"Improving Alaska's quality of transportation through technology application, training, and information exchange."

TECHNOLOGY FOR

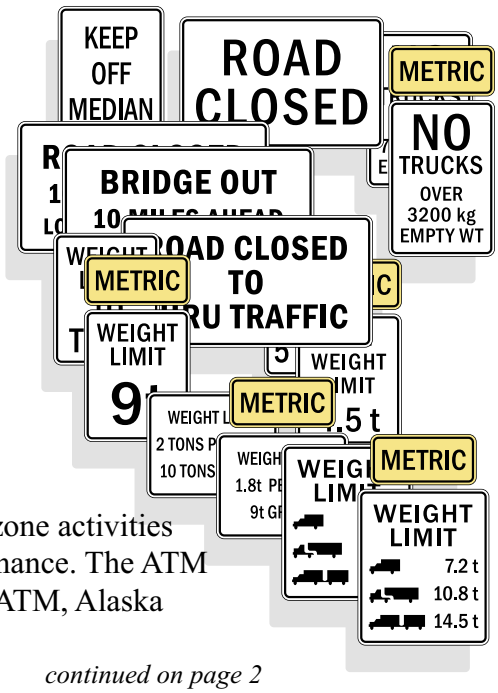
Alaskan Transportation

Local Technical Assistance Program

Fall 2001
July–September
Volume 26, Number 3

In this issue . . .

Alaska's Plan for Adopting the 2000 MUTCD



Anyone planning to put the 2000 MUTCD into practice in Alaska needs to be aware that Alaska Department of Transportation and Public Facilities (DOT&PF) has not yet adopted it. The implementation schedule is contained later in this article.

In Alaska, the *Alaska Traffic Manual* (ATM), not the *Manual on Traffic Control Devices* (MUTCD), addresses traffic control and work zone activities in construction, design, and maintenance. The ATM includes the MUTCD. Besides the ATM, Alaska

continued on page 2

Avalanche Forecasting

Summer's grasp on the high country is fading, the crispness of fall is in the air, and soon a blanket of snow will descend on the mountains, transforming the landscape into the awesome beauty of winter. With the first snows of winter comes the threat of avalanche. In the not too distant past, avalanches were one of the biggest natural hazards facing the traveling public and the transportation workers who live in snow country. This prompted research to understand the mechanics and processes taking place within the snowpack that create avalanches. The era of modern avalanche forecasting had begun and with it, the creation of a whole new profession: the avalanche forecaster.

DOT&PF Identified a Need for Forecasters

Managers at DOT&PF recognized the need to hire avalanche forecasters who could devote time to avalanche safety and education, thus reducing the likelihood of avalanche incidents as well as the state's liability exposure. Alaska DOT&PF now has three Avalanche

continued on page 3

MUTCD 2000

(continued from page 1)

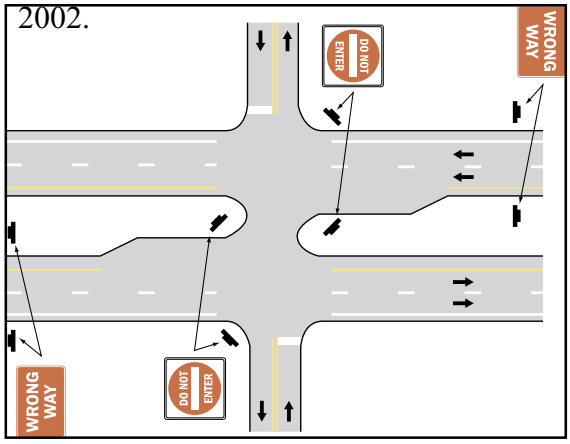
also uses the *Alaska Sign Design Specifications* (ASDS) book.

Alaska Traffic Manual (includes MUTCD)

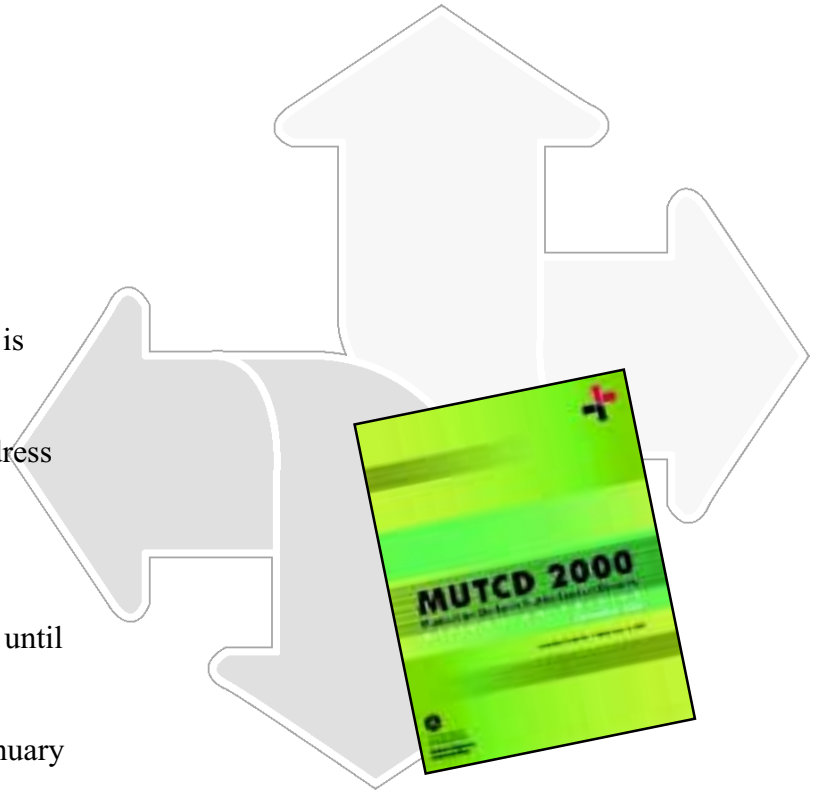
- The *Alaska Traffic Manual,* not the MUTCD, is the legal standard in Alaska.
- ATM = MUTCD + Alaska Supplement
- The Supplement modifies the MUTCD to address Alaska-specific conditions.
- The current ATM consists of:
  1. the 1988 MUTCD with revisions 1-5, and
  2. the Alaska Supplement revised 8/7/00.
- This version of the ATM will remain in effect until the department rewrites the Supplement to correspond with the 2000 MUTCD.
- By law, every state has two years from the January 17, 2001, federal adoption date of the 2000 MUTCD to complete accomplish their adoption. That allows states to work on revisions to their traffic manual until January 2003.
- Alaska DOT&PF expects the revised ATM to be done before July 2002.

Alaska Sign Design Specifications

- The ASDS is the design standard for highway signs in Alaska.
- The ATM refers to the ASDS.
- It was last revised in 1981.
- DOT&PF plans to publish a new ASDS in January 2002.



Clear graphics are available with the PDF (Portable Document Format) files that are down-loadable and print nicely on a good inkjet printer.



Where to purchase or download these documents

ATM and ASDS

1. http://www.dot.state.ak.us/external/state_wide/dnc/eos.d/standards/pubdocs.html

2000 MUTCD

1. Download:

   http://mutcd.fhwa.dot.gov

2. Purchase: Several vendors sell print versions, such as

   http://www.atssa.com/products/default.htm

   or

   http://www.imsasafety.org/

For further information, contact Kurt Smith, Alaska DOT&PF State Traffic Engineer at 907-465-6963 or by email at kurt_smith@dot.state.ak.us

Avalanche Forecasting *continued from page 1*

Forecasters, two permanent and one seasonal. One covers the eastern part of Southcentral Alaska—Thompson Pass, Cordova, and the surrounding region. Another works in the Cook Inlet area of Southcentral Alaska, covering the Turnagain Arm south of Anchorage. The third works the winter months and is responsible for avalanche areas on the Dalton Highway, north of Fairbanks.

These forecasters have a goal of providing the greatest measure of safety to the travelling public and to Alaska DOT&PF maintenance workers. They enhance the emergency preparedness of snow removal crews by helping them understand how rapidly the snowpack is affected by changing weather conditions, including the increased potential for avalanche hazards. Being prepared is key to safely keeping the roads open and avalanche-free.

Avalanche Forecasting

Avalanche forecasting is as much art as it is science. It requires years of practical experience to develop the specific specialized skills and knowledge that are needed. Some of the more important skills necessary are:

- mountain meteorology,
- a through understanding of avalanche mechanics,
- explosives training,
- the ability to travel safely in mountainous terrain,
- good public relations skills, and
- a talent for teaching.

Prior to winter's onset, two of the DOT&PF's Avalanche Forecaster's key responsibilities are to ensure that

1. snow removal crews and other support staff are trained to recognize the snow conditions that create avalanches, and
2. they are capable of performing an avalanche recovery using the basic avalanche rescue tools: the avalanche rescue transceiver, probe, and shovel.

