TECHNOLOGY FOR
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DOT Statewide Research, Development,
& Technology Transfer
Local Technical Assistance Program

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

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From Bad to Worse in Less Than 20 Miles

Tok District Superintendent Dennis Bishop thought that May 7 was a busy day along the Taylor Highway. It was bad. A late but sudden thaw was creating havoc along a nine-mile stretch known as American Summit, a 3,400-foot mountain pass. About half of that stretch was particularly bad, the high temperatures were rapidly melting the nearby snowpack, and the resulting deluge was washing out the ditches and eating into the road.

After seeing the damage and working with the crews on the scene, Bishop pushed 17 miles north to Eagle. The community there was suffering serious damage after a dramatic ice jam and subsequent flooding during the first week of May. News from the Eagle Department of Transportation and Public Facilities (DOT&PF) maintenance station said roads were clogged with ice and debris.

Bishop should have packed his toothbrush. After arriving in Eagle, he could see that the damage was far worse than he anticipated. He stayed on scene for eight days, assessing damage, helping open areas cut off by the flood, and working with Alaska's Emergency Services interagency response team.

(continued on page 2)

AKDOT&PF Responds to Eagle Disaster

by Shannon McCarthy

AKDOT&PF maintenance and operations crews install DURA-BASE composite mats for use as a temporary road after Mission Road in Eagle was covered with ice and debris.

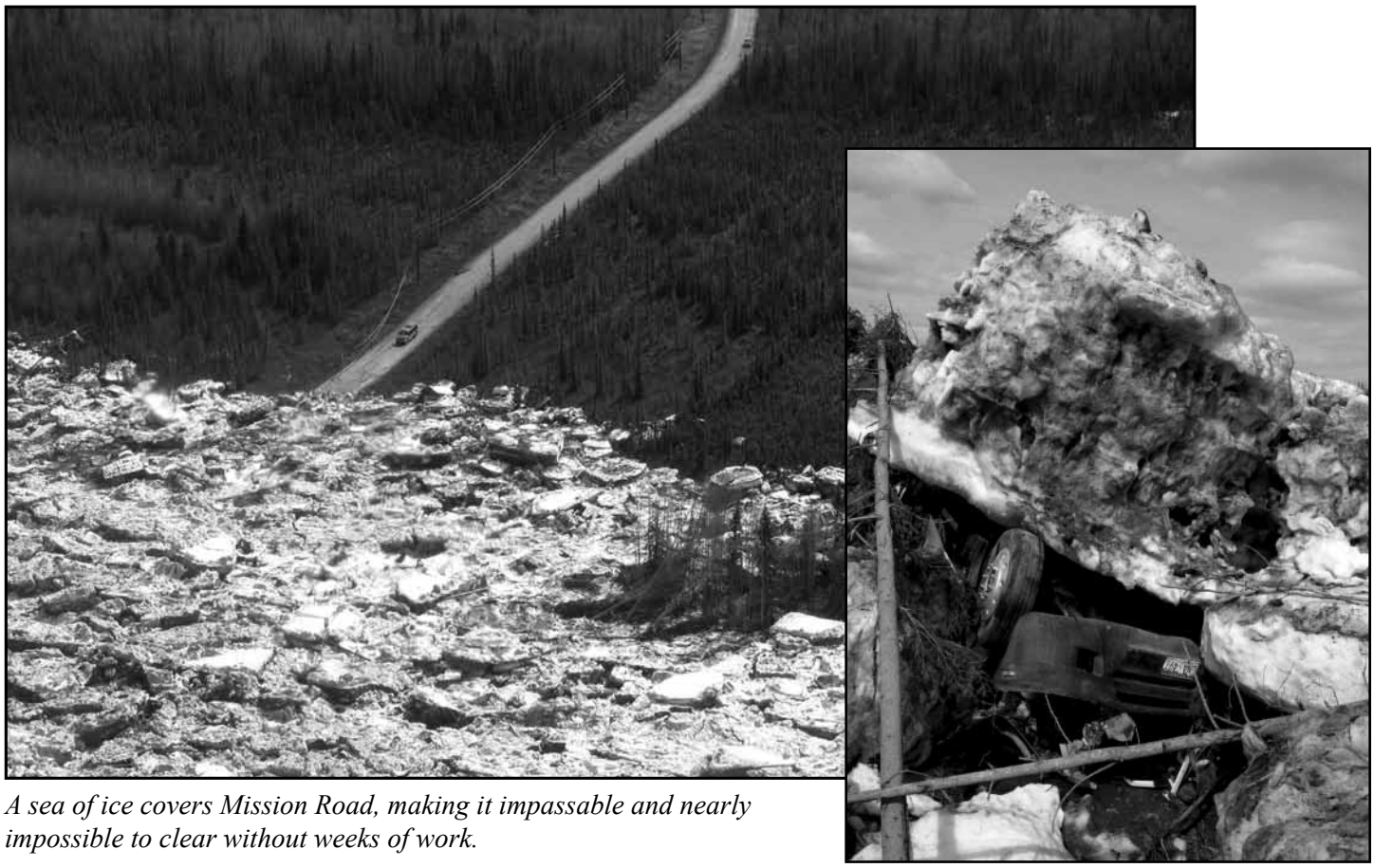
Spring 2009 presented unique challenges to the Northern Region Maintenance and Operations Division. After a long, cold spring, temperatures jumped in interior and northern Alaska for over eight days, April 26 to May 3. With three days reaching almost 80 degrees, the rivers and snowpack were melting at a record pace. Road damage from the sudden melt occurred throughout the Northern Region from as far south as Cordova and as far north as Nome. With 15 separate areas reporting severe damage, crews were busy and resources stretched thin.

