



Center for Safety Equity in Transportation

If you have a right to get there, you have a right to get there safely.

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Semi-Annual Progress Report for University Transportation Centers

Submitted to: Office of the Assistant Secretary for Research and Technology
U.S. Department of Transportation
1200 New Jersey Avenue, SE
Washington, DC 20590

Project Title: **Tier 1 University Transportation Center for Safety Equity in Transportation (CSET)**

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Report Term: Semi-Annual Progress Report

Signature:

Billy Connor
CSET, Director

Abbreviations

- AKDOT&PF – Alaska Department of Transportation and Public Facilities
- ANTHC – Alaska Native Tribal Health Consortium
- AUTC – Alaska University Transportation Center
- CSET – Center for Safety Equity in Transportation
- GIS – Geographic Information System
- ORCID – Open Researcher and Contributor ID
- PI – Principle Investigator
- PPPR – Program Progress Performance Report
- RiP – Research in Progress
- RITI – Rural, Isolated, Tribal, Indigenous
- UAF – University of Alaska Fairbanks
- UHM – University of Hawai'i Manoa
- UI – University of Idaho
- UW – University of Washington

1. Accomplishments

What are the major goals and objectives of the program?

The goal of CSET is to develop context-sensitive transportation solutions that address the safety needs of RITI communities. The Center will develop safety approaches that are sensitive to heritage, traditional ways of knowing and learning, and the preservation of culture. The mission of the Center for Safety Equity in Transportation (CSET) is to provide everyone with fair and equitable access to a safe transportation system.

What was accomplished under these goals?

During the past six months of the project:

- *Setting up email list, website, and social media accounts*

The official CSET email, cset.utc@alaska.edu, has been used to communicate with Executive and Advisory Board members as well as project PIs. A contact list was populated and will be maintained for the duration of the project. Center announcements are being distributed through emails and social media posts to various audiences and stakeholders. Activities will be posted to the website in a timely fashion.

- *Communication: gotomeeting and gotowebinar*

An account has been set up for CSET with gotomeeting and gotowebinar. The Center will utilize gotomeeting for project progress reports and updates, advisory board meeting and board of directors. The Center will utilize gotowebinar for project updates to stakeholders and other efforts to disseminate research findings.

- *E-newsletters*

The Center distributed its fourth quarterly newsletter in December 2018 and a fifth in February 2019. The newsletter is available under the *Publications* section of the website.

- *Research projects*

Nineteen projects continued during this reporting period under three primary areas: knowledge gathering, outreach, and baseline data collection. One of the nineteen submitted their final report for review. The report will be completed and submitted to TRID during the next reporting period. The project information is posted on the CSET website, and logged in the RiP database. Annual project update meetings will be held each summer, and quarterly reports will be collected in a timely manner.

- *Training programs*

None have been developed during this period.

- *Active student internships*

None have been developed during this period.

- *Teacher training and curriculum development activities*

None have been developed during this period.

- *Data collection tools developed*

A GIS-Based Database for RITI communities in Idaho with different layers for state, local, and census roadways networks was updated with information on crashes that involved RITI communities and with information on crashes that occurred on unpaved roads in the state of Idaho.

- *Sponsorship*

CSET hosted the 2018 Region 10 Transportation conference in collaboration with the Pacific Northwest Transportation Consortium (PacTrans) on October 12, 2018 at the University of Alaska Fairbanks (UAF). The theme, *North to the Future: Emerging Mobility and Safety Issues in the Pacific Northwest*, engaged participants in dialogue on how to move our transportation system forward while being conscious of safety and mobility implications. More than 130 professionals, academics and students in the field of transportation engineering attended the conference.

How have the results been disseminated?

CSET staff and researchers have been actively seeking out opportunities to interact with the public, stakeholders and the transportation community.

Professional Meetings

During this reporting period, CSET representatives attended the following professional event:

1. 98th Annual Meeting of the Transportation Research Board, Washington, D.C. January 2019
2. Alaska Federation of Natives Conference, Anchorage, Alaska. October 2018.
3. Region 10 Annual Transportation Conference, Fairbanks, Alaska. October 2018

Outreach

- *Northstar Elementary School*, November 8, 2018

CSET hosted 24 third grade students from Northstar Elementary School visiting the UAF campus. UAF students in Civil and Environmental Engineering provided a presentation on the different types of concrete. The highlight for the students was a demonstration of the differences in concrete strength illustrated by crushing different types of concrete cylinders.

- *BEST STEM Series*, January 25, 2019

CSET Director Billy Connor discussed engineering with homeschooled students who participate in the Building Educational Success Together (BEST) program through the Fairbanks Northstar Borough. The students were introduced to the concepts of friction and safe stopping distances on different road surfaces including asphalt, gravel and ice through an activity that measured the friction coefficient of each surface and used the values to calculate stopping distances.

- *Pearl Creek Elementary STEM Night*, January 31, 2019

CSET staffed a table on road construction and design for elementary school students at Pearl Creek Elementary School's annual STEM night.