Education provides the critical skills needed to assure the best possible outcome, should workers ever have to respond to an incident.

As winter progressively takes hold, snow begins to accumulate at the higher elevations. Each weather event produces a layer within the snowpack. The snow stratigraphy and the bonds that form between them are key components to understanding avalanches. Throughout the course of the winter, Avalanche Forecasters examine the layering of the snowpack at regular intervals to note how well the different layers of snow have bonded to each other, and whether the bonds are strengthening or weakening over time.

The Forecaster combines this information with daily weather observations, area-specific weather forecasts, and anticipated trends to develop an avalanche forecast. That forecast gets issued so both workers and the travelling public knows what to expect. The avalanche forecast outlines the general weather patterns influencing the region, as well as the anticipated weather for the upcoming 48 hours. Following the avalanche forecast is the avalanche hazard rating for different zones for the upcoming 24-hour period, along with any recommendations for avalanche control work and/or road closures.

Avalanche Control

If avalanche control work is required, the Forecaster identifies specific avalanche paths and formulates a control plan. The control plan needs to take into account:

- the extent of the hazard,
- what control measures are required,

continued

This is an example of controlling avalanches by forcing one to happen before it gets dangerous. DOT&PF's Central Region avalanche crew shot it using a 105mm recoilless rifle in the spring of 2000. It is near mile 98 of the Seward Highway in an avalanche path nicknamed "The Dump."

- traffic control,
- notifying the affected agencies, and
- the amount of time needed to mobilize personnel and equipment.

Control measures often involve forcing an avalanche to occur, once the forecasters identify the avalanche potential and related hazards. Forcing the avalanche mean shooting the avalanche with some form of artillery to trigger it. After traffic control is in place and the road is closed, avalanche crews use one of three basic methods to trigger an avalanche:

1. artillery in the form of a 105 mm howitzer recoilless rifle shot from road at the avalanche starting zone,
2. if the avalanche doesn't respond to the howitzer, they go to aerial helicopter bombing using ammonium nitrate fuel oil (ANFO) bombs weighing about 50 pounds or other varieties of explosives to dislodge snow in the starting zone, or
3. physically go up to the avalanche starting zone and plant explosives in the snowpack (punch a hole with a bar or dig a hole and drop the charges in the hole), then manually detonate the explosives using pull-wire igniters (electrical caps are not an option as blowing snow travelling across a snowpack creates and electrical charge that could cause the explosives to detonate early). Explosives are also used for cutting cornices. Cornices often break naturally and cause an avalanche.

Avalanche control is a tremendously complicated task and requires a strong team of professionals to implement it. The timing of active control measures is extremely important because those measures have to occur prior to any avalanche activity that threatens the safety of the general public and transportation workers. Conversely, if it's done too early, there will be little to no result, and credibility can take a beating. Kind of like crying "Wolf!" Avalanche forecasting is a delicate balance that requires the ability to anticipate changes within the snowpack, some of which may occur within a matter of hours.

Related Activities

Doug Lewis, the Thompson Pass Avalanche Forecaster, and Terry Onslow, Forecaster for the Girdwood and Turnagain Pass area near Anchorage, also oversee portions of Intelligent Transportation System (ITS) projects. These are being installed on the Richardson Highway and in the Cook Inlet area. ITS, funded by Federal Highway Administration, helps states research and implement new technologies aimed at managing and maintaining DOT&PF assets and resources more efficiently and with better information. Two projects due to be deployed this winter are the snow plow Magnetic Guidance System (MGS), and the Road Weather Information System (RWIS).

MGS

The MGS for snowplows uses magnetic strips installed in the highway to determine a vehicle's location in relation to the centerline and fog line. These systems will be tested in two plow trucks this winter, possibly including two snow blowers, if a number to technical problems can be resolved. We anticipate this technology to reduce guardrail damage and permit safer operations during periods of low visibility, as well as to reduce total closure times of the highway. Lewis works with this project.

RWIS

RWIS is a federally funded project designed to deploy a network of remote weather systems throughout the state. The system will collect road and weather data from remote locations, which is then sent to a central database where this information will be used to support operational decisions such as deploying snowplows to specific areas, applying chemical deicers, as well as possible avalanche control. Onslow co-manages the Cook Inlet RWIS Phase I deployment, a prototype of sensors installed at sites from the Knik River bridges on the Glenn Highway to Portage on the Seward Highway.

Future Projects

Other projects on the drawing-board for the future include:

- developing Geographical Information System (GIS) based avalanche forecasting tools,
- a high elevation weather network to assist in avalanche forecasting,
- an avalanche detection system for Cordova, and
- developing an avalanche early warning system.

National Uniform Act Symposium November 6–10, 2001

Enjoy beautiful Mesa, Arizona, while at the National Uniform Act Symposium November 6-10, 2001, at the Sheraton Mesa Hotel and Conference Center. The symposium is presented by the International Right of Way Association in partnership with the Federal Highway Administration and the United States Department of Transportation.

The symposium will commemorate the 30th Anniversary of Public Law 91-646 (Uniform Relocation Assistance and Acquisition Policies Act of 1970), and is designed to bring federal, state, and local public agencies together with private consultants in order to gain a better understanding of the Uniform Act and its relationship to their projects.

Experts will discuss complex issues and current trends of appraisal, acquisition, and relocation practices. This is a great opportunity to learn implementation strategies for acquiring real estate for federal-aid projects.

Other federal agencies supporting the symposium are Federal Aviation Administration, Federal Transit Administration, General Services Administration, Army Corps of Engineers, Housing and Urban Development, and the U.S. Department of Interior.

Additional information on the symposium can be found at: http://www.irwaonline.org/National_Uniform_Act_Symposium.htm, or by contacting Angela Federici at 310-538-0233, ext. 143. Hotel accommodations have been blocked at:

Sheraton Mesa Hotel ($99)
(408) 898-8300 (800) 456-6372
Hilton Phoenix East/Mesa ($109)
(480) 833-5555 (800) 544-5866
Group Code RWA A000

Editor's note: Alaska was one of the first states to put PL 91-646 into practice. One of the first major projects was in the Fairbanks area when then Department of Highways acquired land, homes, and businesses for the Gaffney to Farmers Loop project, now part of the Steese Expressway. Gaffney to Farmers Loop went from Gaffney Road at its intersection with the Richardson Highway at the Ft. Wainwright front gate through Rabbit Island, across the Chena River, and looped out to connect to the two-lane Steese Highway at the new Farmers Loop Intersection. Fairbanks Department of Highways Right of Way staff did relocation work with about 150 homes and business in such unique circumstances that FHWA had the National Highway Institute develop courses based on the challenges they faced.

Safety Performance of Rural Two-Lane Highways

From *Transporter,* June 2001

The report *Prediction of the Expected Saftey Performance of Rural Two-Lane Highways* is now available. The report introduces an algorithm for predicting the safety performance of rural two-lane highways. The algorithm estimates the effect on safety performance of roadway segment parameters, including lane width, shoulder width, shoulder type, horizontal curves, grades, driveway density, two-way left-turn lanes, passing lanes, and roadside design; and of intersection parameters, including skew angle, traffic control, exclusive left- and right-turn lanes, sight distance, and driveways. The algorithm enables highway agencies to estimate the safety performance of existing or proposed highways and to compare the safety performance of geometric design alternatives.

The algorithm forms the basis for the crash prediction module of the Interactive Highway Safety Design Model (IHSDM). The software for the crash prediction module is currently under development. Beta testing of the software will begin in early 2002.

For general information about IHSDM, please contact Ray Krammes at ray.krammes@fhwa.dot.gov or 202-493-3312. To order a hard copy of the report, please contact: Michael Griffith 202-493-3316
mike.griffith@fhwa.dot.gov

A PDF version of the report is available online at :

http: / / www.tfhrc.gov /safety/ 99207.htm

New Steel Bridge Design Aids and Research

from the American Iron and Steel Institute

Washington, DC, July 30, 2001—The American Iron and Steel Institute (AISI) has released five new design aids and research reports for steel bridges. These materials provide cost-effective, time-saving design information for bridgeowners, designers, and consultants. The design aids and research reports are available free of charge for a limited time on AISI's web site (see bottom right).

