

“Improving Alaska’s quality of transportation through technology application, training, and information exchange.”

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## Raising the Million Dollar Bridge

**In this issue . . .**

- Raising the Million Dollar Bridge
- Planning, Design, and Field Notes**
- Nordic Abrasion Test Equipment Made locally
- Pavement Edge Treatment
- Interactive Highway Safety Design Model?
- Summary of Trenchless Technology Now Available

**Priority Market-ready Technology And Innovations**

- Cable Median Barriers

**Safety Training**



*The profile of the Million Dollar bridge is restored 41 years after the 1964 earthquake dropped the north span off its pier (below).*



Home of the Trans-Alaska Pipeline, Alaska has been the setting for a few epic engineering battles against nature. The Million Dollar Bridge, on the lower Copper River, is a reminder of another improbable Alaska construction project.

Completed in 1910, the bridge was the crux of the Copper River and Northwestern Railway - built to carry copper ore 196 miles from Kennicott to Cordova. Along that route were some of the greatest obstacles Alaska offers—steep canyons, rivers, hurricane-force winds, mosquitoes, and dozens of glaciers.

Last year Alaska DOT&PF completed repairs to the damaged bridge, ninety-five years after initial construction and four decades after it was rendered inoperative by the Great Alaska Earthquake. Repairs began in October of 2003, to include a seismic retrofit, rebuilding the damaged pier, adding anchoring piers, installing isolation bearings and joints, and raising the fallen span.

Engineers and geologists of the day feared the bridge would be engulfed by encroaching glaciers. It survived nature’s whims until

*(continued on page 2)*

March 27, 1964, when the 9.2 magnitude Good Friday Earthquake, knocked the northernmost span from its concrete piling, where it remained for forty-one years, slumped into the Copper River.

### Replacing the Pier

The earthquake-damaged pier needed replacement. Five 6-foot-diameter steel pilings were driven 150 feet and filled with concrete, cut, capped, and topped by a concrete slab to create the new base for the replacement pier. The old pier would later be demolished and a pier constructed on the new pad. Throughout the project, the historic appearance of the bridge was preserved.

### Raising the Span

Before demolishing the old pier, four temporary steel pilings were erected, two on each side of the existing pier. Each piling was fitted with a 660-ton hydraulic jack. The jacks lifted a block attached to steel rods connected to a lifting beam under the fallen span (see figure below). The span was then lifted a little at a time, limited by the stroke of the jack. The jacks successfully lifted both spans above the level of the damaged bridge pier.

The old pier was then demolished and the new pier built upon the new pad. The bridge sections were then lowered and slid into place on the new pier. The contractor used newly fabricated parts to replace dam-

aged and missing steel members. As much as feasible, materials and methods were selected to maintain the historic appearance of the bridge during the numerous tasks required to rehabilitate and restore.

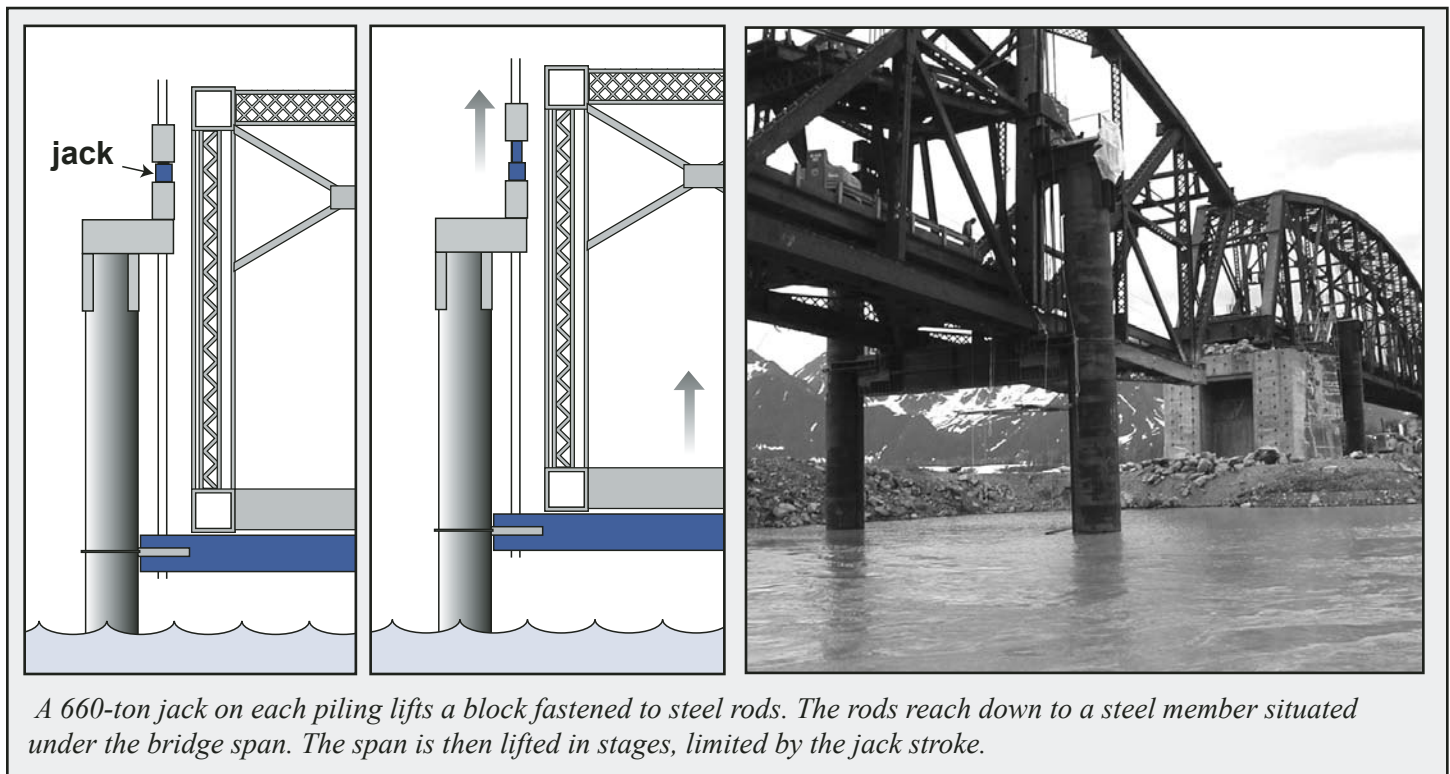
Phase two of the project will include removing the four steel pilings, straightening an offset between spans three and four, and installing isolation bearings on the other two piers