- *Tribal Transportation Planning Organization Meeting*, February 12-13, 2019

Researchers from the University of Washington presented on safety data management and analysis for tribal communities to tribal transportation planners during their session at the Bureau of Indian Affairs NW Tribal Transportation Symposium.

- *CEM Engineering Open House*, February 23, 2019

CSET provided an activity to demonstrate safe stopping distance concepts and measurements to the Fairbanks community during the annual UAF College of Engineering and Mines (CEM). The activity focused on determining the friction coefficient for different surfaces in order to calculate the safe stopping distance. The event was attended by approximately 500 people.

- *Dust Management Workshop*, March 19, 2019

Billy Connor presented dust management at a workshop in Klawock, hosted by Northern Arizona University. Participants from rural Alaskan communities learned techniques to improve air quality in their community by reducing fugitive dust from roads within the community. This included institutional measures as well as the use of proper surfacing and the use of palliatives.

- *Safety Data Management and Analysis Workshop*, March 22, 2019

Ziqiang Zeng and Yin Hai Wang hosted a workshop showcasing safety data management and analysis to tribal transportation planners at the University of Washington on March 22 with Nicole Ahlem, Colville Tribal Transportation Coordinator. A research agreement with Colville Confederated Tribes has been utilized to share data and work together towards a mutual goal of improved safety analysis as a part of other CSET projects.

What do you plan to do during the next reporting period to accomplish the goals and objectives?

We will follow the implementation plan to ensure that all the CSET's funded research, education, and outreach activities move forward as scheduled.

- The Center website, social media presence, and emailing contact lists will be regularly updated and used to promote the Center and its activities.
- CSET's sixth and seventh quarterly newsletters will be distributed during the month of May and August. The newsletter will highlight Center progress, such as projects starting/concluding, new calls for proposals, STIs, etc.
- Steps will be taken to continue bringing students on as research assistants.
- Steps will be taken to develop training programs, curriculum development activities, outreach, and sponsorship opportunities.
- Center researchers and staff will continue participation and involvement with seminars, workshops and conferences as outlined in YR1 and YR2 efforts.
- Year 3 projects will be awarded and begun.
- Efforts to provide community training will be increased based on CSET research.

2. Participants & Collaborating Organizations

What organizations have been involved as partners?

- *Collaborative research and financial support*
Newtok Village Council, Newtok Alaska, Alaska Native Tribal Health Consortium

Have other collaborators or contacts been involved?

Email correspondence been exchanged during the reporting period to discuss research ideas and broad collaborations on research, education, workforce development, and outreach activities between CSET and various collaborators. Plans have been developed for a collaborative effort during the upcoming reporting period to establish common definitions of Rural, Isolated, Tribal and Indigenous for use by the projects funded by the Center.

3. Outputs

Publications, conference papers, presentations, websites, lectures, seminars, workshops, invited talks

Publications

- *Journal Publications*
 - Zhenning Li, Xiaofeng Chen, Yusheng Ci, Cong Chen, and Guohui Zhang. A hierarchical Bayesian spatiotemporal random parameters approach for alcohol/drug impaired-driving crash frequency analysis. *Analytic Methods in Accident Research*. In Press. 2019.
 - Zhenning Li, Yusheng Ci, Cong Chen, Guohui Zhang, Qiong Wu, Zhen Sean Qian, Panos D. Prevedouros, and David T. Ma. Investigation of driver injury severities in rural single-vehicle crashes under rain conditions using mixed logit and latent class models. *Accident Analysis and Prevention*. In Press. 2019.
 - Harrison Togia, Oceana Francis, Karl Kim, Guohui Zhang. A Segmentation-based Approach for Assessing Hazard Risk of Coastal Highways in Hawaii. In Press. 2018. *Transportation Research Record: Journal of the Transportation Research Board*.
 - Chang, K., Ramirez, M., Dyre, B., Mohamed, M., and Abdel-Rahim, A. (2019). "Effects of Longitudinal Pavement Edgeline Condition on Driver Lane Deviation," *Accident Analysis and Prevention*. 128, 87-93. 10.1016/j.aap.2019.03.011.
 - Hansen, R. and Chang, K. (2019). "Horizontal and Vertical Curvature and its Effects on Driver Passing Choice," *Transportation Research Record*. 2673(2), 734-742. 10.1177/0361198119827531.
 - Mohamed, M., Skinner, A., Abdel-Rahim, A., Kassem, E., and Chang, K. (2019). "Deterioration Characteristics of Waterborne Pavement Markings Under Different Operating Conditions," *ASCE Journal of Transportation Engineering, Part B: Pavements*. 145(2). 10.1061/JPEODX.0000101.
 - Qiong Wu, Zhenning Li, Yusheng Ci, Cong Chen, Guohui Zhang. Using latent class analysis and mixed logit model to explore risk factors on driver injury severity in single-vehicle crashes. *Accident Analysis and Prevention*. In Press. 2019.