- *Design for Concrete Deck Overhang Loads.* This research report is authored by Michael A. Grubb, P.E., assistant manager of bridge engineering for AISC Marketing Inc. in Pittsburgh. The report suggests approximate procedures to estimate the factored longitudinal stresses in the top and bottom flanges of exterior girders caused by torsional moments and suggests limit states to ensure adequate ultimate strength of flanges during construction.
- *Seismic Analysis and Design of the AISI LRFD Design Examples of Steel Highway Bridges*. Authored by Ahmad M. Itani, PhD, P.E., associate professor at the Department of Civil Engineering at the University of Nevada, Reno, and Hassan Sedarat, PhD, PE., senior engineer at SC Solutions, Inc. in Santa Clara, California, this guide provides detailed analysis and examples of the LRFD seismic design of highway bridges (AASHTO and LRFD).
- *Steel Bridge Bearing Selection and Design Guide*. This guide facilitates the process of selecting cost-effective bearing systems for steel girder bridges, and provides a quick reference to help with the planning stages of construction. The guide was written by Charles W. Roeder, PhD, P.E., and John F. Stanton, PhD, P.E. Both authors are professors of civil engineering at the University of Washington.
- *Effect of Yield-Tensile Ratio on Structural Behavior-High Performance Steels for Bridge Construction*. Newer production methods make it possible to produce steels with lower yield-tensile ratios. This guide, authored by Roger Brockenbrough, P.E., structural engineer at R.L. Brockenbrough & Associates, reviews how structural behavior is affected by the yield-tensile ratio and the shape of the stress strain curve in general.
- *AISIsplice v.2.1*. In 1999, AASHTO adopted a new methodology for the design of bolted field splices of flexural steel members which includes new formulas for the web and flange forces, as well as minimum design forces. AISI's Transportation and Infrastructure Committee sponsored the development of *AISIsplice* to help engineers implement the new methodology. The software was developed by Dr. Firas Ibrahim of Parsons Brinckerhoff Quade & Douglas, Inc. in Pittsburgh.

"These design aids will benefit both designers who are familiar with steel and those who are unfamiliar with steel bridge design," said Camille Rubeiz, P.E., AlSI's director of transportation and infrastructure. "These tools will impart a greater understanding of steel's widespread, cost-effective and time-saving benefits for all bridge designers, owners and consultants."

For more information on the new bridge design aids, visit AISI's web site at:

www. steel.org/ infrastructure/ bridges

or contact Dan Snyder at 202-452-7100.

These design aids are by the following Construction Market Committee member companies:

Bethlehem Steel Corporation
Dofasco Inc.
IPSCO Inc.
Ispat Inland Inc.
LTV Steel Company
National Steel Corporation
Nucor Corporation
Rouge Steel Company
Stelco Inc.
USS-POSCO Industries
USX-US Steel Group
WCI Steel, Inc.
Weirton Steel Corporation

Where the Rubber Meets the Road

from *Focus* • August 2001

The 13 million tires currently being recalled nationwide by the Ford Motor Company will be recycled, with Ford having expressed a desire to see them reused in paving applications. Ford has asked FHWA to provide technical support for this effort. Other partners that FHWA has asked to join in the effort include AASHTO, the National Asphalt Pavement Association, Rubber Pavements Association, and the RMRC. For more information, contact Byron Lord at FHWA, 202-366-1324 (fax: 202-493-2070; e-mail: byron.lord@fhwa.dot.gov).

New Videos at T2

Announcing new videos in the video library. To borrow, call Simon Howell at 907-451-5482 or e-mail simon_howell@dot.state.ak.us.

Defensive Driver . . . Who, Me?

An animated overview of the key concepts and theories of defensive driving.

Includes:

- The definition of defensive driving
- Six conditions that contribute to collisions
- The standard accident prevention formula
- The definition of the preventable collision
- Instructions on how to make a pre-trip mental inventory

Running time 9 minutes.

Snowplow Safety

Ideal for newly hired snowplow operators or a refresher for experienced operators, this VHS video covers equipment inspection, truck positioning, scanning, mirror use, and defensive driving techniques and provides on-screen diagrams that allow for discussion of collision-prevention techniques.

Running time 23 minutes.

Snowplow Safety: Parking Lots

Perfect for newly hired and experienced operators, this VHS video covers pre-season site preparation, equipment inspection, scanning for hazards such as

lighting fixtures, secured areas, raised utility covers, clearing entrances and exists, where to locate plowed snow, special considerations for plowing 24-hour facilities, and more.

Running time 12 minutes.

Taming the Winter Road

Steer your rig in this direction for winter driving hints and safety procedures. Centered around fellow drivers swapping stories in a direct and informative format, your own employees can review and learn the proper skills required in handling winter driving hazards.

Collision prevention topics include:

- Pre-trip inspection
- Maneuvering through skids
- Handling a jackknife
- Turns and curves
- Applying brakes on ice
- Loading freight correctly
- Urban/highway driving
- and more

Running time 11 minutes.

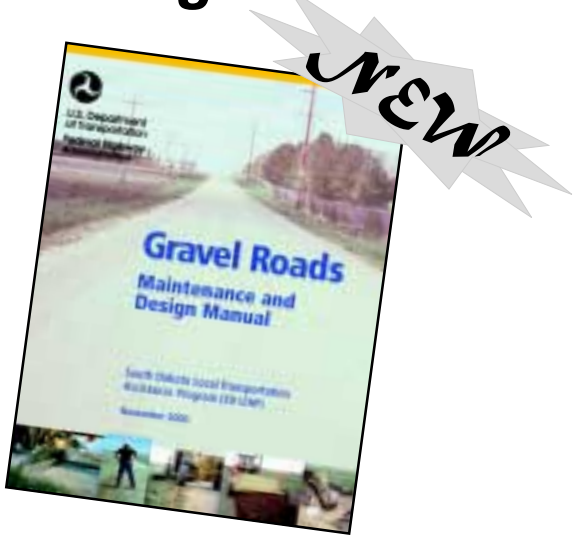
Gravel Roads: Maintenance & Design Manual

Announcing *Gravel Roads: Maintenance & Design Manual.* This manual, developed by the South Dakota Local Transportation Technical Assitance Progam (LTAP) for Federal Highway Administration, provides clear and helpful information for doing a better job of maintaining gravel roads. It presents guidelines to help answer questions about gravel road maintenance.

South Dakota LTAP and FHWA designed the manual for the benefit of elected officials, managers, and grader operators who design and maintain gravel roads. The information presented is as nontechnical as possible without sacrificing clear guidelines and instructions on how to do the job right.

The manual covers:

- Routine Maintenance and Rehabilitation:
  - Understanding Road Cross Section
  - Routine Shaping Principles
  - Crown
  - Road Shoulder
  - Gravel Road Rehabilitation
  - Other areas of concern: Corrugation, Intersections, Bridge Approaches, Superelevation in Curves, Rail Crossings, Driveways, Cattle Guards, Soft and Weak Subgrade
- Drainage
  - Ditches
  - Culverts
  - Bridges
  - Underdrains
- Surface Gravel
  - What is Good Gravel?
  - The Benefit of Testing Aggregates



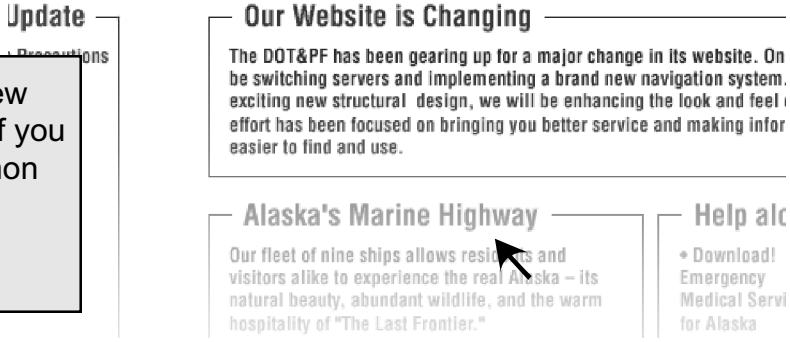
  - Process for Obtaining Good Gravel
  - Handling Gravel)
- Dust Control/Stabilization
  - Types of Stabilizers
  - Benefits of Stabilization
  - Application Tips
- Innovations
  - Changes in Gravel Maintenance
  - Innovative Equipment and Methods
- Appendices
  - Gravel Road Thickness Design Methods
  - Gradation and P.I. Determination
  - Quantity Calculations
  - When To Pave a Gravel Road
  - Walk-around Grader Inspection.

The manual can be found by going to the Research and T2 reports web site at ftp://ftp.dot.state.ak.us:/pub/nres/Research%20Reports/gravman1.pdf

It does require Adobe Acrobat 4.0 or higher to download.

Changes on the Web for DOT & PF

As of November 1, DOT&PF will have a new look to its web page and so will LTAP/T2. If you need help navigating the new site, call Simon Howell at 451-5482 or Sharon McLeod-Everette at 451-5323.



A Vetching Problem: Determining the Nature of Vetch Invasions in Alaska's Road Rights of Way

What is Vetch – Where is it Invading?

