

Keeping Alaska moving through service and infrastructure with applied research, training, and technology transfer

Work-From-Home Lemonade

By Anna Bosin, P.E., RD&T2 Program Manager

Many of us at DOT&PF currently find ourselves in the umpteenth month of remote working. The department has overcome our initial ramp-up of IT systems, and we have mostly conquered our steep learning curve using all the remote meeting platforms known to man. My new day-to-day work and home-life routines are becoming, well, routine. I'm not going to lie: it was a rough start in my house back in March to adjust to the pandemic shut down, but I was grateful that the department offered many resources to help staff power through. A silver lining in all of this is that traditionally in-person meetings, trainings, conferences, and workshops are now happening remotely, which makes them more accessible to staff across the department.

Many of you have already taken advantage of online National Highway Institute trainings hosted by T2, and we are working on adapting other trainings to a virtual platform to continue to deliver to Alaska DOT&PF staff the trainings needed to carry out your work. In addition to Alaska-specific classes being online, University Transportation Centers, AASHTO meetings and other traditionally in-person gatherings are now streaming conferences online. This makes attending a very customizable and comfortable (no dress pants required!) possibility.



Winter 2020, No. 94

In this issue . . .

- Work-From-Home Lemonade
- Frozen Debris Lobe on Dalton Hwy.
- Future Projections of Precipitation in Alaska
- Online Training

As work from home continues, other such opportunities may arise among transportation professional organizations for the coming months (and perhaps longer), so I encourage you to make the most of this rare advantage to “attend” engagements that otherwise may be unavailable to you and staff. It’s been my “lemonade” for staying informed on transportation-related work across the state and country over the last several months and might be for you as well.

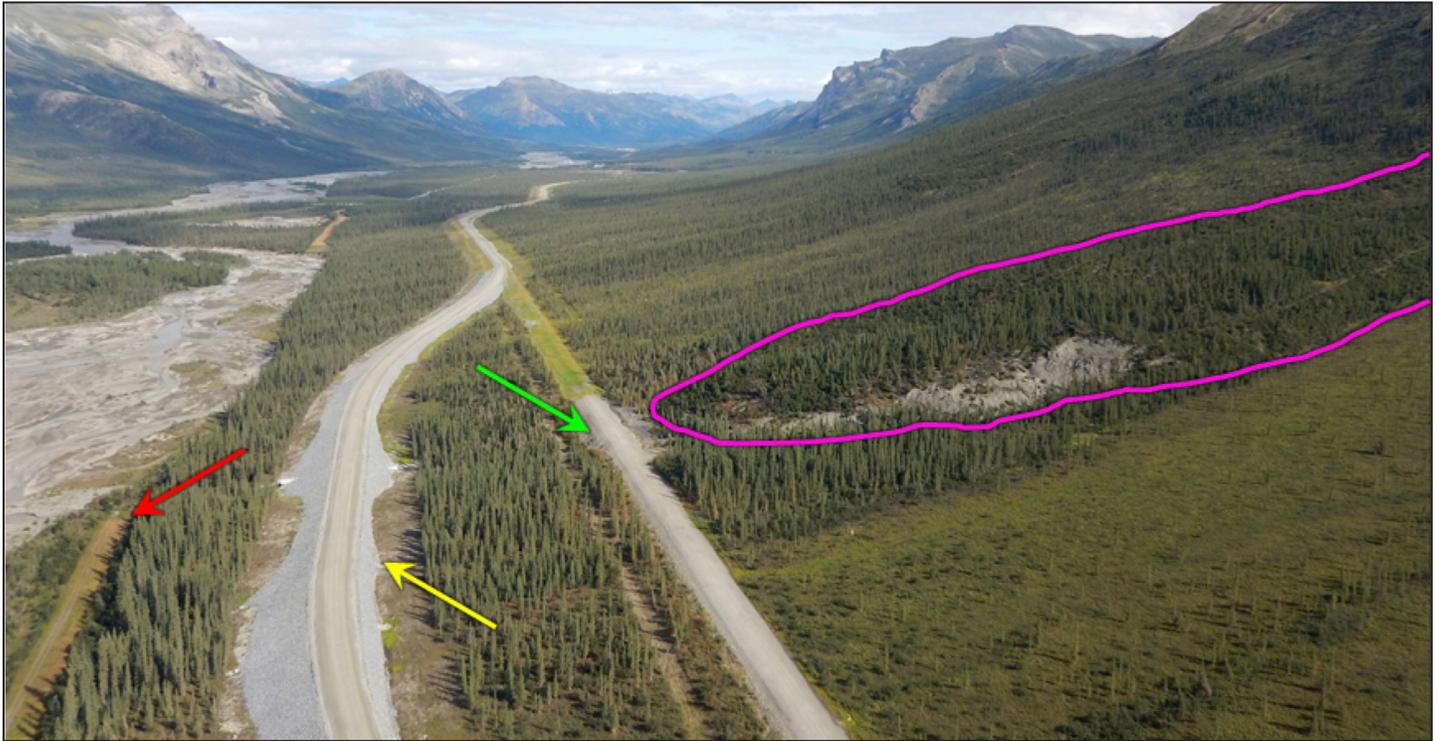
Complete Survey Now to Attend TRB Meeting in January 2021