Ice jams can occur on any Alaska river, and when they happen on the Yukon, it comes with a lot of hydraulic power behind that blockage. In other words, you have a lot of water and it's moving swiftly; if the water can't flow through the channels, it's going to go around it. Unfortunately, on May 4 Eagle was feeling the brunt of it. The ice was pushing into the Old Village site while floodwaters were backing up into the city. Few thought it could get worse. On Tuesday, May 5th, the water began to rise…rapidly. Now 20 feet above flood stage, the river easily pushed large chucks of ice past the city's retaining wall and into Eagle, scouring the landscape as they moved. The boulders of ice pushed houses off their foundations. Fuel tanks were shoved over, powerlines torn down, and vehicles were floating away. Then, late Wednesday night the water dropped, more quickly than it had risen. By Thursday morning, the word was out—it was time to assess the damage and start rebuilding.

Superintendent Bishop was the first to arrive, joining the two DOT&PF operators stationed at Eagle. Recognizing the magnitude of the situation, Bishop conducted his first flyover to assess the damage from the air, courtesy of the National Park Service. He quickly sent word to DOT&PF management that the

Boulders of ice from the Yukon River, some larger than houses, encroach over the city's retaining wall, crushing homes and pushing others off foundations.

The speed of the flooding from the ice jam gave residents little warning of the impending destruction and gave them little time to evacuate personal belongings.



A sea of ice covers Mission Road, making it impassable and nearly impossible to clear without weeks of work.

situation would need additional resources. He also sent word to the crew working on the Taylor Highway that they would be needed up in Eagle as soon as their work was done.

However, one of the first items to address was the Taylor Highway. DOT&PF needed to maintain a good transportation link to in order to bring in relief. Taylor Highway crews led by John Burns kept up their work on the flood-damaged stretch of the Taylor. DOT&PF also immediately lifted weight restrictions to allow responders to get heavy vehicles up the road to Eagle.

Another problem that needed to be immediately addressed was opening Mission Road, a 1.6-mile road connecting Eagle City with the Old Village. People living in the Old Village were safe, having set up a tent city on high ground to escape the waters, but they were essentially cut off, without water, electricity, communications, or refrigeration. They needed road access and fast. Bishop recognized what other responders saw too—the recovery effort was going to be severely hampered by what the river left behind: ice and lots of it. Some chunks were as big as tractor-trailers, some as big as houses. And debris—few things had stayed in place during the flood, and if they did, the ice had literally scoured them.

Mission Road was covered with boulders of ice and debris. It was so bad that DOT&PF personnel couldn't identify normal roadway landmarks—at its deepest, the ice field was 30 feet deep and at its widest over 300 yards wide. To make matters worse, what had been shoved by the ice and flooding included houses, propane tanks, and other items hidden in the ice. Without landmarks, it was impossible to identify the exact location of the traditional village cemetery, located alongside Mission Road. Opening Mission Road would have to wait until the ice melted because of the risk of further damage to items trapped in the abandoned ice and the potential to damage a culturally sensitive site along the roadway.

While the state's emergency services response team was now assembled, communication on the ground remained difficult. There were no working phone lines into the Old Village, but some information was going back and forth on a rough and already deteriorating four-wheeler trail.

Jim Fehrenbacher, DOT&PF's Northern Region Maintenance and Operations manager, and Superintendent Bishop conducted a flyover of Mission

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Road on Sunday May 10 to see what options were available to reconnect the Old Village to Eagle. What they saw was a survey line; a straight shot from the airport to the Old Village that was clear of the devastation. Using Google Earth to confirm what they saw from the air, they used plat maps to determine the surrounding land ownership, which turned out to be a portion of the state's airport and Alaska Department of Natural Resources (DNR) land. Working closely with DNR, they had permission to go forward with a bypass road. But addressing the use of the airport land proved more complicated; the Federal Aviation Administration (FAA) has strict safety requirements. Working closely with the FAA, Bishop and Fehrenbacher were able to design the road outside of the airport's safety areas and were given permission to move forward.

Now that DOT&PF had a route to focus on, the next hurdle was the surface itself—the ground was vegetated and saturated. Borrowing a technology widely used by North Slope oil companies, DOT&PF Maintenance and Operations ordered portable tundra mats. The technology, developed in Fairbanks, allows companies to create temporary roads over sensitive environments. The mats are large but portable, made of a strong composite material, and they interlock to create a roadway.

DOT&PF Construction Project Engineer Artem Ruppert supervised the contractor placing the mats, Great Northwest, Inc. In all, 625 mats were placed for the main road and 1,200 feet of gravel laid for the access road. The Old Village was reconnected to Eagle on May 13. Food, fuel, and generators were immediately brought in, communication was restored, and the mood in Eagle lifted significantly.

Despite the recovery effort, communication remained difficult, and on Friday May 12, Bishop received word that a plane was coming in with a state official who needed a tour of the damaged area and a briefing on the state's response. Nothing was known about who was on the plane, but Bishop showed up at the airport just the same, ready to share information and network for resources. Imagine his surprise when Governor Sarah Palin walked onto the runway. The visit was positive, both for the responders and the residents—the state's full resources were behind the recovery. Spirits were high in Eagle.

By May 13, the Taylor Highway was repaired and all available operators in the Tok District were working in Eagle. The Eagle emergency response included eight DOT&PF operators, two private operators in charge of the rented equipment, and three brush cutters from Tanana Chiefs. They were all dealing with immediate needs—removing obstacles from the roads, restoring ditches whenever possible, and removing the jumbled-up nests of branches, trunks, and roots that choke roadways after a flood. Great Northwest continued to improve the temporary bypass road with their crew, upgrading the wettest areas, widening the road where needed, and creating turnouts.