Vetch is an aggressive member of the legume family. In Alaska, it's a noxious weed. We believe it's not a native Alaskan plant, and no one knows at this juncture exactly where it originated. So far we know of two strains–Purple vetch *(Vicia americana)* and Tufted Vetch *(Vicia cracca)*. Vetch has now spread to the point that it is invading state and local road rights-of way in various locations in Alaska, often smothering other vegetation.

Fairbanksans driving up Chena Ridge, along Geist Road, or on Old Nenana near the Georgeson Botanical Garden will notice it along the roadsides, crawling up willow trees, and covering fences. Observation reveals it has crowded out the clover that just last summer grew along the road near the Parks/Geist Interchange. It also appears to be a hardy plant. As Fairbanks temperatures cool and other plants die off, vetch continues to thrive. A dramatic example of the invasion is in the Anchorage area along the Seward Highway between Tudor Road and Potter Marsh. There, vetch has completely engulfed four-to-five-foot tall ornamental trees. It has also been a problem in the Matanuska/Susitna valley in general, and along the Glenn Highway in the vicinity of the Knik River bridges and the Parks Highway intersection in particular. There are likely more areas in Alaska that we're not aware of.

We hear that vineyards in wine country use vetch to provide cover for grapes. (If anyone can verify this by personal observation, please let us know—someone might have a unique research opportunity.) Some known agricultural applications include use as a nitrogen fixer and as feed for livestock.

Is the Vetch Invasion a Problem?

At this point, the Alaska Department of Transportation & Public Facilities (DOT&PF) has little information on the nature, extent, and consequences of the invasion of vetch in Alaska—especially in road rights-of-way throughout the state. DOT&PF and other local agencies expend significant funds and effort on erosion control measures, landscaping, and revegetation in road right-of-ways. Scenic byways and beautification funding place extra emphasis on landscaping and encouraging retention or reestablishment of natural plant species.

No one knows if vetch could be a significant threat that compromises the success, efficiency, and economics of landscaping, erosion control, aesthetic, and

Vetch grows like a pea-vine, wrapping tendrils so it can crawl up

safety objectives. We do know that it spreads rapidly, grows like a pea-vine, wrapping tendrils so it can crawl up (note the photo of the fence), and can withstand sub-freezing temperatures.

What Can be Done About Vetch?

Controlling vetch could turn out to be a very important mission as DOT&PF prepares to expend funds to landscape highways throughout Alaska. Keeping vetch at bay will be especially critical if it proves to be overtaking natural species. Preventing its spread and culling current growth would be another difficult issue. Public sentiment has not favored DOT&PF's use of chemical pesticides. If it turns out that vetch control is necessary, the department likely must identify and use nonchemical control measures. Currently, DOT&PF does not actively control vetch species in its rights-of-way.

On Old Nenana Highway in Fairbanks, near the Georgeson Botanical Garden.

What's Happening Now . . .

DOT&PF is conducting a brief study to define the general nature and extent of the vetch problem in Alaska. There are two areas of particular interest. One is determining the specific species, their life histories, noxious characteristics, and geographical extent in Alaska's road rights-of-way. The other is establishing whether, when, and where there may be a need for control measures in road right-of-ways in Alaska.

If it becomes apparent that control measures are necessary, researchers will explore and present suggestions for potential, environmentally friendly (nonchemical) control strategies for use in landscaped road rights-of-way. Suggestions for developing education/outreach programs for adjoining landowners would be another possible outcome.

DOT&PF believes the study team can accomplish these goals within the scope of a literature search, site surveys, and interviews with staffs of appropriate agencies. During the fall and winter of 2001, researchers will gather and analyze data. Final reporting is due in late June 2002. For more information, contact Clint Adler, DOT&PF Research Engineer at (907) 451-5321 or clint_adler@dot.state.ak.us.

A dramatic example of the invasion is in the Anchorage area along the Seward Highway; trees are seven to eight feet tall.

Air Cooled Embankment Design

What is air cooled embankment (ACE) design? ACE uses coarse rock to create a convection cell, in this case in a roadbed. The warm ground (about –2 °C.) heats air which rises to the cold surface of the road, where it is cooled. The cold air then falls to the bottom of the ACE, completing the cycle. Using ACE to remove heat from the roadway during the winter months has proven effective both theoretically and in the laboratory. By using the ACE, researchers hope to halt or significantly retard the thaw of unstable permafrost beneath the roadway, thus increasing the lifespan of Alaska roads in permafrost-susceptible areas.

DOT&PF constructed and evaluated the ACE as an Experimental Feature in part of the new alignment of Chena Ridge Road in Fairbanks. They required the ACE to be built in the fall or winter to minimize thawing of the permafrost beneath the roadway. The ACE was built in the fall of 1996, except for the base course and paving, which were completed the next summer. Instrumentation happened in the fall of 1996 and data recording began that November.

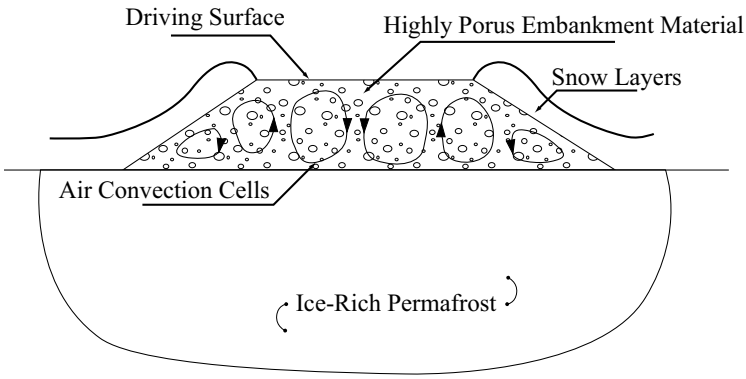
In previous projects, University of Alaska Fairbanks, the research contractor, did the following:

- used computer modeling to investigate the thermal benefits of different embankment geometrics, materials, and slope coverings
- tested the air transfer and thermal properties of candidate embankment materials
- developed embankment design recommendations and instrumentation plans for field demonstration, and
- monitored and evaluated air cooled embankment performance for three years after construction.

The ACE Experimental Feature research, which consisted of temperature monitoring and evaluating the air-cooled embankment performance as described earlier, continued for three years after construction. There was some breakdown of the rock during air-cooled embankment construction, generating some finer material that probably reduced permeability below anticipated values. A small percentage of the thermistors also malfunctioned. However, the air-cooled embankment functioned effectively and largely as planned to chill subsoils in winter.

UAF submitted the final report in September 2001.

The conclusion is that the air-cooled embankment



is effective in maintaining a frozen subgrade beneath the embankment.

- Data collected from the test embankment between December 1996 and December 2000 indicates that convective cooling takes place within the test embankment during winter months.
- Analysis and plots also indicate that mean annual temperatures ranged from 27 to 30˚F in the lower portion of the air cooled embankment.

Available Project Reports

Goering, D. J. Air Convection Embankment Experimental Feature Design Phase 1. *Report No. FHWA-AK-RD-98-01 (INE/TRC 97.06), Federal Highway Administration, Washington DC, 1997.*

Goering, D. J. Parks/Chena Ridge Air Convection Embankment Performance Report: Dec. 1996 to Sept. 1998. *Report No. INE/TRC 99.06, Institute of Northern Engineering, University of Alaska Fairbanks, September 1998.*

Goering, D. J. Parks/Chena Ridge Air Convection Embankment Performance Report: Oct. 1998 to Sept. 1999. *Report No. INE/TRC 00.01 (FHWA-AK-RD-99-04), Institute of Northern Engineering, University of Alaska Fairbanks, September 1999.*

Goering, D. J. Parks/Chena Ridge Air Convection Embankment Experimental Feature. Phase II Final Report*:* Oct. 1999 to Sept. 2000. *Report No. FHWA-AK-RD-01-02 (INE/TRC 02.01), Federal Highway Administration, Washington DC, 2001.*

Eliminating Longitudinal Cracking

The Problem

Many interior Alaska roads are constructed in areas of warm permafrost. These roads often experience a significant failure rate due to longitudinal cracking, which occurs because the permafrost thaws at an accelerated rate at the south slopes of the embankment. The foundation soils subside (sink) beneath the sideslopes, causing the road shoulders to rotate. The rotation creates longitudinal cracking, which most drivers recognize as the deep cracks in the pavement surface that result in hazardous driving conditions. For local government and DOT&PF maintenance workers, these cracks are a headache that requires frequent maintenance.

What causes the thawing?

High mean temperatures cause thawing on the sideslope. There are two primary sources that cause the higher mean temperatures:

(1) thick snow layers in winter, because of snow clearing operations, and
(2) relatively high summer temperatures.

What are we doing about it?

