CSET Newsletter

Volume 5, Issue 2

Center for Safety Equity in Transportation

rural • isolated • tribal • indigenous

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

December 2022

CSET Research Showcase

Extracting Rural Crash Injury and Fatality Patterns Due to Changing Climates in RITI Communities Based on Enhanced Data Analysis and Visualization Tools

The traffic crashes in Rural, Isolated, Tribal, or Indigenous (RITI) communities involving incapacitating injuries and losses are believed to have different causes than those in urban areas. The traffic crashes occurring in RITI communities relate more to actions such as speeding, lack of safety device use (ex. seatbelt)s, adverse climate and weather conditions and lack of maintenance and repairs for road conditions, and inferior lighting conditions than urban crashes. Thus, it is necessary to study the properties and attributes of traffic crashes in the RITI areas using statistical methods and data-driven methods.

The project analyzed the rural crash injury and fatality patterns in RITI communities using the latest mathematical methods. They used a mixed logit model (MLM) to examine the risk factors in determining driver injury severity in four crash configurations in two-vehicle rear-end crashes on state roads based on seven-years of data from the Washington State Department of Transportation. The dataset only includes collisions with passenger cars and pickup trucks involved. These vehicles are the most common in these crashes. Four crash configurations are examined concerning the type of the vehicles and their relative position in a crash. Four models for these configurations and a model for the overall dataset are estimated. In addition, the project developed a latent class mixed logit model (LCM) with temporal indicators to investigate highway single-vehicle crashes and the effects of contributing factors to driver injury severity. The differences between the MLM and the LCM were investigated to explore the relationships between driver injury severity in rain-related rural single-vehicle crashes and corresponding risk factors.

Due to limited visibility and low skid resistance on the road surface, single-vehicle crashes in rain, especially those that occur in rural areas, are more likely to result in driver incapacitating injuries and fatalities. A three-year crash dataset including all rural single-vehicle crashes under rainy conditions from 2012 to 2014 in four South Central states, i.e., Texas, Arkansas, Oklahoma, and Louisiana, was selected by this project to analyze the impact factors on driver injury severity. The MLM and LCM are developed on the same dataset. Results show that choosing the uniform distribution as the prior for random parameters improves the goodness-of-fit of the MLM more than using normal and lognormal distributions. In addition, the two-class LCM also shows superiority when compared to three- and four-class LCMs. Finally, a careful comparison between these two models was conducted, and the results indicate that the LCM has a slightly better performance in analyzing the aforementioned dataset in this study.

Rural roadway patched and uneven due to lack of maintenance and repairs. Photo by Billy Connor.

UNIVERSITY OF ALASKA FAIRBANKS

UNIVERSITY of WASHINGTON

University of Idaho

UNIVERSITY of HAWAIʻI MĀNOA

Ice Roads Workshop

The Artic Infrastructure Development Center (AIDC)and CSET hosted a workshop focused on the placement, design and maintenance of ice roads on November 8-9, 2022 in Bethel Alaska. Funding for the event was provided by FHWA. The workshop included presentations on the Ice Roads Manual developed by the AIDC, the experiences of those building ice roads in Alaska, and the funding resources available through AK DOT. Mark Leary presented on the extensive experiences of the Native Village of Napaimute Ice Road Program. Input from his team highlighted changes required to the Ice Roads manual prior to the manual's final publication. Interest has been expressed by individuals unable to attend the Bethel Workshop for another opportunity to learn about ice road construction. The AIDC is currently investigating the possibility of holding a workshop in Fairbanks in early 2023.

Attendees of the Ice Roads Workshop held in Bethel, Alaska on November 8 and 9, 2022.

Hauling firewood on the Kuskokwim Ice Road near Bethel, Alaska. Photo by Mark Leary

UAF Come study with us!

The University of Alaska Fairbanks is actively seeking graduate students interested in research related to rural, isolated, tribal and indigenous transportation safety. Civil engineering is preferred, but also looking for interdisciplinary and Alaskan Native students. For more information contact Nathan Belz at npbelz@alaska.edu.

CSET at TRB Annual Meeting

CSET researchers will be presenting the results from a wide variety of projects at the transportation Research Board (TRB) 102nd Annual Meeting. the meeting is being held in, January 8-12, 2023 in Washington, D.C. Research sponsored by CSET will be presented during the Advances in Geospatial Data Acquisition lectern Session on January 9 in room 101 of the convention center. Additional research will be presented during the TRB Minority Student Fellows and the Applications, A Fresh Look at Crash Characteristics, and Innovation in Urban Travel Data poster sessions on Tuesday, January 10. CSET research hope to see you there.

Tanana ice road under development, February 29, 2020. Photo by Nathan Belz.