From bad to worse in less than twenty miles had come from awful to OK in less than two weeks. After dealing with the damage on the Taylor and the Eagle flooding for eight days without a trip back home, Superintendent Bishop took a deserved break. He got his old toothbrush back and got some shuteye, but he's counting on a couple more trips to Eagle this summer to check on the recovery process and to see what DOT&PF can do to help.

FMATS, UAF Collaborate to Update Traffic Model

by Patrick Cotter

Collaboration between and among agencies and institutions makes sense. Institutions are looking to expand their research and teaching opportunities and can provide a low-cost alternative to a consultant. Shared resources and shared responsibilities can lead to reduced costs and positive outcomes for a collaborative project. Local institutions and agencies also understand pertinent regional issues that an Outside company might overlook.

In early 2008, the Northern Region Planning Department and the Fairbanks Metropolitan Area Transportation System (FMATS) teamed up with the Alaska University Transportation Center (AUTC) at UAF to update the FMATS travel demand model and convert it to a more robust operating environment. Updating the model was a goal in the 2009–2010 FMATS Unified Planning Work Program. Dr. Ming Lee, an assistant professor with UAF's Institute of Northern Engineering, spearheaded the project.

Dr. Lee brought 14 years of experience in transportation system planning, travel demand forecasting, traffic engineering, and GIS programming to the project. He has worked on travel demand forecasting models for municipalities in California including the cities of San Francisco, Santa Rosa, and St. Helena and the counties of Napa, Sonoma, Solano, Contra Costa, and Lake.

The existing FMATS traffic model was developed in 2001 with the QRSII software package. DOT built the base model to reflect Fairbanks for the year 2000 and developed a forecast model for the year 2025. This model had limited functionality due to:

- Coarse Transportation Analysis Zones (TAZs)
- Poor representation of localized congestion and time-of-day situations
- Traffic assignment not equilibrium-based or capacity-restrained
- Noncompatibility with other GIS information

The UAF team initiated the update by converting the existing QRSII model to TransCAD. The 2008 baseline model updates the FMATS model to the most recent employment data, demographics, and a new software platform. In addition, the model structure was expanded to include time-of-day modeling that produces a.m. peak, p.m. peak, and off-peak traffic volume forecasts. Advantages of the new TransCAD model include:

- Windows-based operating environment
- Utilization of GIS data
- Up-to-date modeling methods
- Consistency with AMATS model

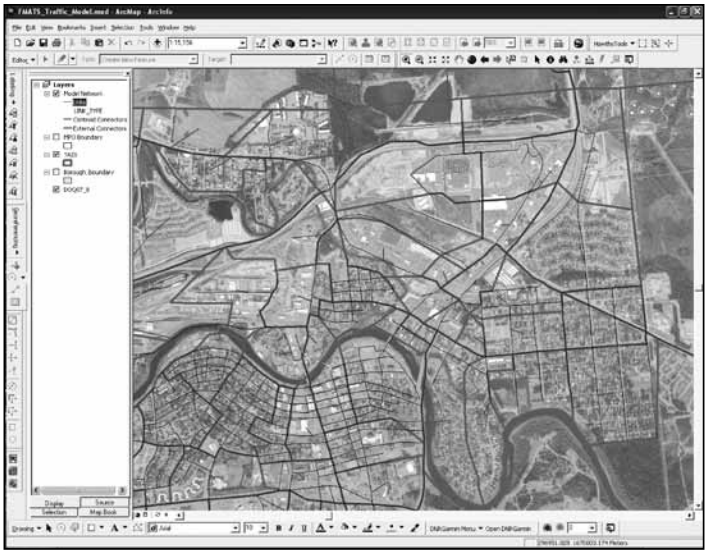
They also refined local TAZs to reflect recent development around Fairbanks. The original QRS model divided the FMATS planning area into 140 TAZs. The new TransCAD model expands the original TAZ structure to include 147 TAZs in the modeling area. These updated TAZs will be submitted to the U.S. Census Bureau for incorporation into the 2010 census tracts.

The new model is an integral part of the Long Range Transportation Plan (LRTP). It enhances transportation needs forecasting, one of the goals of the LRTP. It also extends the viable forecasting horizon beyond 2025.

The successful collaboration has produced more than an updated traffic model. Dr. Lee has also provided FMATS with customized training. Likewise, a UAF graduate student has been able to gain firsthand experience with travel demand modeling. Other agencies are using the model for related studies.

Next steps for improving the FMATS model include conducting a household survey to determine local driving habits and destinations. A proposal to start the survey is in the works.

Patrick Cotter is an area planner and GIS coordinator for Northern Region. He can be reached at patrick.cotter@alaska.gov or 451-5307. For additional information on the AUTC, visit http://www.alaska.edu/uaf/cem/ine/autc/.



Screen shot showing the updated TAZs and traffic links for east Fairbanks.

Fines Preservation with a Fluid/Binder System to Ecologically Manage Gravel Runway Dust

The Alaska DOT&PF operates almost 300 remote gravel runways for commercial, charter and private air traffic. One of DOT's needs in operating these runways is to minimize the gradual loss of vital fines. These fines are one of the sources of fugitive dust that impacts the health of neighboring populations (e.g., U.S. EPA PM10 and PM2.5 requirements) and aircraft operations. Any approach taken to preserve runway fines must minimize the environmental impact on the local ecology and leave aircraft surfaces undamaged. This must be accomplished with local gravel sources, local construction equipment, minimum manpower, and in severe winter weather.