DOT&PF Research contracted with University of Alaska Fairbanks to examine a new technique to cool embankment side slopes, with the goal of avoiding accelerated thaw and longitudinal cracking. The technique, similar to the Air-Cooled Embankment, or ACE, (see previous article) involves using a layer of a uniformly graded coarse aggregate with low fines content and very high permeability. High permeability will allow the ambient air to circulate through the shoulder of the embankment during winter, thus providing an enhanced cooling effect. If the technique proves viable, this project could offer a cost-effective method to avoid longitudinal cracking, improving safety and reducing maintenance.

UAF performed analytical simulations to study the effect of different embankment configurations and geometrics on temperature variations over time within the system. We plan to include the most promising configurations in an actual construction project as an experimental feature. This is geared to happen during the summer of 2002 in the Loftus Road extension project, which creates a new University of Alaska Fairbanks entrance at Geist Road. Once constructed, the experimental configurations will be monitored.

For more information about either project, contact Steve Saboundjian, Research Engineer, at 907-451-5322 or by email: steve_saboundjian@dot.state.ak.us. Reports are available on DOT&PF's research web page (use the report number to find it) at http://www1.dot.state.ak.us/stwddes/research/assets/pdf/

LTPP Manuals of Practice

Now available are printed copies of four manuals of practice on pavement repair materials and procedures, originally published as a two-volume set by the Strategic Highway Research Program and recently updated by the long-term pavement performance (LTPP) program. Each of the following manuals includes a discussion of the most appropriate time to apply a particular treatment, what types of materials and construction methods should be used, and how to evaluate the performance and cost-effectiveness of a repair procedure:

- Materials and Procedures for Rapid Repair of Partial-Depth Spalls in Concrete Pavements *(Publication No. FHWARD-99-152)*
- Materials and Procedures for Repair of Potholes in Asphalt-Surfaced Pavemenis *(Publication No. FHWA-RD-99-168)*
- Materials and Procedures for Repair of Joint Seals in Portland Cement Concrete Pavement Joints *(Publication No.*FHWA-RD-99-146)
- Materials and Procedures for Sealing and Filling Cracks in Asphalt-Surfaced Pavements *(Publication No. FHWA-RD-99-147).*

The manuals also contain step-by-step procedures for ensuring a high-quality repair and a list of sources for materials and equipment.

The LTPP program's recently updated Manuals of Practice include information on materials and procedures for pothole repair.

The LTPP program has awarded four new 5-year contracts for the collection and processing of pavement performance data by region. Data collection and processing will be handled by Stantec in the North Atlantic region, ERES Consultants in the North Central States, Fugro-BRE in the Southern Region, and Nichols Consulting Engineers in the Western States. For more information, contact Jack Springer at FHWA, 202-493-3144 (fax: 202-493-3161; e-mail: jack.springer@fhwa.dot.gov).

A new study of the performance of pavement edge drains at Specific Pavement Study (SPS) –1, –2, and –6 sites was recently launched by the LTPP program. Staff from consulting firm Fugro-BRE will be visiting the SPS sites this fall to determine the condition of the drains and whether or not they are working. A report is scheduled to be issued in Spring 2002. For more information, contact Jack Springer at FHWA, 202-493-3144 (fax: 202-493-3161; e-mail: jack.springer@fhwa.dot.gov).

The long-term pavement performance program's *LTPP Product Plan* can now be downloaded from the IIFPP Website at

www.tfhrc.gov/ pavement/ltpp/brochure.htm

A limited number of printed copies of the manuals are available from the FHWA Research and Technology Report Center, 301-577-0818 (fax: 301-577-1421; e-mail: mgreen@fhwa.dot. gov). Copies can also be downloaded from the LTPP Website at

www.tfhrc.gov/pavement/ltpp/mofpract.htm

A Quick Slope Stability Analysis

(Part 1 of 3 parts)

From *Hawaiian Connections* Volume 3, no. 2 summer 2001, newsletter of the Hawaii LTAP

Editor's Note: Walter Lum, consulting engineer, through many years of experience has developed quick and easy ways to solve complex problems. He has shared his rules of thumb with us.

Slope stability analysis can be performed very quickly by the following semi-graphical procedure, if the slope and slip surfaces are known and drawn to scale.

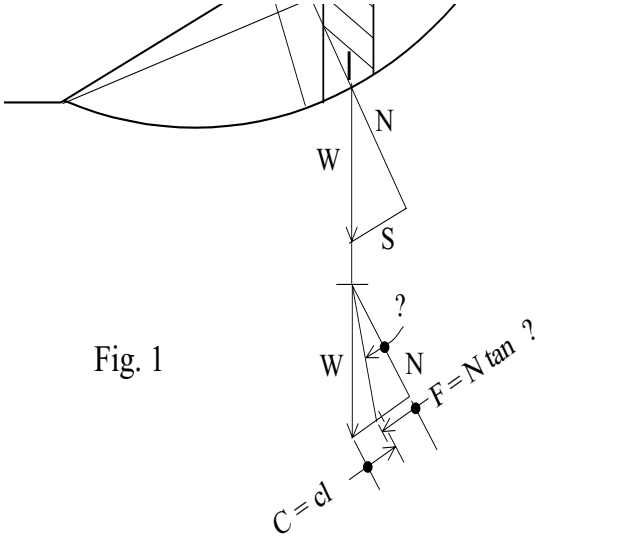


Fig. 1

N = normal through the origin "0"
S = shear required for equilibrium

C = c x l = cohesion available
F = N x tan ?? = friction available

F.S. = (C + F) / S

For F.S. = Factor of Safety of total Slope, Fig. 2

Begin force polygon at point "a", the inter section of weight W and radius R

R = r x L_a/L_c, L_a/L_c = ? / (57.3 x sin ?)

W = weight of triangle and circular segment
(weight of segment = ? x ? x L_c x 0.68)

cg, center of gravity of slope

cg of triangle by eye
cg of segment = 0.4 x ? from chord, L_c
cg of total slope by eye

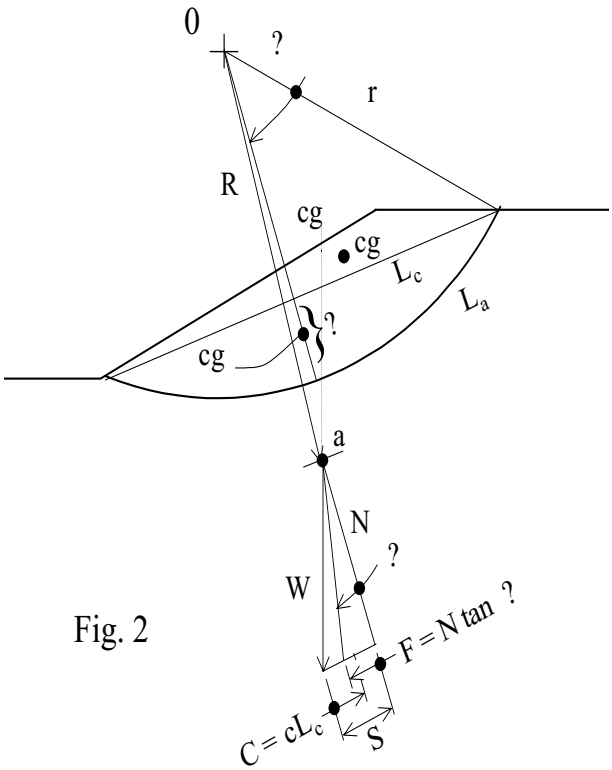


Fig. 2

F.S. = (c x L_c + N x tan ?) / S

F.S. = (C + F) / S

Check it out with a known problem and see if it works.

Winter Concept Vehicles Test Gadgets

Wisconsin has been working on a winter concept vehicle program since August 1998 (the same year that Alaska DOT&PF began putting their concept trucks into use—see the Spring 2001 and Fall 1998 issues of Technology for Alaskan Transportation *for articles about Alaska's activity). They have employed some of the same technologies, and are exploring others. Following are articles from* The Crossroads, *Wisconsin LTAP's newsletters. Contacts for more details about the concept items are listed with the articles, along with a Wisconsin Department of Transportation contact for a report on the results.*

Planning for the Winter Concept Vehicle (WCV) program began in August 1998 and it now has two snow seasons of experience. Starting with three counties in winter 1999–2000, the program had a total of eight counties in the winter of 2000–2001. These volunteer counties field-test new equipment and technology under real winter weather conditions. The program is organized by Tom Martinelli, winter operations engineer, in WisDOT's Bureau of Highway Operations.

"The intent is that the experiences will be shared with other counties, giving them the information they need to decide if they want to incorporate any of these options on their trucks," says Martinelli. The state pays for the concept equipment beyond what the county would normally put on a winter patrol truck. In return, the county people evaluate and report on the individual equipment.

