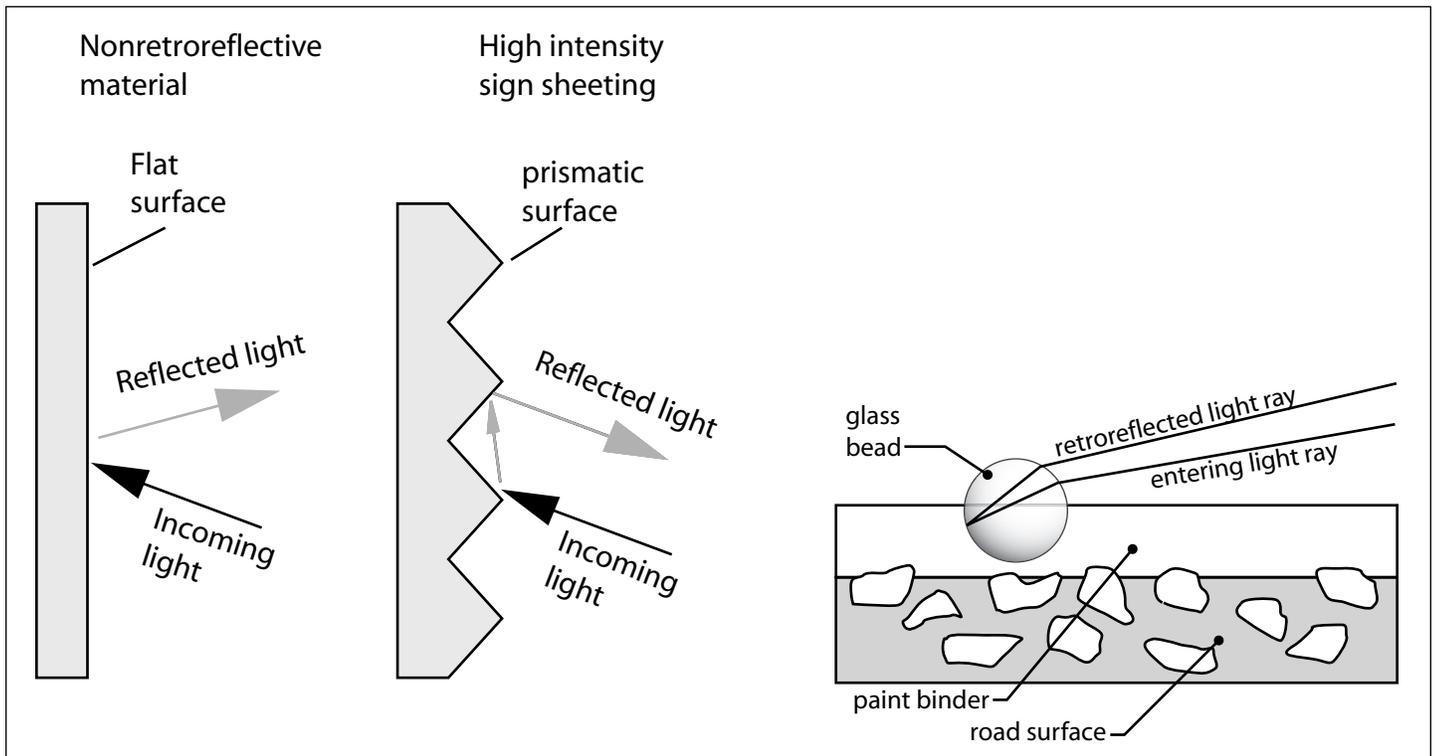
## Marking Curves Reduces Run-off Road Crashes

One reason that accidents happen at night is that the visual information we use to drive is hard to see. Compare the two pictures. Notice how in daylight, you can see the guiderail, lane line, edge line, pavement edge, and the trees. This gives you enough guidance to easily drive around the curve.

In a nighttime picture of the same curve, only the signs are visible.



Now imagine what it would be like to drive this road at night without the chevron signs. The chevrons give you some information that otherwise would be missing. That's how marking curves with chevrons or arrow panels can cut run-off-road crashes by as much as one-third.



How Retroreflectivity works

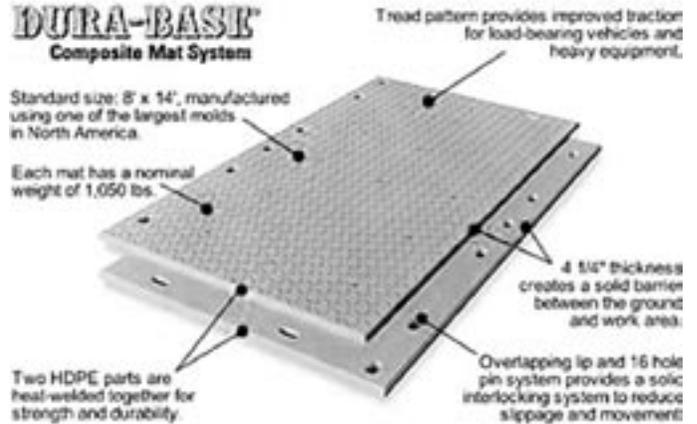
## Follow the Plastic Mat Road

by Dave Waldo

Gaining access across tundra and sensitive wetlands has prompted innovation and clever application of high-density polyethylene products. These new systems are being used for temporary roads, work sites, and even recreational trails. Efficient deployment and relatively low cost has got the attention of industry and public agencies. These products protect the environment, conserve resources, and allow access where it might otherwise be denied.

### DURA-BASE mats

One such product, DURA-BASE mats, was recently selected by Alyeska Pipeline Service Company for an environmental excellence award. The first major application in Alaska was the construction of temporary access roads along the Trans-Alaska Pipeline right of way. Alyeska's successful pilot project is likely the first of many applications in sensitive areas across Alaska.