### How Much?

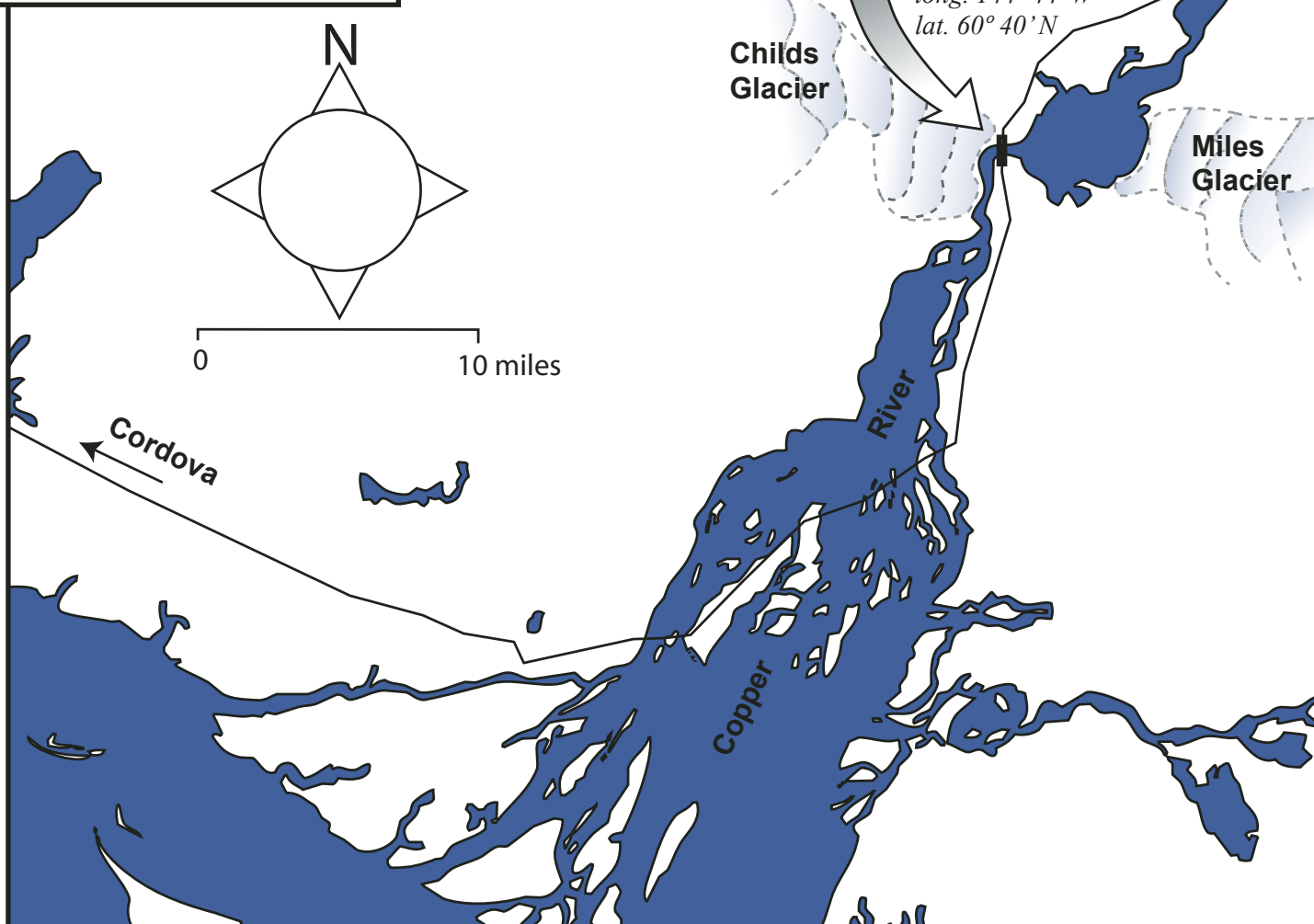
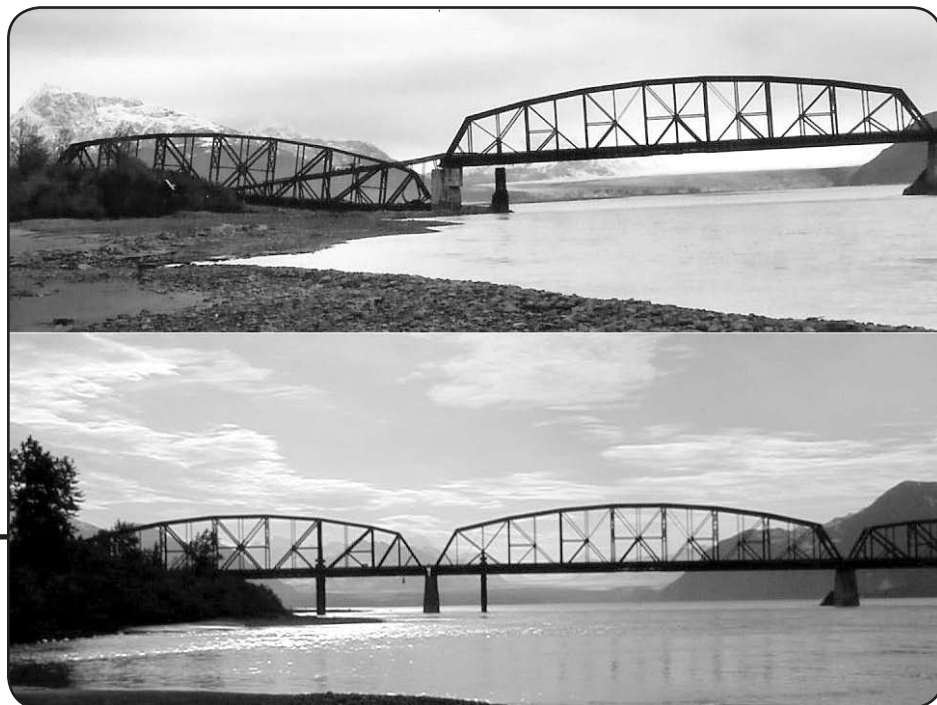
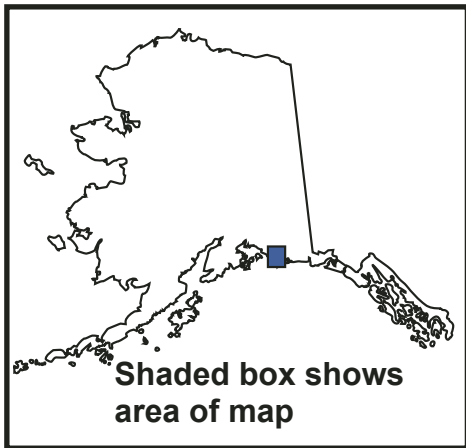
The bridge was completed in 1910, for the then vast sum of 1.4 million dollars. Based on the Consumer Price Index (CPI), that equates to over 27 million in today's dollars. Repairs to the bridge were near 17 million, or about \$850,000 in 1910 dollars.