Also, loose gravel due to the effects of weather and aircraft loading costs air carriers tens of thousands of dollars annually in engine and airframe damage. An additional objective for DOT is to develop fines preservation methods that hold the gravel in place for years with minimal maintenance.

Midwest Industrial Supply has helped AKDOT&PF to develop fines preservation methods for gravel runway rehabilitation and maintenance per DOT dust reduction, environmental, and chemical requirements. These methods have been provided through local contractors who are trained by Midwest, experienced in the methodology, and intimately supported by Midwest.

The rehabilitation methods have been documented and successfully used over a five-year period on gravel runways in both Alaska and Canada the Northwest Territories and Quebec). These methods use Midwest EK-35, a fluid binder system, applied to the gravel to primarily bind the surface together and secondarily increase the bearing capacity (CBR). EK-35 is typically applied at a rate of 1 gallon for every 40 square feet (1/40). The improved strength is sustained for one to more than three years without maintenance through the binding effects of the fluid on the gravel surface. Consequently fines are preserved, gravel stays in place, and dust is controlled to minimal levels.

Maintenance, when it does occur, has involved the reapplication of EK-35 at a typical rate of 1 gallon for every 120 square feet (1/120). Preventative maintenance can be performed at the same one- to three-plus-year interval, depending on the type of gravel and the state of runway bearing capacity. EK-35 has been applied to 19 gravel runways operated by the AKDOT&PF since 2001.

A good example of what is possible is illustrated by the EK-35 application to the runway at Tanana in the AKDOT&PF's Northern Region during 2007 and

2008. The runway is 4,400 ft. long by 150 ft. wide, with the center 90 ft. (between landing lights) being used for air traffic. The runway is constructed of silty, sandy gravel. In 2007, the runway received a 1/40 EK-35 topical application over its center 90 feet. In mid-2008, the runway received a 1/120 EK-35 reapplication over its center 50 feet when surface conditions were observed to be changing but not significantly enough to affect dust levels or aircraft operations.

During the last few years, EK-35 has been independently certified to reduce PM10 dust emissions by greater than 85% and PM2.5 emissions by 60% after a one-year period after application and without maintenance.[1] EK-35 was also independently certified to not injure aircraft surfaces when used as a stabilizing agent and dust suppressant by the Boeing Company per their specification D6-17487, Evaluation of Aircraft Maintenance Materials.[2] In addition, EK-35 was independently demonstrated to have negligible environmental impact in regard to meeting U.S. EPA guidelines for bulk constituents, polynuclear aromatic hydrocarbons, and TCLP regulatory levels for metals, volatiles, semivolatiles, pesticides, and herbicides and aquatic toxicity.[3]

The AKDOT&PF and pilots using the runway deemed its performance in the time since the initial EK-35 application to be excellent. This included dust reduction, foreign object debris, and environmental performance. As an added value, the EK-35 applications sustained sufficient structural integrity of runway surfaces to serve the aircraft using the runway, thereby assuring passenger and aircraft safety.

Figures 1 and 2 illustrate the structural performance of the runway's touchdown area, the area typically experiencing maximum stress. The entire width of the runway that is open to air traffic has sustained an average surface CBR of ~23 in the year since the original EK-35 application. This exceeds the minimum surface CBR of 20 recommended by Hawker-Beech for the safe operation of its Model 1900 aircraft, a typical user of the Tanana runway and many other AKDOT&PF runways. With time, EK-35 continues to be slowly absorbed into expansive soils and penetrate deeper into the runway surface. Local weather does not promote the loss of EK-35 from the gravel. Scheduled reapplication of EK-35 is needed to sustain fines preservation and structural integrity at as-built levels. The recent reapplication of EK-35 to the center of the runway surface increased the surface CBR to an average of ~52, enough to sustain performance for at least another year. This is in contrast to the average surface CBR of ~15 for the portion of the runway

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Figure 1

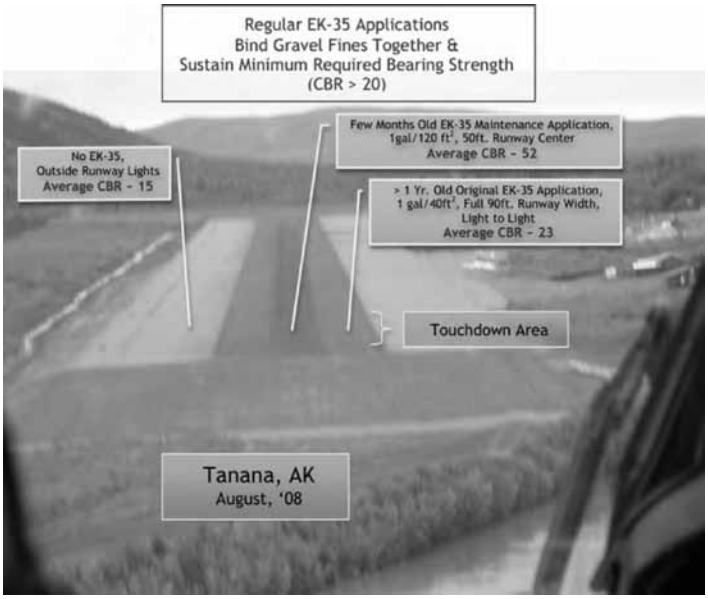
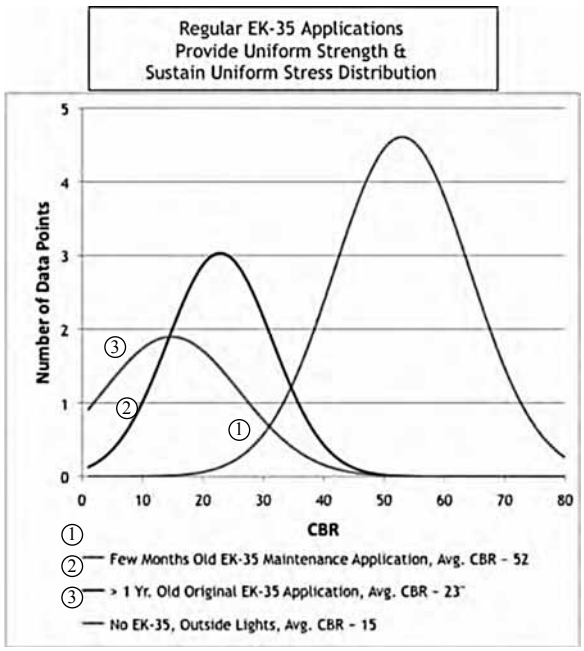