*Installing a temporary road for a project off of a Trans-Alaska Pipeline access road on the North Slope.*



*A crew fastens mats on temporary a road in eastern Russia.*



*Front-end loader rests on Durabase mats during deployment.*



*Durabase mats staged for deployment. A forklift and a couple of people is all it takes.*



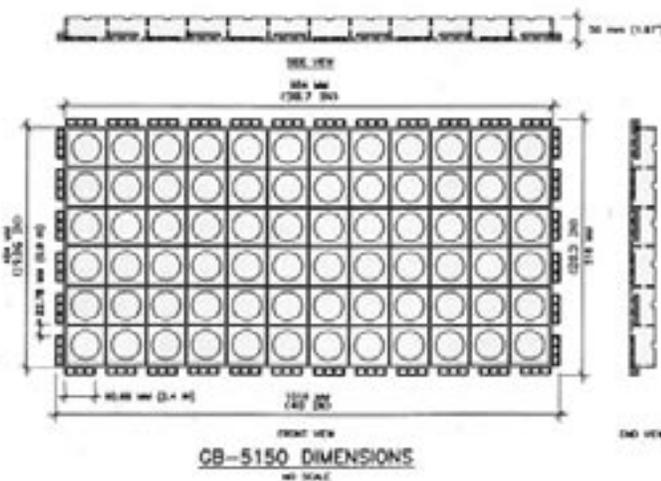
*Durabase mats provide parking and building foundations for this oil rig in Louisiana.*

A conventional gravel road requires excavation, geotextile, foam, transportation of fill material, and permits for gravel. In sensitive areas, removing the road is as costly as laying it down—not to mention the impact. DURA-BASE can simply be laid in place and picked up after days, weeks, or months, to be used again in another application with little or no impact to the environment. The mats usually pay for themselves in a single application. This can mean substantial savings to your agency.

DURA-BASE has been used for access roads, walkways, foundations, camp floors, and shop floors. The City of Barrow just ordered several mats to be used by their whaling captains. Apparently, it is difficult to keep sand out of the carcass while carving up a whale on the beach. The DURA-BASE mats will be deployed on the beach to use as giant cutting boards to keep the meat and blubber clean.

## Geoblock System

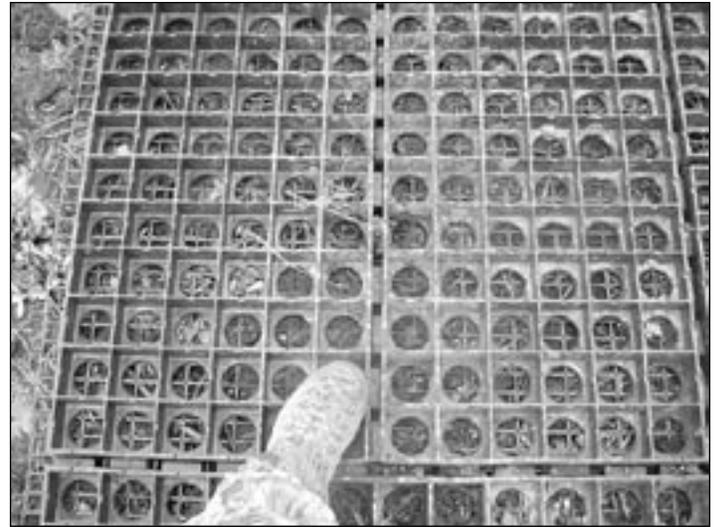
Many recreational trails used by ATV owners cut across wetlands. Continued use degrades the trail to the point where access is hindered and the users make another trail. The process continues until there is a wide swath of damage, ultimately resulting in talk of trail closers or ATV bans.



Across Alaska, a trail hardening system is being used with support from state and federal agencies, sportsman groups, and even ATV dealers. Many of these efforts use the Geoblock system.

The Geoblock units are open celled, lightweight plastic grids measuring 20" x 40" x 2".

The interlocking units create a load-distribution system designed to support heavy loads, allowing water to pass up through the cells while keeping damag-



*Geoblock units are stitched together with plastic tiewraps and drywall screws.*



*A caribou hunter uses Geoblock system installed by BLM near the Denali Highway. This section of swamp showed remarkable regrowth once the trail was improved—users stayed on the Geoblock mats.*

ing tire wear away from the ground and plants. The product is lightweight, easy to deploy, and relatively inexpensive—best of all, it seems to work.

For more information on these products and applications:

DURA-BASE system:

<http://www.composite-tech.com/new.html>

Geoblock system:

<http://www.geocheminc.com/geoblock.htm>

Information on DURA-BASE mats reprinted in part from *Petroleum News*, June 2003

<http://www.petroleumnews.com/>



# Flowable Mortar Helps Prevent Settling of Bridge Approaches

From the Center for Transportation Research and Education, Iowa State University’s *Technology News*, May 2003

Iowa DOT materials technicians and Iowa County engineers have been experimenting with flowable mortar as fill material for bridge approaches. The goal: eliminate the bump where approach meets bridge deck.

## Problem

To install concrete abutments during bridge construction, crews must over-excavate the bank (see photo). When construction is finished, the excavated dirt is commonly used to fill the space under and around the approach slab.

However, it’s difficult to completely fill the space and compact the dirt effectively. The dirt generally settles, and with it the bridge approach. If it settles significantly, moving vehicles experience a jolting thump-thump where the approach meets the bridge deck.

## Fix

In recent years Bill Kirk, Portland cement (PC) technician for Iowa DOT District 6, and his crew have backfilled four bridge approaches with flowable mortar instead of dirt. This is a new application for flowable mortar, which is commonly used as fill material around or within box culverts and in trenches.

Kirk has discovered that, as bridge approach backfill, flowable mortar has two advantages:

- 1 It doesn’t settle. It effectively fills the space and hardens to a durable concrete. Of the four locations where flowable mortar has been used, “none of the bridge approaches have settled at all,” Kirk says.
- 2 It’s economical. Kirk estimates that flowable mortar costs only about \$40 per cubic yard, substantially less than the cost of replacing and compacting excavated dirt.

## “Recipe”

Flowable mortar is a relatively fluid mixture of sand, water, fly ash, and cement.

One cubic yard of flowable mortar for bridge approach fill:

- 100 pounds Portland cement
- 400 pounds fly ash (coal byproduct)
- 2,600 pounds sand
- approximately 67 gallons water
- 3 ounces air agent

This mixture uses coarser sand and more fly ash, air agent, and water than called for in the Iowa DOT’s general specifications for flowable mortar. The extra fly ash and air agent help keep the concrete flowable and the sand in suspension.

For more information

Contact Bill Kirk, Iowa DOT District 6 PC technician, 319-366-0446, [terry.dunlay@dot.state.ia.us](mailto:terry.dunlay@dot.state.ia.us).