### Why Build It?

A fortune in high-grade copper locked deep in the Wrangell Mountains inspired Outside investors, including the Guggenheim family and J.P. Morgan, to risk building a railway from an ice-free port on Alaska's southcentral coast to the rich copper deposits at Kennicott. In 1906, planners recommended four possible routes to the copper, including two from Valdez to the Copper River via 2,000-foot passes, but railroad builders chose a route from Cordova that would follow the Copper River north to Chitina, then continue 60 miles to Kennicott.



The inset photo on this location map shows the dramatic changes the repair made to the 400-foot span #4. The bridge span #3 (on right) is the longest of the four spans at 454 feet.



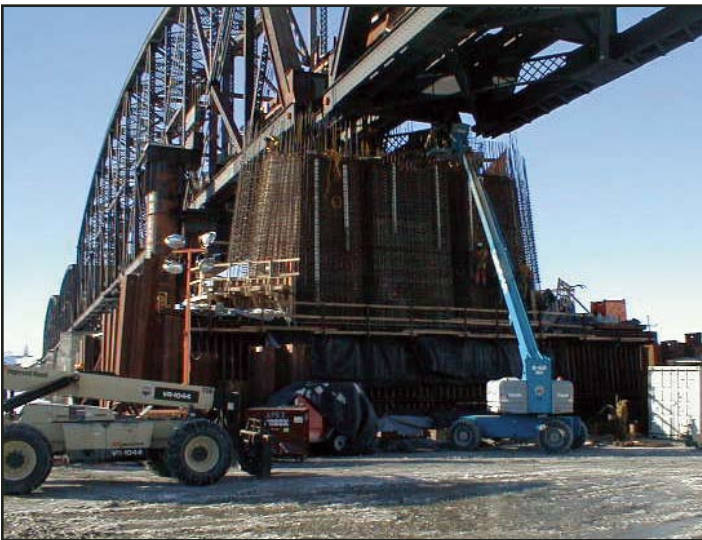
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*Weather conditions during the repair were not always good.*



*Temporary piling being driven with a hydraulic casing oscillator. Existing material is excavated out of the piling as installed. These piers, four in all, were used to lift both the fallen and intact span, so a replacement pier could be constructed.*



*Steel rebar is placed during construction of the replacement pier. Less concrete is used than in original pier due to advances in materials.*



*A new concrete deck was poured to replace the old deck.*



*The bridge structure is intact once again with a newly constructed pier. The four pilings used to lift the spans will be removed under phase two of the project.*

Right: Moving riprap at the site in 2005.

Below: Childs Glacier at the time of original construction of the bridge (ca. 1910).



Starting in April 1909, workers scrambled to complete the Million Dollar Bridge, spurred on by a U.S. law that gave railroad developers four years to complete a designated route. After four years, the government would tax them \$100 per operating mile per year. Contractors finished the bridge by midsummer of 1910.

Soon after construction of the Million Dollar Bridge the glaciers threatened the railroad.

In August 1910, two glaciologists from the National Geographic Society studied the sudden advances of both Miles and Childs glaciers. A northern lobe of Childs Glacier began creeping toward the bridge in June, and by August it was moving eight feet per day. On August 17th, the 200-foot face of the glacier was 1,624 feet away from the bridge.

Ralph Tarr, one of the glaciologists, speculated on what would happen if the glacier continued to advance in 1911. "It is absolutely certain that no corps of engineers could save the bridge and railway if the glacier should advance that far," he wrote.

Childs Glacier did not engulf the bridge, but the glacier crept to within 1,475 feet in June 1911. Childs and Miles glaciers have since retreated, sparing the Million Dollar Bridge, which served the railway from 1910 until 1938, when low copper prices forced the shutdown of the Copper River and Northwestern Railway.

*Thanks to Ned Rozell of the UAF Geophysical Institute for providing a large portion of the text from his article "Glaciers No Obstacle for Copper River and Northwestern Railway", May 23, 2002.*

## The Glacial Threat

Glaciers stuck out their tongues in defiance along the entire route, but the pull of financial gain and human ingenuity overcame them. In one case, workers laid tracks across the debris-covered ice of Allen Glacier for five-and-one-half miles, according to two sources, *The Copper Spike* by Lone Janson and *Iron Rails to Alaskan Copper* by Alfred Quinn.

Two of the largest obstacles on the route were Miles and Childs glaciers, both of which calve icebergs into the Copper River from opposite banks. Erastus Hawkins, the engineer in charge of the railroad project, and Michael Heney, the construction contractor, preferred to run the railroad alongside the Copper River, but the Miles and Childs glaciers sprawl over both shorelines at a pinch point about 15 miles from the river's mouth. Not listening to other engineers who thought the problem was insurmountable, Hawkins designed a 1,550-foot steel bridge to span the Copper River at a river bend between the two glaciers.

Geologists had found that the two glaciers had actually met during the past several centuries, and the leader of a U.S. Army expedition up the Copper River in 1885 reported that the nose of Miles Glacier was then about 120 yards from the site of the bridge. By 1908, both glaciers had receded to provide a gap of about three miles.



# Nordic Abrasion Test Equipment Made Right Here in Fox, Alaska

by Russell Mitchell

Pavement and road embankment aggregates undergo substantial wear and tear. If the aggregates are not up to the task, abrasion and polishing will cause premature failure in a project. Also, weathering from the wet-to-dry and freeze-thaw cycles can degrade aggregates and affect the useful life of a road. Tire traction or skid resistance can be reduced from aggregate degradation too.

One way to evaluate toughness and abrasion resistance in aggregates is the Nordic abrasion test. This test requires a machine built for this purpose, and in Fox, Alaska, in a 4,400-square-foot shop filled with the machines to make it happen, Jon Holmgren is building them.