The counties are testing many 21st century "gizmos and gadgets" now available from vendors. Other technologies under study include CIS systems, data reporting systems, and zero-velocity spreaders.

"We have some features that have not yet proved themselves," says Martinelli, "but we will continue to work with them." The counties reported this past winter's experiences and data at a May WCV Committee meeting. Martinelli will have a progress report available in early summer.

For more details on WCV items and results, ask Tom Martinelli for his report at 608-266-3745, thomas.martinelli@dot.state.wi.us.

Winter Equipment Ideas Ready to go

A baker's dozen of winter equipment ideas have earned strong positive votes from the counties involved in the WisDOT Winter Concept Vehicle program. Now, after two winters' testing, there is more field time to back up their use. Most have several vendors and prices can vary, so talk to your equipment supplier about sources and costs. (Amounts listed below are the approximate cost or the cost range paid by WisDOT in 2000).

Front Plow Shield ($700–$1,400). Plastic hoods are mounted at the top of the plow. The shields capture snow that tends to blow over the plow onto the windshield and direct it under the vehicle. This drastically reduces the whiteout effect for snow plow drivers. It is most useful for higher speed plowing (25 to 40 mph). "They've increased our plowing speed by about 10 mph," says Portage County Highway Commissioner Bill Weronke. "We are probably going to make shields common on all our trucks."

"Since we put it on the truck the employee did not have to clean the lights one time," says Weronke. "Without it, it would take them 10 minutes to clean lights every time they made a round."

LED lights ($1,000–$2,500). New LED lighting systems use large clusters of tiny, very bright bulbs in one bulb assembly. They give much better visibility. They will fit into existing tail and turn light fixtures. "They're a good safety feature," says Dave Lyga, Shop Superintendent, Trempealeau County. "If one element burns out, or even 15, it doesn't affect the light. They're still very bright."

Wing lights. A snow cloud often covers the wing when it is in operation. A light, either LED or strobe, located on the outside edge of the wing plow, alerts motorists that the wing is down and where its end is

continued on next page

when they are passing. Wing lights can be tied to turn signals as well. "It's a great feature that we never had before," says Weronke. "In the past we have had several wings run over on four-lanes and interstates."

HID (High Intensity Discharge) lights ($900–$1,000). These extremely bright blueish lights are set above the normal lights on the truck cab roof. They are not yet approved as headlights for trucks, so they supplement conventional headlights on plow trucks. "They're probably one of the best inventions that ever came out according to our operator," says Lyga. "We have them wired to the high beams and that's the only time they're on. They illuminate the whole countryside."

Rear cameras ($1,700–$2,500). Some concept vehicle truck counties are now mounting two cameras: one in the rear to show vehicles hidden behind the truck. This is very helpful when backing, at intersections, and in urban areas. This same camera can also show whether the spreader is actually putting out material. A second camera sits on the passenger side mirror to show what is in the blind spot, which is very helpful on multilane roads and in urban areas. "We've had several backing accidents in Portage County," says Weronke. "The benefits of the rear camera are very clear. Whether they outweigh the cost, and we can get them through the budget process, I don't know."

Single "joy stick" control. This unit allows the driver to operate plow, spreader, dump box, etc. all with one control. Once drivers learn how to use them, they love them and feel it is safer and less tiring than all the individual controls. "We've been using them for four years on all our plow trucks," says Lyga. "When you had six or eight levers it could be difficult to find the right one in the dark cab. This way it's all done with one hand and the thumb. It's so easy on the hand, and your arm just sits on the armrest."

"Hands free" two-way radio controls. These let the operator radio the base or his foreman without taking his hands off the steering wheel or other plow controls.

Pavement temperature sensors ($450–$900) remain very helpful for plow truck operators and supervisors since application of deicing or anti-icing materials, and even abrasives depends on pavement temperatures. These devices are now in wide use, helping operators use materials more effectively. "We've used them for six years," says Lyga. They let the operator know of changing conditions so they don't have to wait for the foreman to call and say switch to sand or salt."

Under-body plows. These plows apply downward pressure and can remove more snow pack or ice than front-mounted plows. When truck-mounted they can help reduce the need for graders and they are finding some year-round use for shoulder grading and other projects. Uneven manholes or other utilities in the pavement cause operating problems. "I have them on all my state trucks and I haven't run a grader through a snowstorm in the last five years," says Weronke. "They've allowed us to go from 12 graders down to four, which is a big benfit when graders cost $250,000 each." Weronke observes that underbody plows vary widely in reliability and maintenance.

New spreaders with a chain or belt in the bottom of the salt box. These spreaders can be reversed to permit discharge either to the rear or the front of the truck. They can discharge material in front of the drive wheels and to the side, for shouldering or spreading black dirt in the summer. "We like them," says Lyga. "It makes a very versatile truck."

"I don't like them," says Weronke. "If you get a rock in the gear drive or under the belt it can be very uncomfortable chiseling it out of there at 20 degrees below zero."

Automatic tire chains ($1,800). These chains hang next to the wheel until activated, then they spin under the wheel, giving traction. They eliminate tire chain inventory, installation time, and maintenance and seem to be effective in hilly areas. "Our county is quite hilly and we've been using them for a number of years," says Lyga. "Even when we get expensive chains they tend to break, and wear a lot. With this unit you just flip a switch. Maintenance-wise they're so much better; you just replace a short link."

Anti-Icing System. An on-board 900-gallon liquid storage tank, spray bar, and pump system allows the operator to switch back and forth for an anti-icing application to a dry or prewetted salt application mode by the flip of a switch or the turn of a knob. This setup makes the truck more flexibile for various types of winter operations.

For more details on these items, contact Bill Weronke, Portage County, 715-345-5230, or Dave Lyga, Trempealeau County, 715-538-2221. A report is available. Contact Tom Martinelli, 608-266-3745, or e-mail thomas.martinelli@dot.state.wi.us

Wisconsin Tests Snow Removal Concepts on Plow Trucks

Alaska is in good company in their quest for better snow removal equipment. Other states like Wisconsin continue to try new concepts.

Reprinted from Better Roads Magazine
December 2000

Eight Wisconsin counties will be testing new options for snow removal equipment, according to a report from the Transportation Information Center—LTAP at the University of Wisconsin-Madison. Items under review range from a hands-free microphone for the radio to strobe lights on wing plows to combined salt and anti-ice tank systems.

With financial assistance from the WisDOT Bureau of Highway Operations section, the first three winter concept vehicles hit the road last season in Florence, Columbia, and Manitowoc counties. Five more will be operating for this snow season. Early reports after one winter are enthusiastic about many of the new equipment additions.

"From the operator's perspective, they really liked the single joystick, the no-hands radio, the high intensity and strobe lights, and the clear door," says Bob Braunel, Manitowoc County Highway Department Highway Superintendent. "As superintendent, I see potential to save money using the ground speed controller, dual spinners, and anti-icing tanks."

Results from Florence and Columbia counties generally agreed with Braunel's assessments. Tested equipment included nine items.

1. **Single joystick.** A single control stick replaces four levers for equipment operation. It improves safety by requiring less attention from the driver.
2. **Radio/microphone.** Communication is easier and less distracting with the radio microphone switch now mounted on the horn pad on the steering wheel and the microphone mounted in the visor.
3. **Hi cab headlights and strobes.** High-intensity lighting mounted on the truck cab and at the end of the wing plow improves the truck's visibility to other traffic but doesn't distract or blind other drivers, including those of other plows. "You can see it for 250 to 300 ft. and in whiteout conditions," says Braunel.
4. **Lexan door.** Replacing the cab's passenger side door with clear Lexan costs $500 and gives the driver a clear view of the plow's operation on the right side. New versions will be hinged and have a kick-out plate for safety.
5. **Raven DSC 700 ground speed controller.** This automatically varies material delivery (liquid or solid) based on truck speed. The Raven is accurate and effective. "In general, ground speed controllers are the only way to go," says Braunel. "They help with inventory control and deliver accurate applications for varying conditions."
6. **Anti-icing tanks.** Mounting a 900-gal. anti-icing system along with the 9-yd. V-box spreader makes it easy for a superintendent to switch from spreading liquid to solid materials while the truck stays on the road. "You can respond to a weather change and get snow or ice cleared off the road quicker without having to send the truck back to the shop to pick up chemicals," says Braunel. Both Manitowoc and Florence counties used less salt overall by combining liquid anti-icing applications with salting.
7. **Dual spinners.** Spinners mounted on both sides at the rear of the truck save salt by making it easier to salt the centerline of two freeway sections when driving in the passing lane.
8. **Rear-mounted cameras.** Cameras mounted at the rear of the truck display on a small in-cab monitor the spinner operation and following traffic conditions. These are especially helpful when backing up the truck.
9. **Front airfoil on plow.** Florence County found that a front plow snow shield effectively keeps snow from accumulating on the truck's windshield. Other equipment that needs more on-the-road testing includes remote heated mirrors, airfoils to prevent snow build-up on the rear of the truck, and global positioning system equipment. These new equipment options can add up to $60,000 to the base cost of a new snow plow truck, but they're worth it, Braunel believes. "We cut back 30% on

continued on next page

Wisconsin Concept Trucks

continued from pg.17

salt usage by using the concept vehicle," Braunel says.