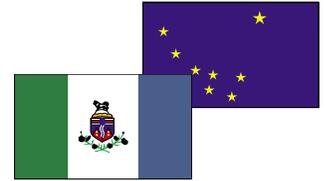


*The area excavated to install concrete abutments during bridge construction must later be backfilled. Photo provided courtesy of Iowa DOT District 6.*



# Yukon Government Representative Attends Low-Volume Roads Conference as Part of BTEP

By Robert Magnuson, Yukon Gov. Assistant Deputy Minister of Highways and Public Works



I attended the 8th International Conference on Low-Volume Roads with the assistance of the Alaska DOT&PF Technology Transfer, Border Technology Exchange Program (BTEP). The conference examined new technologies and new techniques in the planning, design, construction, operation, maintenance and administration of low-volume roads. The focus of the conference was on case studies and discovering practical solutions to common problems.

The following are highlights from some of the sessions I attended:

## National Initiatives of Importance to Low-Volume Road Agencies:

- 50% of the 4 million miles of roads in the U.S. are unpaved.
- AASHTO has completed a new design guide for very low-volume roads, which is available on their website.

## Policy for Sustainable Low-Volume Roads In Costa Rica:

Discussion focused on the social, political, and technical aspects of poor roads in Costa Rica. Their road conservation model includes child education beginning at 10 years of age. Children are encouraged to look for potholes and other road distresses while walking home. Posters listing parts of a road are included in the education program. As much of the roadwork is done manually by locals, they act from the reports of school children—an interesting concept.

## Development of Guidelines for Unsealed Road Assessment:

South Africa has developed an assessment guideline, which includes standard forms, user training, etc. They have standardized their inspection criteria to the maximum extent they believe is attainable. They inspect at 40 KPH with one stop per assessment section and watch for factors such as dust and direction of sunlight, which may shade corrugations. Direction of travel is also important.

## Project Level Highway Management Model For Secondary Hwys. in Saskatchewan:

- Starting to experience problems with thin membrane systems due to increased traffic volumes,

driven primarily by shutdown of rail lines and grain elevators

- Traffic volumes rising 1800–10,000 ADT
- BST surfaces beginning to fail
- Budgets being reduced
- Looking at a method of strengthening road structure downward instead of upward
- Blend of Terra Cem was used as a structural strengthening component
- Reduced base quantity requirements by 50%
- Annual capital costs reduced by about 50% with Terra Cem
- No additional maintenance costs
- Essentially compares current practices against a product like Terra Cem. The model is intended to convince decision-makers of the risks taken in funding these projects.

## Solution for Distressed Pavements and Crack Reflection:

The process is an application of matting to strengthen overlay of chipseal. The chipseal performs better than a pavement overlay with chip seal. There is no cracking.

- Hot mix overlay: \$60,000 per lane mile
- Chipmat: \$20,000 per lane mile
- Consider this product for pavement overlays using latex modified cationic emulsion with a lift of #6 x 3/8" chips and then a second lift of 5/16" chips. All chips are washed.

## Innovative And Cost-Effective Solutions For Roads In Rural Areas And Difficult Terrain:

The study area in South Africa experiences high rainfall. Road stability is obtained by laying fully interlocking plastic grid (20 mm thick, 8" squares) and filling with concrete.

It has been referred to as "geocell pavement". The grid needs to be applied down into the ditch or least into the residual material in ditch bottom. The cost is about the same as a thin subbase, thin base, and surface; however, there is virtually no maintenance cost associated with the geocell pavement.

*continued*

### Low-Volume Roads Conference (continued)

- \$6.00–\$8.00 per Square meter is the approximate cost to construct in S. Africa; much less than other parts of the world.

#### **Evaluation of Hexahydrated Magnesium Chloride Performance as Chemical Stabilizer of Granular Road Surfaces:**

This noncorrosive product is inexpensive in Chile, since it is available naturally in the deserts. It may be an expensive option in other countries. The product is environmentally friendly, with no side effects to grapevines. The local wineries are very important to the local economy. The product is added 3 to 5% by density. In some cases, the road surface is good enough to paint. The performance is excellent in arid and semi-arid climates on all soil types, but is not recommended in wet areas.

#### **Techniques For Extending The Life Of Low-Volume Roads In Seasonal Frost Areas:**

- Tire chips are used for insulation in frost susceptible areas for frost protection.
- Truck tire pressures reduced to below 60 PSI reduces damage of road surface during spring thaw.
- Pressures reduced as far as 40 PSI resulted in no apparent road damage on test sections.

#### **Fiber-Reinforced Polymer Composite Bridges in West Virginia:**

They are targeting inexpensive solutions to low-volume road bridges and have built 75 to 100 bridges to date in the eastern U.S. The bridges are low maintenance, lightweight, and quickly deployed; six people can install 500 sq ft of bridge deck per day.

- 10 lbs. /sq ft versus 100 lbs./sq ft for concrete
- approximately \$20.00 per sq ft for composite decking
- components are prefabbed in a shop—glued or bonded together
- the material is also used as noncorrosive rebar currently used for decking—not structural members
- extreme care necessary when shipping and handling, and in construction
- panels 19 to 24" wide and length of bridge
- require a wear surface—thin asphalt or polymer resin with sand layer often used

- guide rails have not been crash tested

#### **Use of Railroad Flatcars in Cost-Effective Low-Volume Road Bridges:**

This project was inexpensive. The total project cost was approximately 30 to 50% of a conventional bridge. The flatcars are quick to install and available in lengths 45 to 90 feet. A timber subdeck was used and topped with a gravel-draining surface.

#### **Beam-in-Slab Low-Volume Road Bridge System:**

The use of in-house forces is becoming very popular in addressing reduced funding. Cutting out the contractor is seen as a very viable means to reduce costs. (No profit component.)

The beam-in-slab system appears to exist only in Iowa. It is up to 24% less expensive than a traditional bridge structure. I-beams are placed longitudinally from abutment to abutment. Plywood forms are attached to the bottom of the beams and the entire assembly is filled with concrete.

- A new design provided lateral support by drilling 1 1/4" holes in beams. Tie rods are added through each fifth hole. Concrete must fill holes to form dowels between beams.
- CSP forms are now used to reduce the significant concrete deadload.
- Bridges up to 70 feet long have been built using this system.

### **CONCLUSION**

The conference provided an excellent forum for the consolidation of expertise on low-volume roads. The international component offered varied problems, solutions, and perspectives that will serve the industry well as it continues to strive towards better practices.

The Yukon Transportation Maintenance program has also been served by having a Yukon presence at the conference. Some of the knowledge garnered and contacts made at the conference will have a direct effect on our programming.