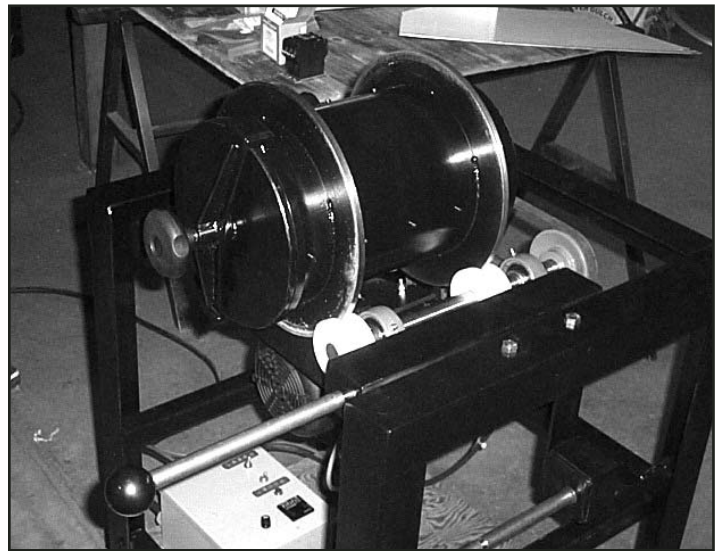
A prototype of a Nordic abrasion test machine Jon built last year has generated more orders for this spe-

cialized tool. They are built to specifications in Alaska Test Methods ATM-312.

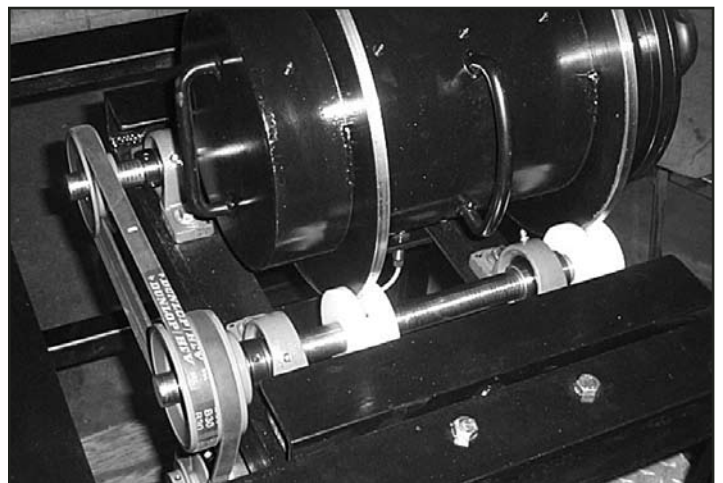
The testers work similarly to hobby rock tumblers. Seven kilograms of chrome-steel ball bearings are tumbled with three and a half kilograms of 7/16 to 5/8 inch aggregate sample and two liters of water in the revolving drum for about one hour at 90 rpm. The drum is then stopped automatically at the 5,400th revolution. At the end of this run, the drum is tipped and the sample charge dumped out to be dried, sieved, and weighed to evaluate degradation. Control of the test is achieved with an inductive pickup sensor connected to a programmable revolution counter and a variable frequency drive.



*A new Nordic abrasion tester is fitted with a safety hood and is almost ready for delivery. You can see the drum is tilted in this picture. It can tip up for loading and down for unloading the sample charge.*



*These photos of the tester shows the concept of the revolving drum that tumbles the sample. The drum rests on Delrin wheels machined in the shop.*

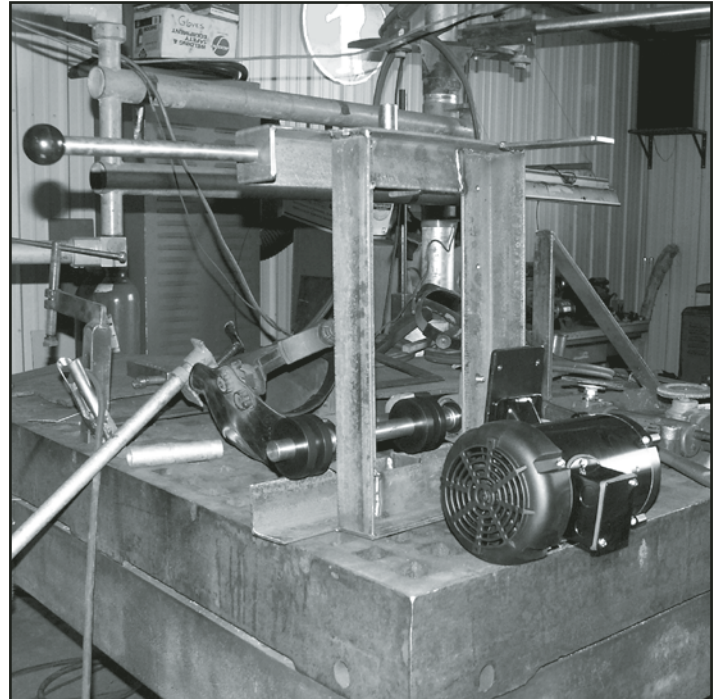


Jon, known as “the man of steel,” is well suited for this work. He has a degree in geophysics and has worked in mining and research in Alaska for over 30 years. His customers include R & M Consultants, an