Figure 2



1 Environmental Technology Verification Report, Dust Suppressant Products, Midwest Industrial Supply, Inc.'s EK-35. RTI International, Midwest Research Institute, Research Triangle Park, NC, 9/05. (PM10 & PM2.5 evaluation per the U.S. EPA Air Pollution Control Technology Environmental Technology Verification Program's Generic Verification Protocol for Dust Suppressants and Soil Stabilization Products.)

2 Letter from Boeing Technology Licensing and Services to Midwest Industrial Supply, Inc., dated December 2000.

3 EK-35 Acute and Chronic Aquatic Toxicity, ABC Laboratories, Columbia, MO, 9/02; and EK-35 VOC, Semi-Volatiles, Metals, TCLP, PAH Tests, Tri-State Laboratories, Youngstown, OH, 7/02.

that received no EK-35. In the case of runways with sandy gravel, EK-35 reapplication has not been necessary for more than three years (e.g., Chicken, AK). Figure 2 shows that the EK-35 applications improved the structural uniformity of the runway surface, which should also improve the surface's capability to sustain efficient distribution of stress from air traffic. These CBR values are based on a comprehensive sampling of ~ 12,000 ft^2 of the touchdown area using surface stiffness measurements per ASTM D5768 as an index of CBR.[4]

The EK-35 applications at Tanana appear sufficient to meet AKDOT&PF dust, environmental and chemical requirements while also providing the surface structural integrity to safely support runway operations.

For more information contact Melvin Main, Midwest Industrial Supply, 717-659-6665, mel.main@midwestind.com. Questions for the ADOT&PF M&O can be posed to Clark Milne, Maintenance Engineer, Northern Region, 907-451-5285, clark.milne@alaska.gov.

4 Murad Y. Abu-Farsakh, Ph.D., P.E., Khalid Alshibli, Ph.D., P.E, Munir Nazzal, and Ekrem Seyman, Assessment of In-Situ Test Technology for Construction Control of Base Courses and Embankments, May 2004, Louisiana Transportation Research Center, Baton Rouge, LA 70808, FHWA/LA.04/385

Construction Management Certificate: A Partnership for Improved Management Skills

Eight years ago, Jake Allen was fresh out of college and confident in the technical knowledge he gained while earning his BS in civil engineering. Allen started working at the Alaska Department of Transportation and Public Facilities (AK DOT&PF) as an engineer assistant in Design. He eventually moved into the Construction Section as a quality assurance engineer. That position requires him to supervise 7 to 10 employees and provide review and support for construction projects. Without any formal management training, Allen discovered that a people-oriented style of voicing support, working cooperatively, and discussing goals created the most positive and productive work environment. This new set of "soft skills" was required to effectively supervise staff and manage projects.

This situation is not unique to Allen or to AKDOT&PF. The typical undergraduate engineering program develops engineers who have strong technical skills, but who lack management training. Most programs do not provide the "soft skills" training that is essential to successfully manage personnel and projects in an atmosphere of support and cooperation. Right now the need for effective management training in a competitive environment is even more urgent as Alaska's aging workforce continues to retire. The department has an influx of new staff that has missed the traditional mentoring between experienced and new employees.

AK DOT&PF Northern Region Construction Engineer Lon Krol is Allen's supervisor. Two years ago Krol recognized that newer employees, such as Allen, would benefit from management skills training as they began transitioning into their supervisory roles. "Our employees were skilled engineers, but management is about people and we needed to incorporate people skills into our training," said Krol.

Lon Krol organized a roundtable discussion between AK DOT&PF, UAF College of Engineering and Mines, and leaders in the construction industry. The goal was to identify the specific skills that industry leaders were seeking in construction professionals. The skills identified during this roundtable discussion became the basis of the Graduate Certificate in Construction Management, a new degree that is proposed for approval by the UA Board of Regents this spring. The proposed graduate certificate in construction management focuses on the management skills of people and projects, so there is broad application beyond just construction and design to other areas

Professor Larry Bennett begins his lecture on Construction Claims Case Studies in Fairbanks and via video conference to Juneau.

such as preconstruction, right of way, materials, maintenance and operations, and planning.

By partnering with UAF to deliver the training necessary for the Construction management certificate, AK DOT&PF is able to capitalize on the professional management expertise available at UAF. Furthermore, the UAF Engineering Department worked to incorporate real-life examples into the classes offered to DOT&PF employees. The learning environment became more strategic; teach management skills to engineers by using case studies from actual work experiences that occurred on AK DOT&PF jobs.

For Allen this customized content is beneficial. "It is an academic and therefore rigorous program," said Allen, "but you actually use class knowledge in your everyday job."