E-mail questions to:  
robert.magnuson@gov.yk.ca



# New DOT Books at the Keith B. Mather Library

9th International Bridge Management Conference: Orlando Airport Marriott,  
Orlando, Florida, April 28-30, 2003 (2003)  
DOT TE1.N3 no.EC049

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Bridge software: validation guidelines and examples (2003)  
DOT TE7.N25 no.485

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Characteristics of state funding for public transportation-2002 (2003)  
DOT HE4401.R48 no.60

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Compensation for contractors' home office overhead (2003)  
DOT TE7.N257 no.315

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Corporate culture as the driver of transit leadership practices (2003)  
DOT HE4401.T37 no.47

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Crash experience warrant for traffic signals (2003)  
DOT TE7.N25 no.491

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Design exception practices (2003)  
DOT TE7.N257 no.316

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Design of highway bridges for extreme events (2003)  
DOT TE7.N25 no.489

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e-Transit: electronic business strategies for public transportation. Volume 4, Advanced features of transit websites  
(2003)  
DOT HE192.5.R46 no.84 v.4

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Effective commercial truck and bus safety management techniques (2003)  
DOT HE5614.2.C66 no.1

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Papers presented at the Eighth International Conference on Low-Volume Roads, June 22-25, 2003: Reno, Nevada  
(2003)  
DOT TE7.H5 no.1819

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Environmental information management and decision support system: implementation handbook (2003)  
DOT TE7.N25 no.481

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Facilitating partnerships in transportation research (2003)  
DOT TE7.N257 no.312

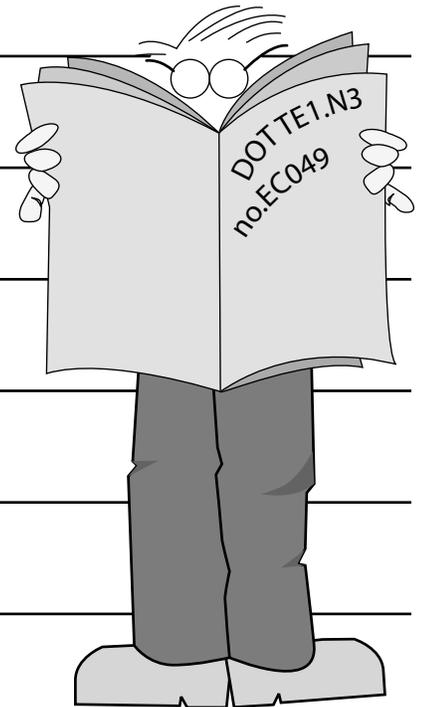
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Geotechnical earthquake engineering handbook (2002)  
DOT TA654.6.D39 2002

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Guidance for implementation of the AASHTO Strategic Highway Safety Plan. Volume 1, A guide for addressing  
aggressive-driving collisions (2003)  
DOT TE7.N25 no.500 v.1

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**Guidance for implementation of the AASHTO Strategic Highway Safety Plan. Volume 2, A guide for addressing collisions involving unlicensed drivers and drivers with suspended or revoked licenses (2003)**  
DOT TE7.N25 no.500 v.2

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**Guidance for implementation of the MSHTO Strategic Highway Safety Plan. Volume 3, A guide for addressing collisions with trees in hazardous locations (2003)**  
DOT TE7.N25 no.500 v.3

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**Guidance for implementation of the AASHTO Strategic Highway Safety Plan. Volume 4, A guide for addressing head-on collisions (2003)**  
DOT TE7.N25 no.500 v.4

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**Guidance for implementation of the AASHTO Strategic Highway Safety Plan. Volume 5, A guide for addressing unsignalized intersection collisions (2003)**  
DOT TE7.N25 no.500 v.5

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**Highway/heavy vehicle interaction (2003)**  
DOT HE5614.2.C66 no.3

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**Public transportation security. Volume 3, Robotic devices: a guide for the transit environment (2003)**  
DOT HE192.5.R46 no.86 v.3

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**Relationship of Portland cement characteristics to concrete durability (2002)**  
DOT TE1.N2516 no.270

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**Roadside Safety Analysis Program (RSAP): engineers manual (2003)**  
DOT TE7.N25 no.492

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**Strategies for managing increasing truck traffic (2003)**  
DOT TE7.N257 no.314

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**Structural supports for highway signs, luminaires, and traffic signals (2003)**  
DOT TE7.N25 no.494

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**Systemwide impact of safety and traffic operations design decisions for 3R projects (2003)**  
DOT TE7.N25 no.486

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**Transportation Research Board informing transportation policy choices: Celebrating the 20th anniversary of Transportation Research Board policy studies (2003)**  
DOT HE193.T747 2003

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**Transportation systems planning: methods and applications (2003)**  
DOT HE193.T733 2003

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**User manual for outsourcing decision assistance model (ODAM) (2002)**  
DOT HE5618.W55 2002

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# Technologies and Innovations FHWA Believes Warrant Special Attention.

**511:** An easy to remember three-digit telephone number available to state and local transportation agencies nationwide for easily providing information, highway and transit conditions to travelers via a telephone. Travelers can make more informed decisions regarding travel routes and modes, resulting in a more balanced transportation network. Contact: Bob Rupert, 202-366-2194

**Asset Management Guide:** The guide, along with the companion NHI course, illustrates asset management principles and identifies techniques and methods for adopting the decision-making framework in transportation agencies. Contact: Frank Botelho, 202-366-1336.

**Auger cast in Place and Continuous Flight Auger:** Characterized by the drilling of a hollow-stem auger into the ground, forming the diameter of the pile. Sand-cement grout or concrete is pumped into the hole as the auger is being removed from the hole, eliminating the need for temporary casing. Once the auger is removed, reinforcement is installed into the pile. These foundation systems can be constructed faster and cheaper for certain applications than deep foundation alternatives. Contact: Silas Nichols, 410-962-2460.

**Border Wizard:** A PC-based model that accurately simulates all cross-border movements of autos, buses, trucks, and pedestrians, using customs, immigration, and security procedures. It can be used to evaluate and balance policy needs for security and trade efficiency and address community impacts of improvements and functions at and near borders. Contact: Mike Onder, 202 366 2639.

**Dispute Resolution Procedures for Environmental Streamlining:** Guidance, titled "Collaborative Problem Solving: Better and Streamlined Outcomes for All" is one element of a national dispute resolution system that presents strategies for interagency collaborative problem solving during the transportation development and environmental review process. Contact: Ruth Rentch, 202-366-2034.

**EPS Geofoam Panels (Accelerated Construction):** Lightweight material that can be used as fill behind walls and other support structures. These lightweight materials, in specific applications, maybe required too reduce stress on underlying soils or lateral pressures to

retaining walls, abutments, or foundations. Contact: Peter Osborn, 410-962-0702.