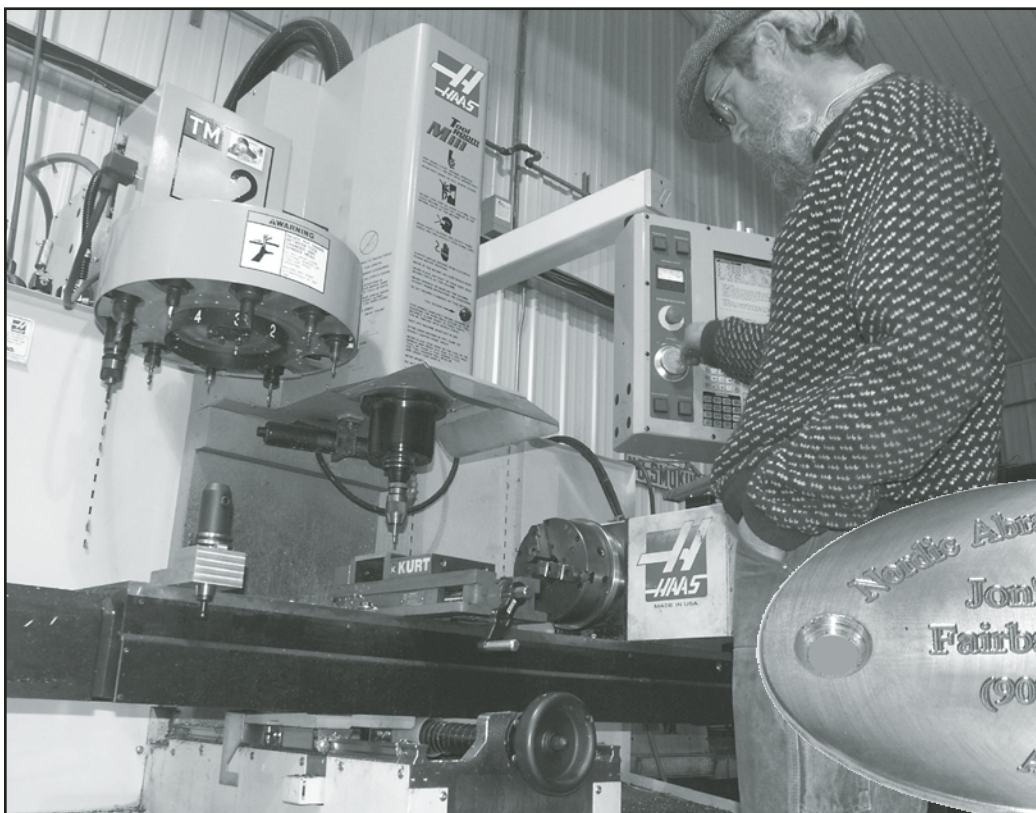
engineering and consulting firm, State of Alaska DOT, the Municipality of Anchorage, and the University of Alaska Fairbanks, Institute of Northern Engineering.



*Jon Holmgren prepares a control unit for the Nordic abrasion testers. Parts for the testers are organized on the table in the foreground*



*The chassis for the drum and drive wheels and bearings is being test-fitted here with the drive motor.*



*Jon uses a new computer-controlled Hass toolroom milling machine. The milling machine was also programed to cut the final touch to the abrasion tester—an aluminum nameplate.*



# The Safety Edge: Pavement Edge Treatment

Reprinted with permission from *Tech Transfer*, summer 2005, the quarterly newsletter of the California LTAP Center

According to the Federal Highway Administration, an estimated 11,000 Americans suffer injuries and 160 die in crashes related to unsafe pavement edges, with losses totaling \$1.2 billion annually.



These figures likely underestimate the problem since the role of a hazardous pavement edge in the sequence of events leading to a crash is often not documented.

Tort liability claims resulting from pavement edge drop-offs cost highway agencies millions each year. In one case, the court awarded \$6 million for injuries caused by a low, defective shoulder drop-off.

“The Safety Edge” can save lives, reduce tort liability, reduce maintenance expenses, and costs less than 1% of a typical pavement resurfacing budget.

## What is an Unsafe pavement Edge?

An edge drop-off of four or more inches is considered unsafe if the roadway edge is at a 90° angle to the shoulder surface. Near vertical edge drop-offs of less than four inches are still considered a safety hazard to the driving public and may cause difficulty upon reentry to the paved surface.

## How Do Unsafe Edges Cause Crashes?

Drivers who slip off a resurfaced road onto an unimproved shoulder are likely to lose control as they attempt to climb back onto the roadway. The pavement edge creates a “scrubbing” condition that a driver must overcome by oversteering. As drivers oversteer to re-enter the roadway, they are prone to lose control of the vehicle. Compounding the dan-



ger, the rear wheel may catch the edge of the shoulder, swinging the car around. This may cause the car to veer into the adjacent lane, where it may collide or sideswipe oncoming cars, overturn, or run off the road and crash.

## How to Prevent Unsafe Edges

Adopting a standard contract specification that minimizes the hazard of steep pavement edges for all construction and resurfacing projects is a simple and cost-effective way to assure pavement edge safety.

The solution to the pavement edge drop-off hazard is two-fold: Require a “Safety Edge,” an angled asphalt edge, or fillet, that slopes 30 to 35° from the pavement surface to the shoulder, as a contract specification in all pavement construction and resurfacing projects. Routinely resurface shoulders when roadways are resurfaced. The angled asphalt edge, or fillet, provides a safer roadway edge and a stronger interface between the roadway and the shoulder. The cost of providing an asphalt fillet is minimal in comparison to the total amount of the resurfacing contract and pays back in countless dollars saved from reduction of fatalities, injuries, property damage, and lawsuits. The fillet ties the existing shoulder into the resurfaced roadway and allows a vehicle to reenter the roadway safely. Highway agencies are able to restore the shoulder after the resurfacing project is completed.

## Other States’ Experiences

The Georgia Department of Transportation (GDOT), working with the FHWA, has demonstrated the ability to construct the “Safety Edge” with no impact on production and at less than 1% additional material costs. Based on the successful performance after one year in service, GDOT intends to incorporate the “Safety Edge” design into all resurfacing projects beginning in 2005. Local city and county governments in Georgia are also making the safety edge part of their routine overlay design. The Indiana and New York Departments of Transportation are implementing the safety edge on several pilot projects in 2005.





# What is Interactive Highway Safety Design Model?

The Interactive Highway Safety Design Model (IHSDM) is a suite of software analysis tools for evaluating safety and operational effects of geometric design decisions on two-lane rural highways.

IHSDM is a decision-support tool. It checks existing or proposed two-lane rural highway designs against relevant design policy values and provides estimates of a design's expected safety and operational performance. IHSDM results support decision-making in the highway design process. Intended users include highway project managers, designers, and traffic and safety reviewers in state and local highway agencies and engineering consulting firms.

IHSDM currently includes five evaluation modules:

- Crash Prediction
- Design Consistency
- Intersection Review
- Policy Review
- Traffic Analysis

A sixth module (Driver/Vehicle) is under development.

The 2004 release of IHSDM may be downloaded free of charge at <http://www.ihsdm.org>. User technical support is also available free-of-charge. An IHSDM Training Course is available through the FHWA's National Highway Institute.

IHSDM development is coordinated with two related initiatives: the SafetyAnalyst, under development by FHWA; and the Highway Safety Manual, under development by the Transportation Research Board.



## IHSDM Technical Support

IHSDM users may request technical support by telephoning the IHSDM Help Line or writing to the IHSDM support e-mail address. The IHSDM technical support staff works onsite in the Geometric Design Laboratory at the FHWA Turner-Fairbank Highway Research Center. Technical support is free of charge to users.