The Transportation Research Board Annual Meeting will be held virtually this year. The Research, Development and Technology Transfer Section (RD&T2) coordinates Alaska DOT&PF’s attendance annually for this event. This year we will be doing the same, but through staff completing [this survey](#) and attending a preconference MS TEAMS meeting in December (to be announced) to ensure a smooth setup for virtual engagement. Attendance is free to DOT&PF staff, but please get supervisor approval before completing the survey. If you need additional information, you can reach out to any RD&T2 staff to assist.

Each January, the [Transportation Research Board \(TRB\)](#) hosts approximately 15,000 transportation professionals from around the world in Washington, D.C., to learn about the newest research and practices in transportation. For those of you unfamiliar with TRB, it’s a subgroup under the National Academy of Sciences and was established exactly 100 years ago. Their mission is to provide leadership in transportation improvements and innovation through trusted, timely, impartial, and evidence-based information exchange, research, and advice regarding all modes of transportation. I invite you to take a look at the [TRB online event program](#) for this year to consider whether this conference would offer valuable content for you. In addition to providing continuing education credits, sessions can also enhance individual employee development/training plans and exposure to national and international research in transportation that might be relevant to Alaska.

Beware of the Blob: Frozen Debris Lobe Creeps Towards the Dalton Highway

Compiled from the research proposal of Margaret Darrow, PhD, P.E.



Oblique view of frozen debris lobe-A (outlined in pink), the old (green arrow) and new Dalton Highway (yellow arrow) alignments, and the location of the buried Trans-Alaska Pipeline System (red arrow), as seen in August 2019.

Acting much like the creature from the 1958 movie “The Blob,” frozen debris lobes (FDLs) are slow-moving landslides that occur in permafrost. Unlike the slimy amoeba-like makeup of the Blob in the movies, FDLs are made up of soil, rocks, trees, and ice and can be found along slopes in the southern Brooks Range. Along the Dalton Highway corridor, 23 FDLs have been identified within a mile uphill of our only surface transportation connection to the Alaska oil fields. The largest and closest FDL moving towards the Dalton Highway is FDL-A at milepost 219.

Because of FDL-A’s relentless approach to the Dalton Highway, during the 2018 construction season, the highway was realigned 400 feet downslope of its original location. As of August 2020, FDL-A is estimated to be approximately 40 feet from the old Dalton highway alignment and moving at an average rate of 1.2 inches per day. The research project “Monitoring and Analyses of Frozen Debris Lobes Phase II” will study and observe how FDL-A deforms the old highway embankment and will measure the pressure that this moving landmass imparts to the embankment.



DOT&PF crew drilling test hole at FDL-A site, August 2020.

What is learned from this collision may help to develop future mitigation plans for FDLs.

Field work was completed in August 2020. Four 35-foot deep boreholes were drilled into bedrock along the embankment centerline, and a suite of geomechanical instrumentation was installed to collect data that will:

- quantify the timing and rate of deformation,
- identify the type of deformation,
- quantify the amount of change in earth pressure during the collision,
- determine the annual rate of movement, and
- produce a three-dimensional interpretation of the FDL-embankment collision using LiDAR scanning.

Instrumentation was wired to an automated data acquisition system (ADAS). The ADAS includes all the necessary instrumentation to serve as a weather station for the project area and includes a high-resolution camera that will capture the timing of the collision of FDL-A with the embankment, as well as general visible deformation. Daily images of FDL-A can be viewed at fdlalaska.org.