**FHWA Traffic Noise Model (TNM), Version 2.1:** By improving the ability to predict noise impacts in the vicinity of highways, this model improves the quality of decisions. Field efforts would be to assist with the implementation of the FHWA TNM and guide future improvements to the model. Contact: Bob Armstrong, 202-366-2073.

**Highway Economic Requirements System - State Version:** A software model designed to evaluate the implications of alternative programs and policies on the conditions, performance, and user cost levels associated with highway systems. The model provides cost estimates for achieving economically optimal program structures and predicting system condition and user cost levels resulting from a given level of investment. Contact: David Winter, 202-366-4631.

**Improved Decision Making Using Geographic Information Systems:** Software for manipulation, analysis, and display of geographically referenced data. Applications include safety analysis, environmental partnering, asset management, highway inventory attributes, oversize truck permitting, and other applications. The GIS-T website contains numerous examples of how and where this technology has been implemented. Contact: Mark Sarmiento, 202-366-4828.

**Interagency Funding Guidance for Environmental Streamlining:** Guidance, titled "Interagency Guidance: Transportation Funding for Federal Agency Coordination Associated with Environmental Streamlining Activities" provides transportation and resource agencies options for using federal funds to support federal resource agency coordination for streamlining environmental reviews. Contact: Lamar Smith, 202-366-8994.

**ITS SpecWizard:** A software tool that can assist transportation agencies in writing specifications for the NTCIP (National Transportation Communication for ITS Protocol) standards-based ITS equipment. The user answers ITS questions and SpecWizard produces a file for incorporation into specifications for NTCIP-based equipment. Contact: Jason Hedley, 202-366-4073.

## Announcements

2003

**Load and Resistance Factor Design and Rating of Bridges, Earth Retaining Structures, and Culverts:** An American Association of Highway Transportation Officials (AASHTO) Load and Resistance Factor Design (LRFD) and Rating (LRFR) bridge specification provides for more uniform levels of safety, which should lead to superior serviceability and long-term maintainability. Contact: Firas Ibrahim, 202-366-4598.

**New Pavement Design and Construction Methodologies:** An advanced mechanistic pavement design procedure that relies on new tests for material characterization, proper quality assurances, and enables construction innovations. Methodologies provide long-life pavements that are safe and cost effective. Contact: Leslie Myer, 202-366-1198; John D'Angelo, 202-366-0121.

**Pavement Smoothness Methodologies:** The new pavement smoothness specification covers smoothness test methods, smoothness equipment specifications, and equipment certification programs. Other components that complement the smoothness specification include an NHI Course (131100) on inertial profiler operations, Profile Viewer software, and best practice guides for construction of smooth asphalt and concrete pavements. Contact: Mark Swanlund, 202-366-1323.

**QuickZone:** A user-friendly computer software tool for estimating and analyzing length of queues and delays in work zones. Contact: Scott Battles, 202-366-4372.

**Red Light Cameras:** The traditional enforcement of red light running violations is automated by using red light camera systems that detect an offending mo-

torist, capture an image of the license plate, and issue a citation by mail. Contact: Hari Kalla, 202-366-5915.

**Roundabouts -** A circular intersection that requires entering vehicles to yield to existing traffic in the circulatory roadway. Studies show that modern roundabouts can reduce intersection fatalities by up to 90%, reduce injury crashes by 76%, and reduce pedestrian crashes by 30 to 40%. Contact: Hari Kalla, 202-366-5915.

**Rumble Strips:** Shoulder rumble strips are continuous grooved indentations in roadway shoulders that provide both an audible warning and a physical vibration to alert drivers that they are leaving the roadway. Studies have shown a significant reduction in drift-off road crashes. Contact: Dick Powers, 202-366-1320.

**Safe Speeds in Work Zones:** Innovative technologies are being used to improve work zone safety for highway users and workers. Portable speed limit that automatically display safe speed based on traffic conditions and the nature of the roadwork and feedback displays that show the speed of approaching vehicles are two technologies that can improve safety in work zones. Contact: Davey Warren, 202-366-4668.

**Transportation, Economics, and Land Use System:** TELUS is an information management and decision support system. It assists state DOTs and metropolitan planning organizations in preparing their annual Transportation Improvement Program (TIPs) and Statewide Transportation Improvement Programs (STIPs). The system tracks history, schedule, funds expended, budget, and the relationship to other projects. Contact: Fred Ducca, 202-366-5843.

## ...and a List from AASHTO

The American Association of State Highway and Transportation Officials (AASHTO) created the Technology Implementation Group to identify high-payoff, ready-to-use technologies and to champion the implementation or deployment of these few select technologies, products, or processes that are likely to yield significant economic or qualitative benefits to the users throughout the country.

**Accelerated Construction:** Creative techniques to reduce construction time and enhance quality and safety. This includes techniques and elements along with innovative contacting practices that reduce congestion and enhance quality and safety. Contact: Dan Sanayi, FHWA, Dan.Sanayi@fhwa.dot.gov.

**Air Void Analyzer:** The air void analyzer can be used to measure air content, specific surface, and spacing factor of fresh Portland cement concrete. This real-time evaluation can improve quality control. Implementation goals include developing common standard test protocol, specification, and data collection form. Contact: John Wiakowski, KSDOT, JohnW@ksdot.org.

## Announcements

2003

**Fiber Reinforced Polymer:** Material that can be used to repair cracks in overhead sign supports by wrapping the support with fiber reinforced material. Fiber reinforced polymer can prevent overhead sign support failure and provide structural integrity to the overhead sign support. Contact: Paul Wells, New York State DOT, pwells@gw.dot.state.ny.us.

**Global Positioning System Surveying:** Global positioning system uses satellites that transmits signals continuously and has many highway applications including surveying pavement conditions and inventorying highway assets. GPS offer increases accuracy and reduces labor, time and costs. Contact: Charlie Brown, NCDOT, CharlieBrown@dot.state.nc.us.

**Ground Penetrating Radar:** Ground penetrating radar can be employed to collect information about underlying highway pavement layers without incurring the time and labor costs and traffic delays that come from traditional method of drilling for core samples. This vehicle-mounted technology collects pavement layer thickness and identifies rapidly deteriorating pavement areas at normal highway speeds. Contact: Ken Fluts, TxDOT, kfults@dot.state.tx.us.

