

MOUNTAIN-PLAINS CONSORTIUM

RESEARCH BRIEF | MPC 17-335 (project 352/400) | October 2017

Evaluation of Ice Loads on Bridge Sub-Structures in South Dakota



the **ISSUE**

Researchers developed and used an on-site monitoring device to measure ice impact load on bridge sub-structures in South Dakota streams. This data will help researchers to evaluate the applicability of AASHTO code ice load estimation for these locations. Estimations of ice loads on bridge structures used in designing bridges may be quite different than those encountered on actual bridges. Lack of accurate data may lead to bridge substructures that are over designed with excessive construction cost or under designed, compromising public safety.

the **RESEARCH**

A customized ice load monitoring device was designed and installed at two locations in South Dakota and collected impact data for two years. Statistical analysis was performed using the data obtained and compared to ice load calculations currently used in South Dakota.



A University Transportation Center sponsored by the U.S. Department of Transportation serving the Mountain-Plains Region. Consortium members:

Colorado State University
North Dakota State University
South Dakota State University

University of Colorado Denver
University of Denver
University of Utah

Utah State University
University of Wyoming



Lead Investigator(s)

Dr. Shiling Pei
spei@mines.edu
Colorado School of Mines

Project Title

Evaluation of Ice Loads on
Bridge Sub-Structures in
South Dakota

Sponsors | Partners

USDOT, Research and
Innovative Technology
Administration

the FINDINGS

Based on limited data, it is safe to use the AASHTO ice load calculation with the highest effective ice strength and without small stream reduction.

the IMPACT

Research results confirmed the safety of the current ice load calculation practice adopted by SD DOT. Improved ice load estimations will allow for appropriately-designed bridge substructures that optimize construction cost without sacrificing safety.

For more information on this project, download the entire report at <http://www.ugpti.org/resources/reports/details.php?id=892>

For more information or additional copies, visit the Web site at www.mountain-plains.org, call (701) 231-7767 or write to Mountain-Plains Consortium, Upper Great Plains Transportation Institute, North Dakota State University, Dept. 2880, PO Box 6050, Fargo, ND 58108-6050.



This publication was produced by the Mountain-Plains Consortium at North Dakota State University. The contents of this brief reflect the views of the authors, who are responsible for facts and the accuracy of the information presented herein. This document is disseminated under the program management of the USDOT, Office of Research and Innovative Technology Administration in the interest of information exchange. The U.S. Government assumes no liability for the contents or use thereof.



NDSU does not discriminate in its programs and activities on the basis of age, color, gender expression/identity, genetic information, marital status, national origin, participation in lawful off-campus activity, physical or mental disability, pregnancy, public assistance status, race, religion, sex, sexual orientation, spousal relationship to current employee, or veteran status, as applicable. Direct inquiries to Vice Provost for Title IX/ADA Coordinator, Old Main 201, NDSU Main Campus, 701-231-7708, ndsu.eaaa@ndsu.edu.