Observing and measuring the impact of FDL-A on the abandoned section of embankment through geomechanical instrumentation, LiDAR, and repeat photography will provide a three-dimensional framework populated with material engineering properties that



Trench with geomechanical instrumentation wires to ADAS.

can be used to understand the effects this landslide has on the highway embankment. What is learned in this full-scale field experiment may help in future mitigation efforts of mass movement events with similar characteristics throughout Alaska, and show how rates of FDL movements may change over time. At the end of “The Blob,” the solution to stopping the Blob’s ever-expansive jelly-like globule advance was to send it to the Arctic to keep it frozen. As we see increasingly warmer temperatures in the Arctic, will we see more Blob-like characteristics in our Arctic environment? This important research project may provide insight to answer that question.



The socially distanced research team at the completed FDL-A site.

Future Projections of Precipitation for Alaska Infrastructure



Photo: Ian Grant

The traditional method of determining design discharges for hydraulic structures in Alaska and elsewhere is to use historical data. However, Alaska's climate is changing, which means that historical data cannot be used to estimate future conditions. Alaska is projected to experience major changes in extreme weather during the twenty-first century.

During project design, the Federal Highway Administration (FHWA) encourages consideration of climate change and risks due to extreme weather events. However, FHWA does not recommend using arbitrary increases of historical information to estimate design discharges. Instead, FHWA recommends using sound hydrologic practices and data.

The research project "Future Projections of Precipitation for Alaska Infrastructure" will calculate and provide downscaled, bias-corrected projections of future liquid precipitation. At the end the principal investigators will provide an online repository and an in-person technical seminar.

What Are We Hoping to Learn?

Projected precipitation data is necessary to design hydraulic structures, such as bridges and culverts, which must function effectively over time. Structural failure can be costly in terms of remediation and repair, or catastrophic in terms of human health and safety. On the other hand, over-building can lead to significant unnecessary budget expenses.

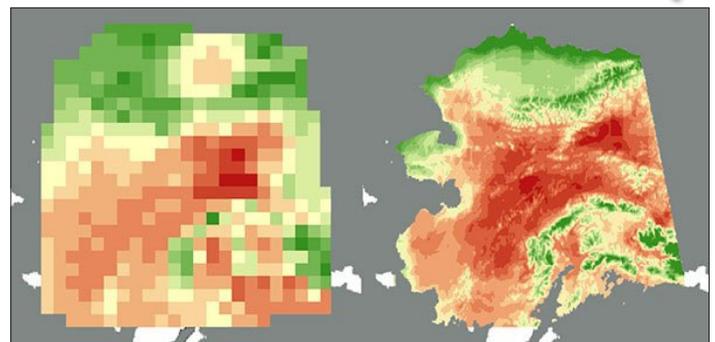
Design discharges are currently estimated based on either (a) intervals in an upper range, based on historical data, or (b) other methods that use estimated

precipitation data. Neither take into account the best available science as recommended by FHWA, which should include projected climate data for the lifespans of the hydraulic structures in question.

As a result, current methods are not defensible and are likely to result in hydraulic structures that are designed for discharges that are either too high or too low. Incorporating climate projections into design discharges would not only bring current practices into

compliance with FHWA recommendations but would also increase long-term budgetary efficiency and reduce the long-term risk of catastrophic structural failure.

Broadly, the goal of this app is to recreate a similar interface to what is available on this NOAA application, but using weather, research, and forecasting output. Goals include allowing users to select the type of data they want, such as precipitation depth, annual maximum, imperial/metric. This app will also allow spatial selection of a pixel by using the map or entering latitude and longitude. When a user selects a pixel the app will show results in a tabular form matching the existing Atlas 14 NOAA app. This will ensure that results can be printed in some format, with a time-stamp of when the data are generated in addition to ensuring that the data can be ingested into a GIS app in a format that DOT engineers are familiar with.



Downscaling results. Left: Original CRU data at 0.5 x 0.5 degrees. Right: the same CRU data downscaled to 2 x 2 km. Source: UAF SNAP website <https://uaf-snap.org/methods-overview/downscaling/>



What does FHWA's EDC-6 mean for Alaska?