**Highway Rail Warning System:** A low-cost active warning system that can replace a passive crossing warning signs at low volume highway-railroad at-grade intersections. The system consists of locomotive-installed hardware that communicates with the crossing device to activate the signals, can upload and download data on nearby crossings, and report on system operations or health. The device is mounted on standard crossing poles and solar/battery powered with wireless communications between device and the locomotive. Contact: Dave Huft, South Dakota DOT, dave.huft@state.sd.us.

**ITS Technologies in Work Zones:** The use of ITS technologies in work zones, such as ramp metering systems, intrusion alarms, and queue detection information (sensors/cameras), is aimed at increasing safety for workers and road users and ensuring a more efficient traffic flow. These technologies provide means to better monitor/manage traffic flow through and around work zones that minimize the impact of delays and increase safety. Contact: Doug Rose, Maryland SHA, Drose@sha.md.us.

**Prefabricated Bridge Elements and Systems:** Prefabricated bridge elements and systems may be manufactured on-site or off-site, under controlled conditions, and brought to the job location ready to install. These systems minimize traffic impacts of bridge construction projects, improve construction zone safety, makes construction less disruptive for the environment, increase quality and lowers life-cycle costs. Using these systems reduces traffic and environmental impacts by minimizing the need for lane closures, detours, and use of narrow lanes. Contact: Mary Lou Ralls, TxDOT, mralls@dot.state.tx.us.

**Thermal Imaging Safety Screening System:** The system allows an operator at a weigh station to view the relative temperatures of brake drums seen through the wheel rims of commercial vehicles. The infrared (IR) image of a correctly operating brake system shows all brake drums to be hot and approximately the same temperature when the vehicle is braking. When a brake is defective, the brake drum appears to be the same temperature as the wheel rim and darker than a properly operating brake. The system was developed using commercial, off-the-self components and advanced IR image acquisition, processing, and storage. Contact: Gary Hoffman, PennDOT, ghoffma@dot.state.pa.us.

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## Petroleum News Available to State of Alaska Employees

All State of Alaska employees and Dept. of the Interior employees have a paid online subscription to Petroleum News—North America's weekly oil and gas newspaper. So do all Yukon, Alberta, British Columbia, and North West Territories employees.

Call *Petroleum News* for your full access password at 907-522-9469, or e-mail [circulation@PetroleumNews.com](mailto:circulation@PetroleumNews.com).



## Alaska Pavement Management is On Line

by Robert S. Gartin, AK DOT&PF engineer

Annual highway and airport pavement condition reports have been on line at the Alaska DOT&PF web site since 2000. The *Draft Airport Pavement Condition Report* for 2003 was recently posted and the data collection for the 2003 Highway Pavement Condition Report should occur this fall.



Figure 1: Pavement condition reports: From the DOT Home page:

- [www.dot.state.ak.us](http://www.dot.state.ak.us)
- click on WORLD of DOT,
- click on Pavement Management,
- then click on Pavement Conditions and Research.

### What's in the Pavement Reports?

The highways reports show pavement conditions in terms of ride quality (International Roughness Index), rut depth, and a combined Pavement Serviceability Rating (PSR). Explanations of these terms are in the introductions to the reports. Pavement maintenance and rehabilitation recommendations are also included.

The airport reports show pavement conditions in terms of Pavement Condition Index (PCI). That is a scale of 0 to 100, with 100 being perfect pavement. Recommendations for maintenance and rehabilitation are provided. This is the Airport Pavement Maintenance Management System. These and the highway reports are "static" maps that you select the view you want to see. However, you can zoom in for a closer look.

The interactive web-mapping for highway pavement data is especially exciting. The system lets you zoom in and select specific pavement data. Currently it can present 2000 to 2002 data from the pavement management database, such as:

- pavement type
- conditions
- traffic
- age
- width
- geographic and man-made features

This is a lot of information on one screen, so be patient in letting it load. Below is a shot of the main screen.

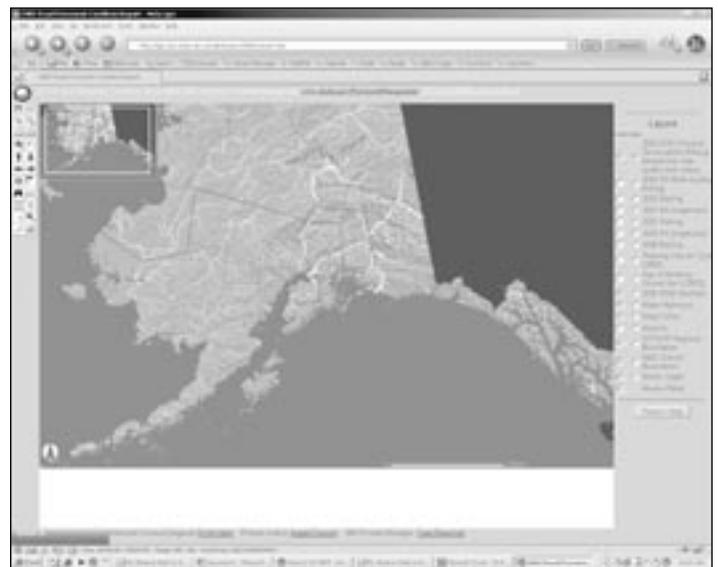


Figure 2: Interactive web-mapping for highway pavement data.

### Navigation Features

You can zoom in and out by using the magnifying glass icons on the upper left of the screen and move around with the "hand" or arrows icons. You can show legends by clicking on the table icon at top left of the tool bar. Information on particular locations is available by using the black circled "i" icon on the left side.

*continued*

## Announcements

2003

That operation opens up a window on the lower part of the screen that shows the pavement management database information as mentioned above.

Your choices of what to view on the map are selected by clicking the boxes "Visible" or "Active." Only one "Active" layer is possible. That is the one you get information on with the "i" icon and is what will show in a legend. However you may choose multiple Visible layers but be careful not to click layers that will plot on top of each other such as IRI and Rutting or several year's IRI.

Once you get the screen showing what you want, you can hit the Shift and Print-Screen keys and paste

it into a report or whatever you like. This all takes a little while to get used to, but is really amazing technology offered by the DOT&PF. Thanks to the Headquarters Information Services Division. Below is an example of a zoomed in screen print.

### Pavement Management Saves Resources

Pavement management in Alaska strives to make better airports and highways through communication of data so that users can make informed decisions on proper actions. Putting effort and money towards the areas of highest need saves time and money for everyone.