## IHSDM Help Line

Users may telephone the IHSDM Help Line at (202) 493-3407. The Help Line is monitored during normal business hours on weekdays, except for federal government holidays.

## IHSDM Support E-Mail

Users may contact the IHSDM technical support staff by sending an e-mail to [IHSDM.Support@fhwa.dot.gov](mailto:IHSDM.Support@fhwa.dot.gov). Staff monitors this e-mail account during normal business hours on weekdays, except for federal government holidays.

This web site summarizes the capabilities and applications of the IHSDM evaluation modules. It also provides a library of the research reports documenting their development. <http://www.tfhrc.gov/safety/ihsdm/ihsdm.htm>



# Now Available: Summary of Trenchless Technology for Use with USDA Forest Service Culverts

Trenchless technology consists of the methods, materials, and equipment used for replacing, rehabilitating, or installing pipes with little or no excavation of the ground above. Closely associated with this technology are various techniques for investigating, locating, inspecting, and assessing conduits and the surrounding materials.

This report, which summarizes the trenchless technologies most appropriate for USDA Forest Service roadway culvert applications, can help USDA Forest Service engineers best determine where and when to use this rapidly evolving technology. Techniques for replacing or rehabilitating corrugated metal pipe (CMP) culverts, 18 inches or greater in diameter, are emphasized because they are commonly used for USDA Forest Service culverts.

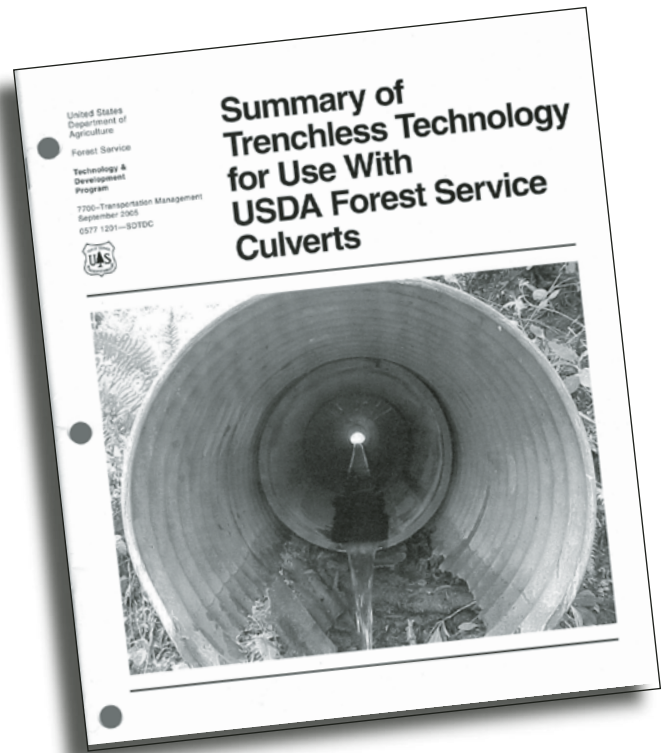
The report topics cover:

- trenchless technology versus open-cut excavation
- pipe maintenance
- pipe rehabilitation
- pipe replacement
- new pipe construction

(USFS 9/2005) 17 pages

Single copies of this document may be ordered from:

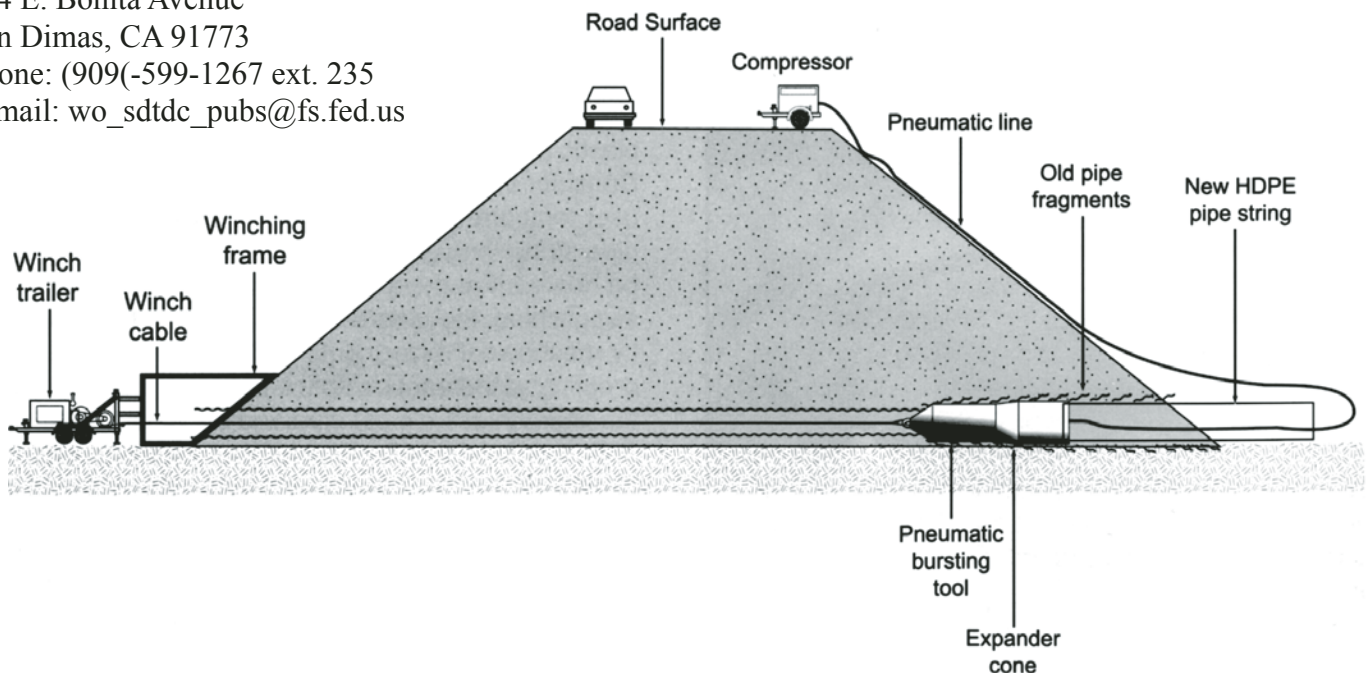
USDA Forest Service, San Dimas Technology and Development Center  
 444 E. Bonita Avenue  
 San Dimas, CA 91773  
 Phone: (909(-599-1267 ext. 235  
 E-mail: wo\_sdtc\_pubs@fs.fed.us



For additional technical information, contact the Engineering Program Leader at SDTDC.