The partnership with UAF has other advantages too. UAF is currently offering the course Construction Claims Case Studies. The course is held in Fairbanks, but 14 DOT&PF engineers from the Bridge Section based in Juneau are attending the class via video conferencing. The instructor has also traveled to Juneau and held class there, while communicating with the Fairbanks class via video conferencing. This joint class with both construction and bridge engineers allows for two groups of professionals, who are based in different locations, to work through examples of construction claims that occurred during bridge construction. Historically there tends to be tension between construction and bridge engineers, and more construction claims are filed on bridge projects because bridges are more complex than road projects and they require different construction techniques.

In addition to customizing course content and using video conferencing to offer the courses in more than one location, the UAF construction management certificate program has these features:

- Short, typically one credit with 14 hours classroom instruction
- Focused on skills that the students can apply quickly
- Meet in the late afternoon at the end of the workday, in the employer's office or nearby—no parking problems
- Scheduled for the winter season.

"Administering the construction management certificate program had the potential to be difficult," said Dr. Robert Perkins, P.E., UAF College of Engineering and Mines. "There are so many players involved. But all have offered overwhelming support. This is a workforce development idea that's time has come."

There is an added benefit to training younger employees and preparing them for supervisory roles: employee retention. Retention is a dilemma not just for AKDOT&PF but also for other technical organizations in Alaska. The Alaska Department of Labor anticipates that by 2014 Alaska will need 400 new engineers a year; currently the University of Alaska has approximately 100 engineers graduate per year. AK DOT &PF hopes that advanced training opportunities, such as the construction management certificate, will help attract and retain quality engineers. A job with training as a fringe benefit is a more attractive job. A trained employee is a more productive employee. According to industry experts, the "early exit of more experienced professionals causes stress on the organization and threatens project delivery, quality, and efficiency.

By partnering with UAF Engineering to offer ongoing training for employees, DOT&PF is not only producing more qualified mangers, they are retaining employees and by this they improve the effectiveness of their workforce.

According to Allen, the partnership between UAF and AK DOT works. "I thought that I was already too busy for something like this," said Allen, "but as it turns out this kind of knowledge actually makes time in your schedule as opposed to just taking time. Most engineers are technically astute right out of school but are lacking in people skills. This program helps to fill that gap and make us more rounded."

Geotechnical Research Update

From the research partnership of the Alaska Department of Transportation & Public Facilities and the Alaska University Transportation Center at University of Alaska Fairbanks

TEMP/W

UAF's Professor Margaret Darrow, Ph.D. (formerly with AKDOT&PF Northern Region Materials) is conducting research to calibrate TEMP/W, a two-dimensional, next-generation modeling program we use for characterizing the behavior of frozen ground with roads and airfields. This is a step up from the previous one dimensional model, MUT1D. Although we have been using TEMP/W (mostly in Northern Region), we have not had it "ground truthed" to calibrate the model to known conditions. The research underway will accomplish the calibration by comparing modeling to data collected at selected sites we instrumented with thermistors. This research will allow us to make more accurate predictions of the behavior of embankments on frozen soils and result in more confidence that our designs are reasonable and cost effective.

In-place MEMS Slope Inclinometers

Darrow is also conducting research comparing a new type of slope inclinometer (slope inclinometers measure the movement of soils at unstable slopes such as landslides) with older technology that is the current standard of practice. The current slope inclinometers use a probe lowered down plastic casing to collect measurements at closely spaced intervals in order to find changes in orientation of the casing over time. The site must be revisited each time data collection is required. In addition, the casing has limited flexibility and therefore only allows measurement for relatively small movements. The new in-place slope indicators include flexible strings of many micro electro mechanical systems (MEMS) accelerometers that are installed in the ground and left in position over lengthy periods of time. The instrument strings are more flexible than the casing used in the current method so more data can be collected over a wider range of movement. Data can be collected at intervals or nearly continuously in on-site storage devices or sent via telemetry to office locations without the need for a site visit. There are some potential problems with installation and re-use of the new instrumentation, and this research will determine whether these problems are reasonably solv-

New flexible MEMS string

Current casing and probe method

able. The new, more accurate and efficient method is expected to result in better understanding of unstable ground movements. This research will help us decide whether, when, and where we should use the promising new technology.

Unstable Slope Management Program

Professor Scott Huang, PhD, and Margaret Darrow are conducting introductory research in preparation for our launch of an Unstable Slope Management Program (USMP) through a STIP-funded project managed by the Statewide Materials Geotechnical Section. The research is initially focusing on review of several successful unstable slope and rockfall management programs in other states and Canada. After assessing other programs, Huang and Darrow are creating a proposed "Alaskanized" USMP (with DOT&PF and technical advisory committee guidance). The USMP, when implemented, will incorporate asset management concepts to inventory our unstable slopes, assessing the hazards they present and developing a priority list of slopes identified as requiring repair or mitigation. Ultimately the program can be a vehicle for obtaining funding for the work in a normal construction sequence or in emergencies or through maintenance efforts. Use of a USMP can make our highways safer and reduce our liability.

Slope Stabilization Using Shallow Anchors and Wire Mesh

This research is headed up by Professor Xiong Zhang, PhD, of UAF and Bob McHattie, PE, formerly a geotechnical engineer with DOT&PF. It is focused on the problems of excavating and stabilizing cuts in ice-rich or otherwise unstable wet slopes, for example

Whittier access rockslide

Dalton Highway unstable slope

ice-rich silt cuts on the Dalton Highway. Several techniques for stabilizing such slopes are under consideration, including anchoring wire mesh to the slopes to provide support during thawing of the soil. Current activity includes laboratory and field testing of anchor performance in ice and frozen ground. The aim of the research is to improve on our traditional method of cutting the slopes and letting them stabilize over relatively long periods of time while releasing meltwater to ditches and streams.