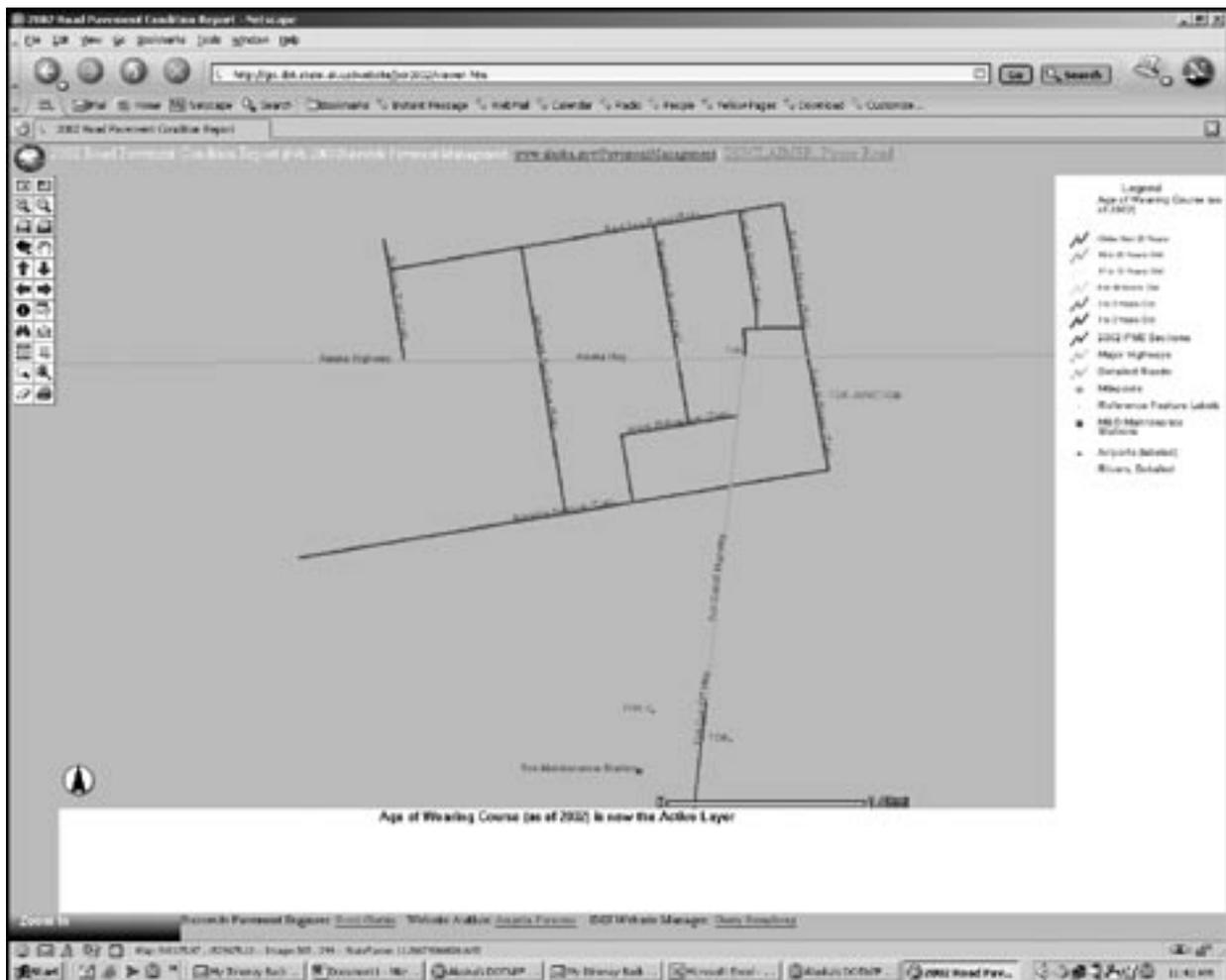
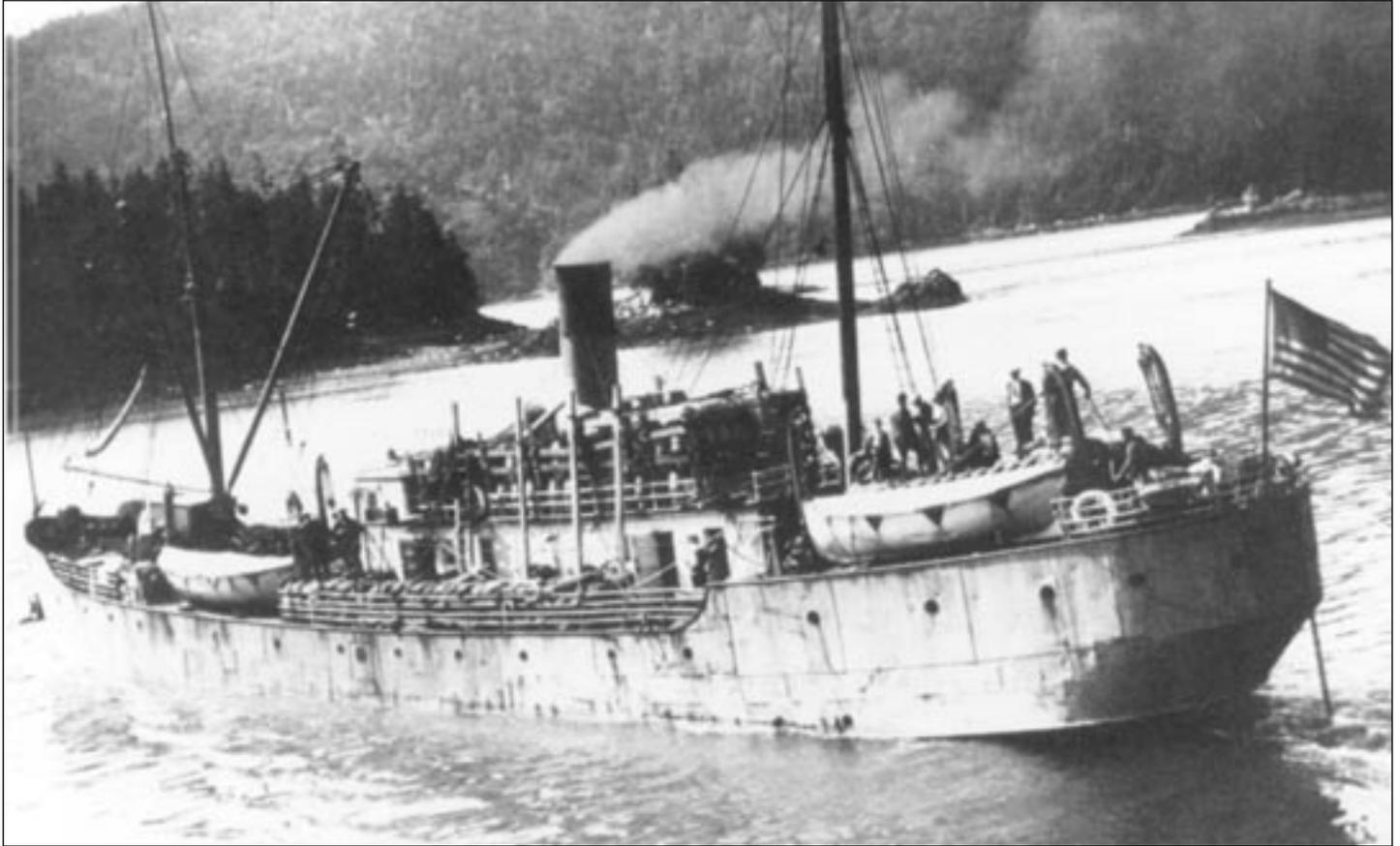