Phone: 909-599-1267

E-mail: mailroom\_wo\_@fs.fed.us



# Cable Median Barriers

from FHWA publication, *FHWA-HRT-06-058 HRTC-01/01-06(1M)E*

**Problem: An alternative to traditional concrete and metal-beam barriers is needed because these structures can be expensive and difficult to install**

Median crossover crashes often result in fatalities or severe injuries to occupants of the errant vehicle and the motorists in the opposing traffic lanes. State departments of transportation are interested in reducing median crossover crashes through the use of median barriers. However, the concrete and metal beam barriers traditionally used to prevent these crashes are difficult to install on sloped terrain where their performance is often suboptimal. In addition, concrete and metal beam barriers are expensive, and state and local agencies often lack the resources to rapidly deploy these technologies to areas where vehicles frequently cross over the adjacent medians.



*Above: A standard three-strand cable median barrier.*

*Below: A high-tension four-strand cable median barrier.*



## Putting It in Perspective

Many States have collected data that demonstrate the significant impacts of crossmedian crashes:

- Between 1990 and 1999, only 2.4 percent of all interstate crashes in Iowa were crossmedian crashes, yet these crashes resulted in 32.7 percent of all interstate fatalities.
- From 1999 to 2000, more than 70 people in South Carolina lost their lives in 57 separate interstate crossover median crashes.
- North Carolina DOT has found crossmedian crashes to be three times more deadly than other freeway crashes. Crossmedian barriers are expected to lead to an estimated 90 percent reduction in these types of collisions.

Recent research shows that cable median barriers are more forgiving than traditional concrete and metal beam barriers and can be effective when installed on sloping terrain. Collision forces are deflected laterally, thereby reducing the forces transmitted to vehicle occupants.

## Solution: Promote the accelerated deployment of cable median barriers

As an alternative to concrete and metal beam barriers, some states are turning to cable median barriers in areas where there is sufficient median width and a high potential for crashes.

Although cable barriers have been used since the 1960s, it was not until the 1980s that some state DOTs started using a modified cable rail as a median barrier. Today, many states, including Arizona, Colorado, North Carolina, Ohio, Oklahoma, Oregon, South Carolina, Utah, and Washington state, are installing cable barriers in medians originally built without barriers. New data suggest that cable median barriers are an effective mechanism for preventing fatal and disabling crashes. In Washington, for example, annual crossmedian fatal crashes declined from 3.00 to 0.33 fatalities per 100 million miles of vehicle travel, while annual disabling accidents went from 3.60 to 1.76. The overall benefits of cable median barriers were calculat-

ed to be \$420,000 per mile annually. While cable median barriers have low installation costs, they can be costly to repair after a crash. In addition, when several posts are hit during a single crash, the cable barrier may then be vulnerable to crossovers until the damaged section is repaired. Rapid maintenance can be difficult, especially during winter months. However, several proprietary high-tension cable designs are now available that can withstand multiple hits.

## Successful applications: Using cable barrier systems to meet local needs

The North Carolina and Oregon DOTs completed detailed in-service evaluation reports of cable barrier systems and found that the systems were nearly 100 percent effective in preventing deadly crossover crashes on freeways. Cable median barriers have been successful in South Carolina, where three-strand cable systems were installed in areas with multiple median crossover crashes. From August 2000 through July 2003, the South Carolina cable median system was hit 3,000 times, but only 15 vehicles penetrated the cables. In addition, Oklahoma and several other state DOTs recently installed proprietary cable barrier systems with reported success.

Some motorcyclists have expressed concerns over cable barriers. Researchers in the United Kingdom, however, found little difference between crashes into cable median barriers and other barrier types. According to the data, most riders are separated from their motorcycles soon after leaving the pavement and are sliding on the ground by the time they reached the barrier. The data also did not show that cable barriers cause extraordinary injuries.

### Deployment Statement

The increased use of cable barriers in relatively wide medians where a barrier is warranted will decrease the number of severe cross-median crashes. Cable barriers are cost effective because they are relatively inexpensive compared to other types of barriers. They also perform better than other barriers when installed on the moderately sloping terrain common to many existing medians.

### Deployment Goal

The goal is for every state to review its median crossover crash history to identify locations where cable median barriers may be warranted and to implement appropriate construction projects that use cable median barriers.

### Deployment Status

Many state DOTs have independently assessed the extent of their median crossover problem and have modified the barrier warrants established in the late 1970s. Most of these states also have installed a significant number of cable barriers, including both the generic, lower-tension design and high-tension patented cable barriers. The American Association of State Highway and Transportation Officials (AASHTO) is modifying its median barrier warranting criteria to reflect current trends, an action that will lead to the installation of additional median barriers in many states.

### Additional Resources

Guidelines for median barrier warrants, selection, and installation are contained in AASHTO's 2002 Roadside Design Guide. Information on crash-tested cable barriers can be found at <http://safety.fhwa.dot.gov/report350hardware> under Longitudinal Barriers, using the keywords, "Cable Barriers." To learn more about AASHTO's approved technologies, visit <http://tig.transportation.org>.

### Benefits

- Cable median barriers are an effective means of reducing fatal crossover crashes.
- Sufficient cost efficiencies can be achieved through the introduction of higher-tension cable systems.
- Financial resources can be saved if crews at state DOTs develop the skills to rapidly repair cable median barriers.

For more information, contact:

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# Personal Fall-protection Systems

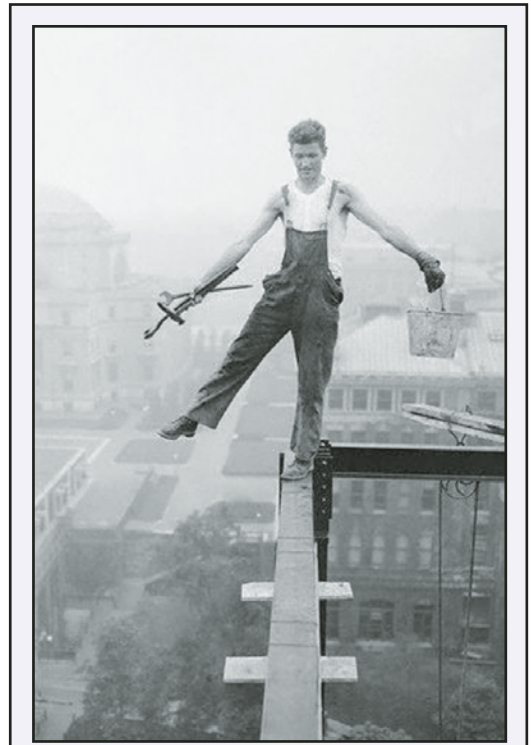
Personal fall-protection equipment is the only thing between you and eternity if you happen to fall. Keep this in mind when maintaining your equipment.