Every Day Counts (EDC) is a state-based model that identifies and deploys proven, underutilized innovations to shorten the delivery process—saving time, money and resources. Alaska DOT&PF has participated in EDC since its inception, capitalizing on several innovations for Alaska. On December 8–10, FHWA will be hosting a virtual summit to discuss EDC-6 innovations: https://www.fhwa.dot.gov/innovation/everydaycounts/edc_6/summit.cfm. EDC-6 innovations and links providing more information are listed below:

Crowdsourcing for Advancing Operations

Crowdsourced data can be obtained whenever and wherever people travel, allowing agencies to capture in real time what happens between sensors, in rural regions, along arterials, and beyond jurisdictional boundaries. Agencies at all levels can use crowdsourced data integrated from multiple streams to optimize roadway use for reduced congestion and increased safety and reliability.

e-Ticketing and Digital As-Builts

Converting paper-based materials ticketing systems and as-built plans into electronic (e-Ticketing) workflows and digital as-builts enhances the accessibility of highway project data. e-Ticketing improves the tracking, exchange, and archiving of materials tickets. Digital information, such as 3D design models and other metadata, enhances the future usability of as-built plans for operations, maintenance, and asset management.

Next-Generation TIM: Integrating Technology, Data, and Training

Traffic Incident Management (TIM) programs aim to shorten the duration and impact of roadway incidents and improve the safety of motorists, crash victims, and responders. New tools, data, and training mechanisms are available that can benefit both new and existing TIM programs, including local agency and off-interstate applications.

Strategic Workforce Development

The demand for highway construction, maintenance, and operations workers is growing, while at the same time, emerging technologies require these workers to have new skills. The Highway Construction Workforce Partnership has developed new resources and innovative strategies for identifying, training, and placing individuals in the Contractors' workforce filling the construction jobs that support the Nation's highway system.

Targeted Overlay Pavement Solutions (TOPS)

Pavement overlays represent a significant portion of highway infrastructure dollars. State and local highway agencies can maximize this investment and help ensure safer, longer-lasting roadways by employing innovative overlay procedures that will improve pavement performance, lessen traffic impacts, and reduce the cost of pavement ownership.

UHPC for Bridge Preservation and Repair

Ultra-high performance concrete (UHPC) is a new material for bridge construction that has become popular for field-cast connections between prefabricated bridge elements. Bridge preservation and repair is an emerging and promising application for UHPC. UHPC-based repair solutions are robust, and offer superior strength, durability, and improved life-cycle cost over traditional methods. State and local agencies can deploy UHPC for bridge preservation and repair to maintain or improve bridge conditions.

Virtual Public Involvement (VPI)

Public engagement during transportation project planning and development helps agencies identify issues and concerns early in the process, which can ultimately accelerate delivery. Virtual public involvement strategies supplement traditional face-to-face information sharing with technology platforms that increase the number and variety of methods agencies use to inform the public, receive feedback, and collect and consider comments.

National Highway Institute Online Training

This could be a good time for online training offered by the National Highway Institute (NHI). Many of the courses NHI offers online can be used toward obtaining Continuing Education Units (CEUs), Certification Maintenance (CM) credits, and Professional Development Hours (PDHs) for transportation professionals.

Start now by creating an account with your Alaska DOT&PF email account. We always encourage everyone to talk with your supervisor before enrolling in T2 or non-T2 sponsored courses.

To enroll, go to <https://www.nhi.fhwa.dot.gov/course-search?tab=0&sf=1>

Online Training Available on the T2 Website



- Commercially Useful Function Federal-aid Highway Program Video Training
- Wetlands
- Stormwater
- Hazard Communication
- Airports Multi-Sector General Permit Training
- Introduction to Title VI Training
- Inspection Report Form 25D-100 Instructions



- Natural Occurring Asbestos: Asbestos Awareness Training
- Natural Occurring Asbestos: Competent Person Training
- Natural Occurring Asbestos: Project Designer Training



- RBA: Operate Alaska's Marine Transportation Services
- RBA: Modernize Alaska's Transportation Infrastructure
- RBA: Operate Alaska's Transportation Infrastructure



- NEPA Procedures Manual Training, Module 1: Environmental Procedures Overview
- NEPA Procedures Manual Training, Module 2: Class of Action Determination
- NEPA Procedures Manual Training, Module 3: Categorical Exclusions
- NEPA Procedures Manual Training, Module 4: Environmental Assessment and Finding of No Significant Impact
- NEPA Procedures Manual Training, Module 5: Environmental Impact Statement

