Measuring friction on icy, snowy roadways

CTRE's participation in the January 2000 Winter Runway Friction Workshop at North Bay, Ontario, marked Iowa's continued commitment to improving highway safety.

Reducing those slippery spots

At the workshop, CTRE tested the SALTAR friction meter, a state-of-the-art Norsemeter AS product that measures pavement surface friction in winter conditions.

The SALTAR is mounted on the Iowa Department of Transportation's (Iowa DOT) highway concept maintenance vehicle (HCMV), a prototype snow plow for advanced winter research and maintenance, which CTRE is testing and evaluating (see the sidebar below).

Friction measurements reported by the SALTAR can help snow plow operators decide when, where, and how much chemical or abrasive to apply to increase surface friction and help keep moving vehicles under control.

The accuracy of SALTAR measurements is critical to effective maintenance decision making.

Testing at North Bay

Sponsored by the Joint Winter Runway Friction Measurement Program (a government/industry study directed by National Aeronautics and Space Administration, Transport Canada, the Canadian National Research Council, and the U.S. Federal Aviation Administration), the workshop had two primary goals:

- assess the effectiveness of different ground friction measuring devices on various winter-contaminated surfaces
- verify the correlation between different ground friction measuring instruments

These goals matched those of the HCMV study team for testing the SALTAR.

Iowa's unusually mild winter of 1999–2000 rarely provided icy or snowy pavements on which to test the SALTAR.

HCMV: a pooled-fund study

The highway concept maintenance vehicle (HCMV) not only serves as a maintenance truck in the winter but also acts as a moving research lab for evaluating new technologies. A consortium formed by the Iowa, Michigan, and Minnesota departments of transportation developed the HCMV prototype.

The HCMVs currently used by the consortium states include some or all of the following features:

- front, wing, and underbody plows
- AMS-200 on-board data logger
- global positioning system (GPS) receivers
- Road Watch pavement/air temperature sensors
- Frensor freezing point chemical sensor
- liquid and granular spreading equipment
- extra horsepower for fast acceleration
- fiber-optic lighting
- high-intensity discharge (HID) lights
- SALTAR friction meters

With the success of the HCMVs, the consortium is working to increase the number of state DOTs participating in the program and the number of HCMVs on the road.

For more information, visit http://www.ctre.iastate.edu/research/conceptv/focus.htm. •

The harsh weather conditions at North Bay, however, provided "perfect" pavement conditions.

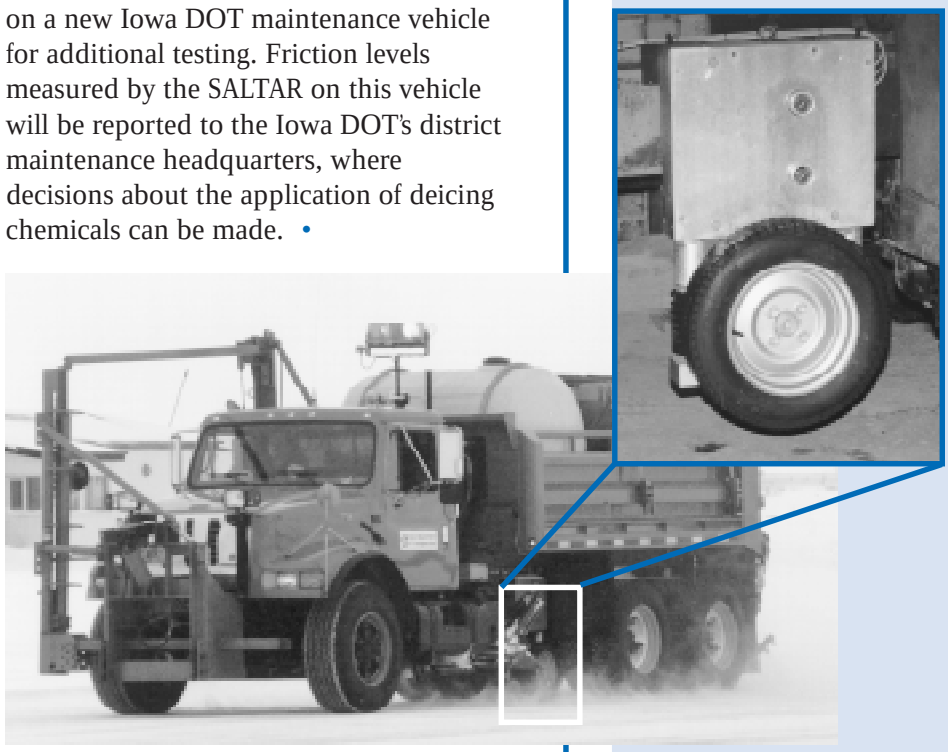
CTRE was able to monitor the SALTAR's performance on a variety of surfaces:

- loose and compacted snow
- smooth and rough ice
- sanded and chemically treated ice
- slush

Dennis Kroeger, transportation research specialist at CTRE, says, "Testing at North Bay was successful. The SALTAR was successful in measuring roadway conditions on these surfaces." For example, the SALTAR successfully measured low friction values on the hard-packed snow and higher friction values on dry pavement.

Because of the promise shown by the SALTAR at North Bay, it has been installed on a new Iowa DOT maintenance vehicle for additional testing. Friction levels measured by the SALTAR on this vehicle will be reported to the Iowa DOT's district maintenance headquarters, where decisions about the application of deicing chemicals can be made. •

The SALTAR friction meter measures pavement surface friction in winter conditions.



An Iowa DOT maintenance vehicle tests the friction meter. (Photos courtesy of the Iowa DOT.)

Keeping up with TSA

In keeping with its mission to provide students interested in transportation with a number of professional activities and opportunities, Iowa State University's Transportation Student Association (TSA) has helped its members make numerous professional connections and has encouraged students to experience the transportation industry on both the local and national level.

Several TSA members attended the Institute of Transportation Engineers annual meeting in Nashville, Tennessee, in August 2000. In January 2001, almost a dozen TSA members attended the Transportation Research Board (TRB) meeting in Washington, D.C. Students attended presentations and participated in a round table discussion with other students from Texas A&M and the University of Massachusetts.

TSA also held its fourth annual golf outing as well as "Transportation Career Days." Both events gave students opportunities to mingle with transportation officials. "Transportation Career Days," for instance, began with an evening of presentations by seven companies. The second day of the event provided an opportunity for qualified students to interview with the participating companies.

TSA has plans for field trips to a trucking firm, engineering firm, and a crash test facility. Members are also organizing a social service activity to educate area elementary school children on issues of traffic safety. •