Historical Pile Driving Data Analysis

This project will collect and assess our historical pile-driving data and provide a relational database of pile-driving data; provide a data management framework for current and future data; improve our modeling for estimating skin friction and end bearing for pilings used to support bridges and other structures; and provide a means to establish the most appropriate load and resistance factor design for pile driving. For this research, we have engaged the services of Steve Dickenson, PhD, PE, a geotechnical engineer and former civil engineering professor at Oregon State University.

For more information about these and other geotechnical research projects, contact:

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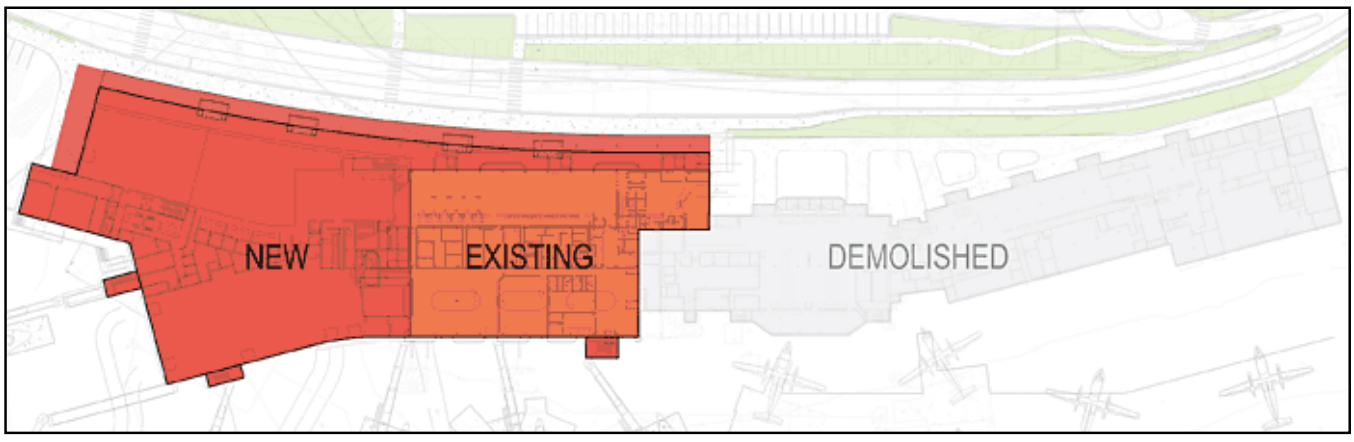
A New Arrival: Fairbanks International Airport Terminal Opens

With a fresh face featuring public art, terrazzo floors, expanses of glass, and even an espresso bar, only the sandbox and the mounted bears help to remember the old terminal. Phase two of the Fairbanks International Airport Terminal Area Development Project opened to the traveling public on May 7, 2009.

About the Project

To address recent and ongoing functional and operational deficiencies associated with Fairbanks International Airport terminal building, AKDOT&PF and the Fairbanks International Airport (FAI) embarked on an ambitious terminal area development plan to assess and plan for the long-term needs of the traveling public.

Ready to serve: Department of Transportation and Public Facilities Deputy Commissioner of Aviation Christine Klein addresses guests at the terminal opening at Fairbanks International Airport. (Official DOT&PF photo by Meadow Bailey, DOT&PF Northern Region public information officer.)



The planning phase began in October 2003 and concluded in April 2004 with the selection of a preferred approach that provided the design team with the following conceptual outline of how FAI can best accommodate domestic and international passenger service into the future:

- extend the southern end of the existing airport terminal, connecting with a portion of the existing structure built in 1985;
- seismically upgrade, renovate, and reconfigure the 1985 portion of the existing terminal;
- demolish portions of the terminal constructed before the 1985 structure;
- reconfigure and renovate the airside and landside terminal facilities;
- provide enhanced safety, security, architectural, mechanical, and electrical upgrades.

FAI moved from planning to the design phase and completed schematic design in February 2006.

- Early building demolition and site work began in May 2006.
- Construction of the new terminal addition and existing terminal first floor renovations began in spring 2007 and continued through winter 2008.
- Remaining building renovations began in spring 2008, with substantial completion by summer 2009.
- Final demolition of the pre-1985 portion of the terminal and remaining site work is scheduled to be complete during the summer of 2009.

History of Fairbanks International Airport

Early aviators in the Alaska territory frequently made do without prepared landing strips, putting their airplane down wherever air transportation was required. Aviation service in the Fairbanks area was initiated at an airfield known as Weeks Field, or Weeks Ball Park, in 1923. This multiuse facility gained importance in the community and throughout the Alaska aviation system from the time that Carl Ben Eielson first flew into Fairbanks in 1923 to start Alaskan Airways. A majority of the area's general aviation and commercial air traffic was accommodated there through mid-century, though air carrier aircraft used Ladd Air Force Base, today called Fort Wainwright. Plans coalesced in 1948 for development of a new facility: Fairbanks International Airport. Construction was authorized by Congress that year. Operations were shifted to the new airport in 1951, though minimal facilities and no terminal building were then available. Air carriers used temporary structures until completion of the passenger terminal building in 1954.

This site, still held today, is located approximately four miles west from the urban center of Fairbanks, just north of the confluence of the Chena and Tanana Rivers. Weeks Field is now a residential area.

The airport was under the charge of the federal government from its opening until Alaska was granted statehood in 1959. Ownership and responsibility for operation were then transferred to the State of Alaska, Department of Public Works, then to the Department of Transportation and Public Facilities, under whose charge the facility remains today.