## Inspect your equipment daily and before each use:

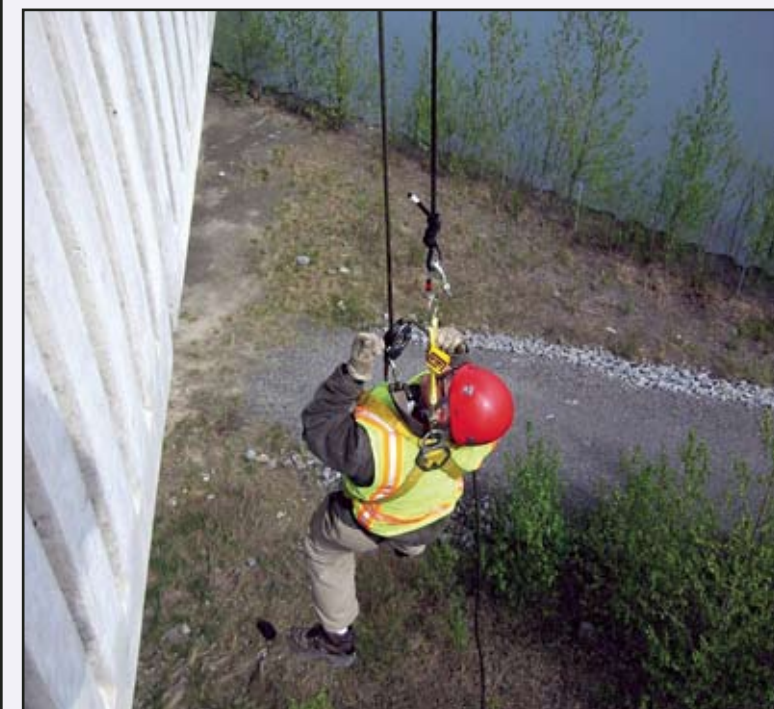
- Look for any defects in the equipment.
- Check the harness/lanyard for frays, cuts, or other damage, such as welding burns.
- Check the harness/lanyard for wear, especially around grommets and buckles.
- Look for distortion of the buckle.
- Be sure D-rings are free of breaks, cracks, rough edges, and distortion.

## Maintain equipment:

- Keep equipment away from acids, caustics, and other corrosive materials.
- Avoid dropping equipment on the ground and avoid sharp tools or objects.
- Never cut or rough-punch holes in equipment, as this can weaken the equipment and void the manufacturer's warranty.
- Never use gasoline or other drying solvents on any equipment. Instead, lightly coat leather with neatsfoot oil or saddle soap. For fabric harnesses, use only special dressings recommended by the manufacturer.
- Store all equipment in dry compartments or hang it separately so it will not be damaged.



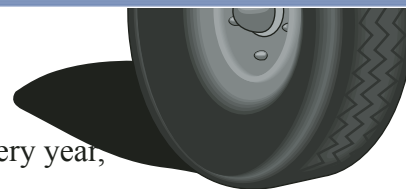
Personal fall protection was once a matter of good balance. This is not acceptable.



Personal fall-protection systems include a body harness (safety belts for fall arrest are no longer allowed by OSHA) and a lanyard that connects you to a substantial anchorage.



## Fleet Safety: Backing Accidents



Roughly one out of every four accidents (25%) involves backing.

Considering that the average driver operates in reverse less than a mile every year, this statistic is even more alarming.

### The following tips will help you avoid collisions while backing

- Continuously check all mirrors while backing.
- Always back slowly while continuously looking and listening for signs of trouble.
- Avoid backing whenever possible. Drivers should plan ahead to reduce backing operations in the first place.
- Try to position the vehicle to avoid backing.
- If backing cannot be avoided, it is better to back in upon arrival than to back out later while departing.
- Conduct a visual walk-around of the vehicle to check for maneuvering room or pedestrians.
- Whenever available, use a passenger to guide you during backing operations.

### Following are key collision failures related to backing operations:

- Failure to look before backing
- Failure to check blind spots
- Failure to conduct a walk-around
- Backing at an unsafe speed
- Failure to check mirrors often for potential hazards.

All backing accidents are preventable. The key is to plan ahead to avoid backing in the first place.

You should only back up your vehicle as a last resort.

## Training and Meeting Calendar

## Alaska T2 Training Listserve: Training for 2006

Stay informed on training scheduled for federal, state, and local transportation agencies, including consultants, contractors, and other transportation professionals. Now you can receive updated training information every few weeks.

To subscribe to the listserv via a web browser connect to the address below:

Simply enter your e-mail address into the text box of the online Mailing List Summary Form. You'll receive a confirmation e-mail and then you'll be notified periodically as new trainings are posted to our website.

[http://jnumail17.state.ak.us/guest/RemoteListSummary/DOT\\_Training\\_Notification\\_list](http://jnumail17.state.ak.us/guest/RemoteListSummary/DOT_Training_Notification_list)

InterMail  
PostOffice  
EDITION  
Mailing List  
Directory

### Mailing List Summary Form

List Address: DOT-Training-Notification@list.state.ak.us

Short Description: Mailing list for AK DOT&PF, RTT training notifications

List Name: DOT-Training-Notification-list

Long Description:

This notification mailing list is for Alaska DOT&PF training sponsored by the Research and Technology Transfer Section.

Subscription Policy: open

Available Delivery Modes: Immediate or Digest

Digest Schedule: Fri 16:30

Your E-mail address:

- Immediate Delivery  Digest Delivery  
 Unsubscribe

**June**

**NHI 135056: Culvert Design**  
June 1–2 in Whitehorse, YT

**Community Impact Assessment**  
June 27–29 in Anchorage

**Bidtab Training**  
June 5–6 in Fairbanks  
June 15–16 in Anchorage  
June 20–21 in Juneau

**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](http://www.dot.state.ak.us)



## Meetings Around Alaska

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



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