Figure 3: Interactive web-mapping for Tok area, showing ages of pavement with recently chip sealed roads and older highway paving.

for question contact:  
scott\_gartin@dot.state.ak.us



## Of Steamships and Public Health



*The Starr. Reprinted with permission from Anchorage Museum of History and Art (#B90-3-12),*

Last issue of this newsletter we featured the new fast vehicle ferries soon to be in service in Alaska, but here is a first-hand account of how we used to get to and around the state. The following is from a letter written by Miss Stella Fuller, a Delano Red Cross nurse who worked in Alaska from 1922 to 1924.

"I was on the boat for two weeks in the worst weather the steamer *Starr* has ever experienced. The *Starr* is seaworthy but that is the best we can say about her—she rolls, nosedives, bucks, and shakes like a thing of evil disposition. The waves came over the hatches and down the ventilators, dishes crashed, and the poor victims of "mal de mer" clutched the sides of their berths in agony and awful fear of being thrown out..."

This letter was excerpted from the new book *With a Dauntless Spirit: Alaska Nursing in Dog Team Days* (2003) from the University of Alaska Press, [www.uaf.edu/uapress](http://www.uaf.edu/uapress).

The book is a good read and among the stories are many contemporary accounts of transportation problems in Alaska during the first half of the twentieth century.



*The Starr at Kanatak. Transport to shore required lightering. Reprinted with permission from Anchorage Museum of History and Art (#B65-18-168).*



# Training and Meeting Calendar

2003

**November**  
**Construction: Contracting Warrant System - Level 2: Contract Administration**  
 Juneau: November 3-4

**NHI 135071A: Surface Water Modeling System with Flo2DH and SMS..**  
 Anchorage: November 3-7



**December**  
**NHI 131063A: Hot Mix Asphalt Pavement Evaluation and Rehabilitation.**  
 Anchorage: December 8-10

**Asphalt Summit.**  
 Anchorage: December 11-12

**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, select "T2 Training" under "Hot Topics Quicklinks," and then choose "Training" from the menu on the left.

## Meetings Around Alaska

| Society                    | Chapter  | Meeting Days  | Location & Contact  |   |
|----------------------------|--|---|---|---|
| ASCE                       | Anchorage<br>Fairbanks<br>Juneau                         | Monthly, 3rd Tues., noon<br>Monthly, 3rd Wed., noon<br>Monthly, 2nd Wed., noon*       | Moose Lodge<br>Captain Bartlett Inn<br>Breakwater Resturant                     | * except June–Aug.  |
| ASPE                       | Anchorage<br>Fairbanks<br>Juneau                         | Monthly, 2nd Thurs., noon*<br>Monthly, 1st Fri., noon<br>Monthly, 2nd Wed., noon**    | Coast International Inn<br>Captain Bartlett Inn<br>Westmark Hotel               | Jennifer Gibson, 343-8130<br>* except summer<br>** except June–Aug. |
| ASPLS                      | Anchorage<br>Fairbanks<br>Mat-Su Valley                  | Monthly, 3rd Tues., noon<br>Monthly, 4th Tues., noon<br>Monthly, last Wed., noon      | Executive Cafeteria, Federal Building<br>Ah Sa Wan Restaurant<br>Windbreak Cafe | George Strother, 745-9810   |
| AWRA                       | Northern Region  | Monthly, 3rd Wed., noon   | Rm 531 Duckering Bldg.,<br>University of Alaska Fairbanks                       | Larry Hinzman,<br>474-7331  |
| ICBO                       | Northern Chapter   | Monthly, 1st Wed., noon<br>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<br>** except July, Nov., & Dec.               |
| IRWA                       | Sourdough Ch. 49<br>Arctic Trails Ch. 71<br>Totem Ch. 59 | Monthly, 3rd Thurs., noon**<br>Monthly, 2nd Thurs., noon**<br>Monthly, 1st Wed., noon | West Coast International Inn<br>Oriental House<br>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.<br>except July and August                                 | DOWL Engineers  | Julie Gaken, 269-0634<br>Karen Helgeson, 269-0997                   |

# Alaska DOT Employee Recognized for NOAA 2003 Environmental Hero Award



The National Oceanic and Atmospheric Administration presented its annual Environmental Hero Award to 35 recipients. Held in conjunction with Earth Day celebrations, the award honors NOAA volunteers for their “tireless efforts to preserve and protect our nation’s environment.”

One of those recognized was **Terry Onslow** of the Alaska Department of Transportation in Girdwood, Alaska. Terry has worked diligently to provide top quality weather information to both the Anchorage Forecast Office and the Alaska Pacific River Forecast Center for nearly two decades. In return, he and the state Department of Transportation received more accurate weather information to support the state DOT avalanche mitigation and road maintenance efforts. Due to Onslow’s work, the NWS has gathered new, high quality weather data along not only the Seward Highway but the entire state road system using the Road Weather Information System. Onslow continues to work with the DOT in adding new observation sites and has recently begun adding NWS precipitation buckets to RWIS sites for use in both assessing liquid precipitation totals and, ultimately, toward improving precipitation forecasts.

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

- rest the cursor on “World of DOT&PF”
- rest the cursor on “Programs”
- double-click on “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 T<sup>2</sup> staff. Any reference to a commercial product or organization in this newsletter is only for informational purposes and is not intended as an endorsement.*

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