The concept vehicle program is a partnership among the eight volunteer counties, the WisDOT Bureau of Highway Operations, and Monroe Truck Equipment Company. By the time the three-year project ends, WisDOT's winter equipment committee will have a benefit/cost analysis of all the equipment tested, and will probably develop a set of standard specs and recommendations based on these real-world tests.

For more information on the Concept Vehicle program, contact Tom Martinelli at WisDOT, 608-266-3745. You can reach Bob Braunel in Manitowoc at 920-683-4351.

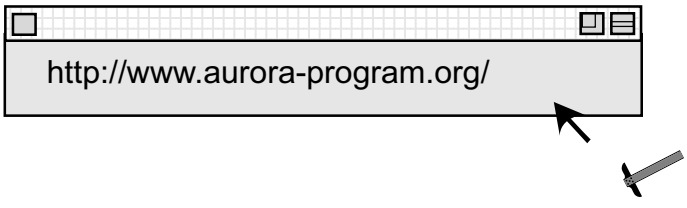
Helping Make Road Weather Information Systems Happen

from Transporter • *June 2001*

The Aurora program is helping transportation agencies more effectively incorporate road weather information systems (RWIS) into their winter road maintenance toolboxes. Under FHWA sponsored research, Aurora is developing affordable (less than $9,000 per unit) RWIS, creating computer-based RWIS training packages specific to particular geographic regions and agencies, benchmarking the performance of RWIS forecasts, and synthesizing national road weather forecasting. Aurora is an FHWA pooled-fund consortium of public agencies in the United States, Canada, and Europe working together to advance RWIS technology. Members include State DOTs in Illinois, Iowa, Minnesota, New York, Pennsylvania, South Dakota, Tennessee, Virginia, and Wisconsin; provincial agencies in Quebec and Ontario; and the Swedish road authority, many of whom champion Aurora projects vital to their agencies. Universities and meteorological services in Canada, Iowa, Minnesota, North Dakota, and Sweden participate as affiliate members. According to Lee Smithson, AASHTO's Snow and Ice Cooperative Program coordinator at the Iowa Department of Transportation, Aurora meetings are like "mini international scanning tours." Members and affiliates meet three times a year and conduct monthly teleconferences to set and review their research agenda, discuss RWIS- related activities around the world, share their agencies' accomplishments, and learn solutions for common in-the-field problems. Aurora welcomes new members.

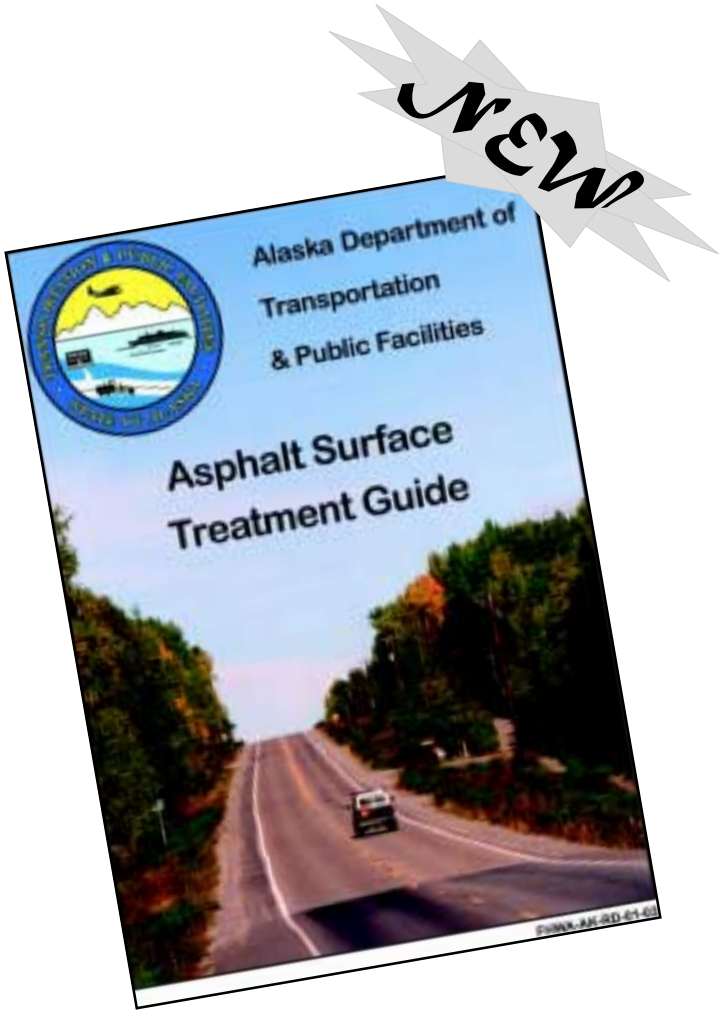
For more information contact Curt Pape, Aurora Program Chair, Minnesota Department of Transportation, at curt.pape@dot.state.mn.us or Paul Pisano (202) 366-1301; paulpisano@fhwa.dot.gov

See Aurora's Web site at

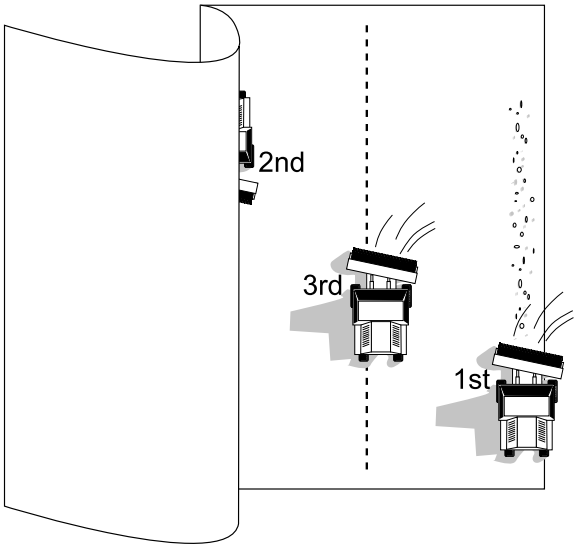


Asphalt Surface Treatment Guide

Alaska DOT&PF Research section recently released a brand-new *Asphalt Surface Treatment Guide.* The guide focuses on the three surface treatments used most in Alaska: chip seal, double layer, and high float. It is a decision-making tool, not a policy, for selecting and building the appropriate surface treatment for based on conditions, available materials, and budget. The information has never been gathered together before for Alaska use. This guide originated because most AST work got done by workers armed with a "cheat sheets" from a variety of manuals and personal experience, and some based on undocumented experimentation. The AST guide is a comprehensive, reliable technical reference containing specifications, detailed construction methods and cautionary information. The guide is to be used as an everyday "working document" at the job site.



You will soon be able to download this document from the Internet. For the web address, call Sharon McLeod-Everette at (907) 451-5323, or e-mail sharon_mcleod-everette@dot.state.ak.us

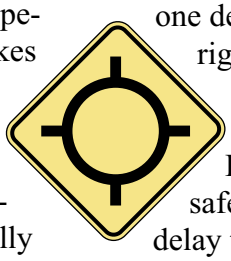


The new Asphalt Surface Treatment Guide *is designed to be used as an everyday "working document" at the job site.*

Roundabouts: The Next Intersection

by Kurt Smith, Traffic Engineer, Ak. DOT &PF

"I find traffic signals almost insulting," said Jay, our guide on a 4WD tour of the Daintree Rainforest in Australia. He does not like to stop at signals, especially when there is no conflicting traffic. He likes roundabouts, which let him make his own stop/go decisions and rarely require him to stop.



Australians' seemingly unanimous approval of roundabouts contrasts with the negative reactions sometimes heard from Alaskans – especially from those who are experiencing Anchorage's first roundabout. Those reactions include concerns about safety and not knowing how to drive roundabouts, as well as more humorous remarks. For example, an Anchorage body shop suggested posting a sign in the middle of a new roundabout identifying them as a sponsoring business. Others have suggested placing handy accident report vending machines in every roundabout island. Although these were tongue-in-cheek suggestions, they reflect the initial reactions of many who have little roundabout experience.

My wife and I recently returned from a driving vacation in Australia and New Zealand. On the way over, I wondered about negotiating roundabouts while driving on the "wrong" side of the road. I had driven few roundabouts and thought that if they were going to be a problem, they would be a more serious problem under that circumstance.