Development at the airport in past decades has been commensurate with growth in the community. Two notable traffic increases have occurred. First, a surge in passenger and cargo volumes and corresponding aircraft operations occurred in the years 1974 through 1977, when the Trans-Alaska Pipeline System was under construction. Second, traffic at the airport changed in character as international air cargo flights began refueling at Fairbanks in 1979. Japan Airlines and Korean Airlines began service stops on cargo flights in May of that year. Fairbanks became an attractive option because of fuel availability. Use of Boeing 747, McDonnell Douglas DC-10, and McDonnell Douglas DC-8 all-cargo aircraft by these carriers changed the nature of operations at the airport. These larger, heavier aircraft place a greater demand on the infrastructure of the airport. Scheduled international service was discontinued in the spring of 1984, but regularly scheduled service resumed in September of 1990 with the introduction of Lufthansa Cargo to the airport.

Notable facility developments have occurred on the air side and land side in the last two decades. The greatest capacity improvements have come with the construction in 1971 of a general aviation runway, 1R-19L, parallel to the primary runway, a major passenger terminal expansion in 1984, and now the just-completed Fairbanks International Airport Terminal Area Development Project.

Second Circumpolar Conference on Geospatial Sciences and Applications

This conference, to be held at the Westmark Hotel in Fairbanks, Alaska, on August 4–6, 2009, is a unique opportunity to discuss issues and present current research related to geospatial activities in the arctic environment. This conference provides an opportunity to present results associated with the International Polar Year, environment and climate change monitoring and geographic analysis, geospatial standards and their application, and the construction of virtual collaborative networks including arctic mapping and the virtual Arctic Spatial Data Infrastructure (ASDI).

Sessions are scheduled for the following themes:

- virtual globes and geobrowsers;
- capturing local and traditional knowledge;
- imagery, remote sensing, and sensor networks for the arctic landscape; and
- arctic mapping and data access

Forum on the development of an arctic spatial data infrastructure:

- moving towards arctic SDI,
- national activities in support of arctic SDI,
- data access and sharing,
- policy baseline for arctic SDI,
- technical baseline for arctic SDI, and
- arctic SDI initiative development.

Training and Meeting Calendar

August

Introduction to Percent Within Limits: The Quality Measure of Choice
Aug. 11 in Anchorage

September

GPS Height Modernization
Sep. 9 in Fairbanks

October

NHI 131050A: Asphalt Pavement Recycling Technologies
Oct. 15–16 in Anchorage

NHI 380070A: Safety Effects of Geometric Design Features for Two-Lane Rural Highways
Oct. 23 in Anchorage
Oct. 27 in Fairbanks

Warrant Level 2
Oct. 5 in Fairbanks
Oct. 7 in Anchorage
Oct. 12 in Juneau

Warrant Level 3
Oct. 6 in Fairbanks
Oct. 8 in Anchorage
Oct. 13 in Juneau

Meetings Around Alaska

Society	Chapter	Meeting Days	Location	Contact
ASCE	Anchorage Fairbanks Juneau	Monthly, 3rd Tues., noon Monthly, 3rd Wed., noon* Monthly, 2nd Wed., noon*	Moose Lodge Westmark Hotel Breakwater Restaurant	 * except Sept. and Feb. * except June–Aug.
ASPE	Anchorage Fairbanks Juneau	Monthly, 2nd Thurs., noon* Monthly, 1st Mon., noon Monthly, 2nd Wed., noon**	Coast International Inn Regency Hotel Westmark Hotel	Jennifer Gibson, 343-8130 * except summer ** except June–Aug.
ASPLS	Anchorage Fairbanks Mat-Su Valley	Monthly, 3rd Tues., noon Monthly, 4th Tues., noon Monthly, last Wed., noon	Sourdough Mining Co. 5200 Juneau st. Westmark Hotel 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, 1st Tues., noon**	Alaska Aviation Heritage Museum	Karthik Murugesan, 272-1877 ** except July and Aug.
IRWA	Sourdough Ch. 49 Arctic Trails Ch. 71	Monthly, 3rd Thurs., noon** Monthly, 2nd Thurs., noon**	West Coast International Inn Zach's Sophie Station	 ** except July & Dec.
Asphalt Pavement Alliance	Alaska	3rd Wednesday of every other month	varies	John Lambert 267-5294
PE in Government	Anchorage	Monthly, last Fri., 7 a.m.	Elmer's Restaurant	
Society of Women Engineers	Anchorage	Monthly, 1st Wed. 5:30 p.m. except July and August	DOWL Engineers	Julie Gaken, 269-0634

For information about T2-sponsored training, contact:

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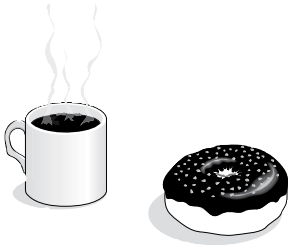

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Erosion Control Association Award

Sam Lamont, an environmental liaison with AKDOT&PF, has won the 2009 Educational Achievement Award from the International Erosion Control Association.

The Educational Achievement Award is presented annually to an outstanding individual who has demonstrated a commitment to excellence in natural resource conservation and environmental protection through delivery of effective erosion and sediment control education.

In 2008 Lamont became the first certified professional in erosion and sediment control at DOT statewide and one of nine in Alaska.

Sam Lamont, AKDOT&PF Construction, pictured left, receives the 2009 IECA Education Achievement Award from Alex Zimmerman of the Pacific Northwest Chapter of IECA.

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- select "Research & Technology"

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