- Zhenning Li, Cong Chen, Qiong Wu, Guohui Zhang, Xiaoyue Cathy Liu, Panos Prevedouros, and David Ma. Exploring Driver Injury Severity Patterns and Causes in Low Visibility Related Single-Vehicle Crashes Using a Finite Mixture Random Parameters Model. *Analytic Methods in Accident Research*. Vol. 20. 2018. pp. 1-14.
- Zhenning Li, Cong Chen, Yusheng Ci, Guohui Zhang, Qiong Wu, Xiaoyue Cathy Liu, and Zhen Sean Qian. Examining driver injury severity in intersection-related crashes using cluster analyses and hierarchical Bayesian models. *Accident Analysis and Prevention*. Vol. 120. 2018. pp. 139-151.

- *Reports*

None to report at this time.

- *Conference papers*

None to report at this time.

- *Presentations*

- Miah, Mintu M. and Panos D. Prevedouros, Effects of Reading Text While Driving: Analysis of 200 Honolulu Taxi Drivers on a Simulator, Paper 19-00176, 98th Annual Meeting of the Transportation Research Board, Washington, D.C., 2019. In poster session 1311, Hall A, B375, Mon., Jan. 14, 130-300P.
- Jonathan B. Metzgar, Diane M. Murph, and David L. Barnes, *Dust Palliative Mean Particle Residence Time Calculator*, 2018 Region 10 Transportation Conference. Poster.
- Hao Yu, Pan Liu, Zhenning Li, Guohui Zhang, and Hui Shen. Exploring Factors Affecting Young Travelers Mode Choice Considering E-Hailing Service. The 98th Annual Meeting of Transportation Research Board, Washington, D.C., Jan. 2019.
- Zhenning Li, Yusheng Ci, Cong Chen, Guohui Zhang, and David Ma. A Spatio-Temporal Bayesian Hierarchical Approach to Analyze Alcohol/Drug Impaired-Driving Related Traffic Crashes by Severity. The 98th Annual Meeting of Transportation Research Board, Washington, D.C., Jan. 2019.
- Ying Yao, Hongji Du, Xiaohua Zhao, Yunlong Zhang, Guohui Zhang. Classification of Fatigued Driving and Drunk Driving Based on Decision Tree Methods: A Simulator Study. The 98th Annual Meeting of Transportation Research Board, Washington, D.C., Jan. 2019.
- Belz, N., Chang, K., and Hansen, R. (2019). "Using Field and Simulation Data to Assess Passing Zone Behavior on Rural Two-Lane Highways," Transportation Research Board Conference; Washington, DC.
- Mohamed, M., Abdel-Rahim, A., Kassem, E., and Chang, K., and McDonald, A. (2019). "A Laboratory-Based Procedure for Testing and Evaluating Pavement Markings," Transportation Research Board Conference; Washington, DC.

- *Other Products*
 - Dust Palliative Mean Particle Time Calculator (UAFDUST) developed and tested. Available on line at <http://autc.uaf.edu/engineering-tools/>
- *Website Updates*
 - The CSET website is live at cset.uaf.edu.
 - Year 2 project information is available on the website.
 - Events that are deemed noteworthy have a brief summary and photo displayed on the website.
- *Lectures/Seminars/Workshops/Invited Talks*
 - *Workshop: Defining Isolation in a Transportation Context*, Presided by CSET Director Billy Connor. October 12, 2018
 - *Workshop: Safety Data Management and Analysis for Tribal Lands*, March 22, 2019
- *New methodologies, technologies or techniques*
None to report at this time.
- *Inventions, patents and/or licenses*
None to report at this time.

4. Outcomes

- *What outcomes has the program produced? How are the research outputs described in section 3 being used to create outcomes?*

The Dust Palliative Mean Particle Time Calculator (UAFDUST) is the last step in implementing the Dust Column Test Method into the Alaska Test Methods. This allows users of the test method to have an accepted test method which can be used to select the proper dust palliative and the proper application rate. It is the only test capable of determining the effectiveness of a palliative before field application. It also provides a method of determining the effectiveness in the field.

The research agreement established between the University of Washington (UW) and the Colville Confederated Tribes is a critical step towards working together towards a mutual goal of improved safety analysis in tribal communities. Subsequently, UW hosted a workshop showcasing related work to tribal transportation planners which took place at the University of Washington on March 22 with Nicole Ahlem, Colville Tribal Transportation Coordinator.

5. Impact

- *What is the impact on the development of the principal discipline(s) of the program?*

Dust management training has improved air quality, safety and reduced maintenance costs of rural Alaska roadways. The focus has been on a tiered approach beginning with institutional controls such as reduced speed and reducing aggressive driving. When that doesn't yield the desired results palliatives are recommended. Training has been coordinated with Alaska Department of Conservation and EPA.

- *Other Disciplines –*

CSET is a multidisciplinary Center, and will therefore have an impact in fields outside of the traditional areas of transportation research. In future reports, this section will serve to answer the following questions.

- *What is the impact on the development of transportation workforce development?*
- *What is the impact on safety in RITI communities?*
- *What is the impact on physical, institutional, and information resources at the university or other partner institutions and communities?*
- *What is the impact on technology transfer?*
- *What is the impact on society beyond science and technology?*
- *In what ways have researchers and students who are part of or who focus on native or federally recognized tribes and communities been involved?*

6. Changes/Problems

- Nothing to report.