I found them simple and easy to drive, even on the left side. I don't remember stopping at any of the hundreds of roundabouts on our route. When there were cars on other approaches, the conflicts were handled easily and intuitively. Roundabouts present you with one decision to make at a time and it's as easy as a right—or left, depending on the country you're in—turn on red.

The numbers back up those impressions. Data shows that single-lane roundabouts are safer for cars, bikes and pedestrians, cause less delay than signals (except at very high volumes), and greatly reduce stops. According to a recent Insurance Institute for Highway Safety study, roundabouts reduce injury accidents by 75%, and incapacitating injury or fatal accidents by as much as 90% when compared to intersections with traffic signals or stop signs. Widespread installation of single lane roundabouts in Alaska could greatly reduce injuries and fatalities.

State road authorities, with municipalities leading the way, are starting to install roundabouts. In the fall of this year, the Municipality of Anchorage constructed Alaska's first modern roundabout on southport Drive. The City and Borough of Juneau constructed a teardrop-shaped traffic circle in the spring, although it did not incorporate the deflection and other design features of modern roundabouts.

More are on the way. The DOT&PF plans to construct multi-lane roundabouts at the Dowling Road / New Seward Highway (NSH) ramp intersections in Anchorage and a single lane roundabout at a new Loftus Road intersection at the University of Alaska Fairbanks. The Municipality of Anchorage plans to

Alaska's first modern roundabout: Southport Drive, Anchorage, September 2001

construct a single lane roundabout on Elmore Road at the new South Anchorage High School. Roundabouts are being considered for several other locations.

The decision to install multi-lane roundabouts is more complex than it is for single lane ones. In general, multi-lanes are less safe than single lanes. When compared to traffic signals, accident data indicate they are safer for vehicles, less safe for bicycles, and the jury is still out for pedestrians. However, regardless of what the pedestrian data eventually shows, some pedestrians will feel less safe at multi-lane roundabouts than at signals. People accustomed to WALK and DON'T WALK signals at signalized intersections can be uncomfortable crossing multiple lane approaches without this type of positive guidance.

Like single lanes, multi-lane roundabouts have substantial advantages. They move a lot of traffic with minimal delay and often reduce the need for additional lanes between intersections. The latter is a major factor at diamond interchanges (like Dowling/NSH) where additional lanes between ramps can increase project costs by millions.

Even with all their advantages, roundabouts are not appropriate everywhere. They do not function well in coordinated signal systems. They are not a good choice at intersections where the traffic on one leg is so heavy that it would lock out a downstream approach. They are not a good substitute for grade-separation on high-speed, controlled access arterials. Single lane roundabouts can't handle traffic volumes much over 15,000 entering vehicles per day. Multi-lane roundabouts can't handle as much traffic as very large signalized intersections. There are other situations where they may not the best solution. However, the exceptions leave a large portion of Alaska's intersections as good roundabout candidates.

In the transportation business, we often face hard choices: highway safety vs. environmental impact, standards vs. community character, highway capacity vs. pedestrian friendliness, neighborhoods vs. through traffic, etc. In contrast, single lane roundabouts are often an easy choice. They are safer for vehicles and pedestrians, environment-friendly, reduce delay, look better, and use no electricity. They offer an unprecedented opportunity to improve Alaska's highway system.

Yield to Right—NOT: Roundabouts reverse the usual right of way rule for drivers who arrive at an intersection at the same time. At roundabouts you yield to the left (to traffic already within the roundabout).

Traffic circle construction, Downtown Juneau, May 2001.

New Law: The DOT&PF is working with the Department of Public Safety to draft a new law telling drivers and pedestrians how to negotiate roundabouts and telling police who is at fault in case of an accident. Alaska will likely be the second state to enact such a law. The main points of the law are: (1) entering drivers yield to vehicles already within the roundabout, (2) no passing on the right within multi-lane roundabouts, (3) trailing drivers within multi-lane roundabouts yield to exiting vehicles in front of them, (4) drivers should choose their approach lane at multi-lane approaches based on whether they are turning left, right, or going straight, and (5) pedestrians may not cross to roundabout central islands.

First Impressions: The first roundabouts built in each community are ambassadors. If well designed, experience indicates the public will want more of them. If not, communities may reject them. Designers should thoroughly understand the principles of roundabout design and, desirably, have designs checked by experienced outside designers before construction.

Training Calendar 2001

Training (www.dot.state.ak.us, go to "World of DOT & PF", then click on "Training Opportunities")

November

NHI 361020: Alaska Native Employment Partnership
Anchorage: Nov. 6–7

FHWA Contract Administration Core Curriculum Course
Anchorage: Nov. 13–14
Fairbanks: Nov. 15–16
Juneau: Nov. 19–20

Soil Stabilization Workshop
Fairbanks: Nov. 27
Anchorage: Nov. 28
Juneau: Nov. 29

ITS Awareness Seminar
Anchorage TBA NHI 137001

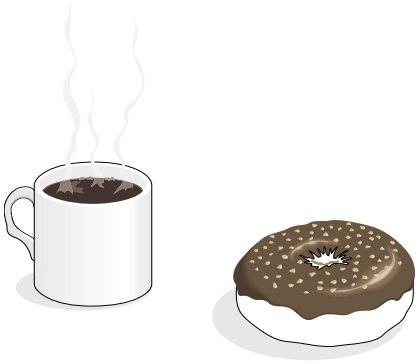
December

Snow Fence Design & Installation
Nome TBA Week of December 9
Fairbanks TBA Week of December 9
Palmer TBA Week of December 9

Planning & Managing Snow & Ice Control Activities: Anti-Icing, Deicing, Abrasives
Juneau TBA Mid-December
Anchorage TBA Mid-December
Valdez TBA Mid-December
Fairbanks TBA Mid-December
Palmer TBA Mid-December
Kenai TBA Mid-December

IECA Phase II: How to Select, Install & Inspect Site Erosion & Sediment Control. Best Management Practices for NPDES Storm Water Permit Compliance
Juneau: Dec. 11
Anchorage: Dec. 12
Fairbanks: Dec. 13
Note: these dates will change; IECA is adding a second Anchorage section.
Agenda and registration is at: www.ieca.org/education/courses/NPDESusa.html
(Workshop not sponsored by T2)

For information about T2 sponsored training, contact:
Sharon McLeod-Everette at 907-451-5323; sharon_mcleod-everette@dot.state.ak.us or Simon Howell at 907-451-5482; simon_howell@dot.state.ak.us.



Meetings Around Alaska

Society	Chapter	Meeting Days	Location & Contact	
ASCE	Anchorage	Monthly, 3rd Tues., noon	Northern Lights Inn	
	Fairbanks	Monthly, 3rd Wed., noon	Captain Bartlett Inn	
	Juneau	Monthly, 2nd Wed., noon*	Westmark Hotel	* except June–Aug.
ASPE	Anchorage	Monthly, 2nd Thurs., noon	West Coast International Inn	
	Fairbanks	Monthly, 1st Fri., noon	Captain Bartlett Inn	
	Juneau	Monthly, 2nd Wed., noon*	Westmark Hotel	* except June–Aug.
ASPLS	Anchorage	Monthly, 3rd Tues., noon	Executive Cafeteria, Federal Building	Alex Prosak, 562-3252
	Fairbanks	Monthly, 4th Tues., noon	Ah Sa Wan Restaurant	
	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	Zach's Sophie Station	Jeff Russell, 451-5495
ITE	Anchorage	Monthly, 4th Tues., noon**	Sourdough Mining Co.	Alex Prosak, 562-3252 ** except July & Dec.
IRWA	Sourdough Ch. 49	Monthly, 3rd Thurs., noon**	West Coast International Inn	
	Arctic Trails Ch. 71	Monthly, 2nd Thurs., noon**	Oriental House	
	Totem Ch. 59	Monthly, 1st Wed., noon	Mike's Place, Douglas	** except July & Dec.
PE in Government	Anchorage	Monthly, last Fri., 7 a.m.	Elmer's Restaurant	
Society of Women Engineers	Anchorage	varies	Karen Helgeson, 522-6513	

Farewell to LTAP Advisory Board Member David Mumford

David Mumford, LTAP Advisory Board member representative from the Municipality of Anchorage, recently vacated his post when he moved from Anchorage to Montana to become public works director for Billings, Montana. David served on the board from January 1994 through August 2001.

Bon voyage, David, we wish you well. We appreciate all your hard work and support for the program.

And Welcome to Lee Coop

We welcome Lee Coop as the new Municipality of Anchorage LTAP advisory board member. Lee is the Assistant Traffic Engineer for the Municipality of Anchorage, and will attend his first board meeting on October 30.

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.

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