- NEPA Procedures Manual Training, Module 6: Re-Evaluation
- NEPA Procedures Manual Training, Module 7: Public and Agency Involvement
- NEPA Procedures Manual Training, Module 8: Section 4(f) and 6(f)
- NEPA Procedures Manual Training, Module 9: Endangered Species Act and Marine Mammal Protection Act
- NEPA Procedures Manual Training, Module 10: Cultural Resources

How to enroll:

1. Go to our link: <https://dot.alaska.ecatts.com/lmsTrainingCalendar>
2. Log in to your account or create an account (sidebar, bottom right)
3. Find “on-line training” under the Training Links on the sidebar.
4. “Add on-line training” to your Scheduled Training and you're ready to go.



For information about T2-sponsored training, contact:

Dave Waldo at 907-451-5323,
david.waldo@alaska.gov
 Simon Howell at 907-451-5482,
simon.howell@alaska.gov

Upcoming Training

Alaska Flexible Pavement Design

City	Fairbanks
Date/Time	Mar 23–Mar 24
8:30–4:30	
Location/Phone	AK DOT- T2 Training Room, 2720 Pickett Place
Registration Deadline	March 9
Class Size	24
Seat Availability	3 seats available for State (DOT) and 4 seats available for Local Government
Instructors	Billy Connor, Director, Alaska University Transportation Center, University of Alaska Fairbanks, and Steve Saboundjian, State Pavement Engineer, P.E., Ph.D, DOT&PF

The current training calendar can be found at:

<https://dot.alaska.ecatts.com/lmsTrainingCalendar>

For periodic emails about research, sign up for our list-serve:

<http://list.state.ak.us/mailman/listinfo/dot-research-notification>

For periodic emails about training, sign up for our list-serve:

<http://list.state.ak.us/mailman/listinfo/dot-training-notification>

For any other information about T2-sponsored training, contact:

Dave Waldo at 907-451-5323,
david.waldo@alaska.gov

or

Simon Howell at 907-451-5482,
simon.howell@alaska.gov

or go to: www.dot.state.ak.us

AASHTO T3 Training Available Free for Alaska DOT&PF Employees

Just create an account with your Alaska DOT&PF email account. Remember, we encourage everyone to talk with your supervisor before enrolling in T2 or non-T2 sponsored courses. Then go to:

<https://tc3.transportation.org/training-resources/courses/>

Hundreds of courses in several topic areas:

- Construction
- Maintenance
- Materials
- Traffic and Safety
- Pavement Preservation
- Employee Development

AASHTO Training Store LOGIN

T3 TRANSPORTATION CURRICULUM COORDINATION COUNCIL

A NATIONAL RESOURCE A VALUABLE PARTNER

ABOUT TC3 | WHY TC3? | **TRAINING RESOURCES** | SUPPORT TC3 | EVENTS | CONTACT US

Matrices | Courses | Suggest a Course | On-the-Job Aids | State Sharing Program | Additional Training Resources

Home / Training Resources / Courses

Online Training On Your Time

TC3 offers over 190 web-based training (WBT) courses with additional courses planned as needs are identified. These WBTs were developed to support training weaknesses and gaps identified in the TC3 matrices. TC3 training accounts for 80% of national-level training needed by the technical workforce.

As of 2015, TC3 now offers courses on an AASHTO LMS platform. The new platform houses updated courses and a user-friendly interface to complete courses on your time and at your leisure. To view our current course listing, [click here](#). You can also browse all courses through the AASHTO bookstore. For additional information and clarification, view the TC3 glossary terms. To learn how to register for an AASHTO account and to enroll in training, view our [How to Register guide](#).

To become a self-sustaining organization and increase training offerings to the technical workforce across the country, TC3 has implemented a tiered fee structure. Contributing DOTs can take courses free of charge, and non-participating DOTs and private sector users will be charged a fee per course.

Have a course you would like to see developed, or want to request a course for development? Complete the form below.

Research, Development, and Technology Transfer Staff

Anna Bosin, P.E., Research Program Manager
907-269-6208, anna.bosin@alaska.gov

Dave Waldo, T2 Manager, Editor
907-451-5323, david.waldo@alaska.gov

Simon Howell, Training Specialist
907-451-5482, simon.howell@alaska.gov

Erin Anderson, Research Engineer
907-451-3055, erin.anderson@alaska.gov

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



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.



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