

# The Bridge

Linking Transportation Research and Practice



## Agencies share winter operations best practices

### First-ever Michigan Winter Operations Conference attracts a large crowd

By John Rynanen, Editor  
Center for Technology & Training

**Science** (*n*) – a branch of knowledge or study dealing with a body of facts or truths systematically arranged and showing the operation of general laws.

**Art** (*n*) – skill acquired by experience, study, or observation, often involving the conscious use of creative imagination and a personal, unanalyzable creative power or ability.

Controlling snow and ice on winter roads is complicated because it involves both a “body of facts or truths systematically arranged,” and also a “conscious use of creative imagination.” Experts in the field understand and respect the chemistry, physics and math involved, but they’re also willing to use their imaginations, exercise creativity, and follow hunches to figure things out. Basically, they know how to cross back and forth between science and art.

#### Blurring the line

At the 2011 Michigan Winter Operations Conference in Midland on November 10, attendees were treated to a full day of experts blurring the line between science and art. The full agenda and PDF copies of the presentations are available on the Michigan LTAP website: [MichiganLTAP.org/winterops2011](http://MichiganLTAP.org/winterops2011).

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### Cooperation cuts salt costs 40%



At the 2011 Michigan Winter Operations Conference, Gary Rank, facilities manager for the City of West Des Moines, Iowa, described how his agency spearheaded an effort to build a facility for sharing salt among multiple jurisdictions in Central Iowa. The facility includes two fabric-roofed buildings which have a total capacity of 22,000 tons of salt. It was completed in 2008, and is currently shared by eight municipalities. The bulk buying power realized through the sharing agreement translates in to a savings of about 40% over salt prices for individual agencies.



City of West Des Moines

*Wishing you the very best in 2012.*



“The Old Year has gone. Let the dead past bury its own dead. The New Year has taken possession of the clock of time. All hail the duties and possibilities of the coming twelve months!”

*Edward Payson Powell*

## The Bridge

*The Bridge* is published quarterly by the Center for Technology & Training (CTT) through Michigan’s Local Technical Assistance Program at Michigan Technological University. Subscriptions are free and available by contacting the CTT.

### Michigan’s Local Technical Assistance Program

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## LTAP Steering Committee

The Local Technical Assistance Program (LTAP) is a nationwide effort financed by the Federal Highway Administration and individual state departments of transportation. It intends to bridge the gap between research and practice by translating the latest state-of-the-art technology in roads, bridges, and public transportation into terms understood by local and county highway or transportation personnel.

The LTAP Steering Committee makes recommendations on, and evaluations of, the activities of the Local Technical Assistance Program.

**Kurt E. Zachary, P.E. 517-702-1832 FHWA**  
Local Program Engineer, FHWA

**Bruce Kadzban, P.E. 517-335-2229 MDOT**  
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Sponsored by



U.S. Department of Transportation  
Federal Highway Administration



Published in cooperation with



**4000 copies mailed this edition**

*The Bridge* is printed with soy-based ink on recycled, acid-free paper (50% recycled, 10% post-consumer waste)  
Michigan Technological University is an equal opportunity educational institution/equal opportunity employer.

**Winter Ops from Page 1**

Dr. Wilfrid Nixon, professor of Civil and Environmental Engineering at the University of Iowa, delivered the opening presentation. Dr. Nixon is recognized internationally as an expert in snow and ice control; he has been working in the field since the late 1980s, during which time he has conducted research on plow performance, chemical usage, information management in winter operations, and other topics. His presentation at the Michigan Winter Operations Conference, titled *The Science of Snow and Ice Control*, provided a great foundation for the presentations to come.

“Dr. Nixon made clear the importance of safety, mobility, and economic competitiveness for a given region,” said Steve Cook, MDOT operations and maintenance engineer. Cook served as moderator for the conference. “His presentation provided a great high-level view of why winter maintenance operations are so important and how a single weather event can have far reaching affects in a region. He really set the tone for the rest of the day.”



City of Farmington Hills

A 2,635 gallon tank trailer is an important part of the City of Farmington Hills' winter operations plan. Bryan Pickworth, road maintenance supervisor at the City of Farmington Hills, and Mark Clancey, fleet manager at the City of Wixom, teamed up at the 2011 Michigan Winter Operations Conference to discuss how their respective agencies use salt brine for anti-icing and deicing pavement. “The tank trailer allows us to treat more roads in less time in the winter,” Pickworth said. “And we use it in the summer for dust control on gravel roads.”

**Best practices from all over**

Dr. Nixon was among 13 total presenters for the conference. Nixon and two others—Dr. Xianming Shi from Montana State University and Gary Rank from the City of West Des Moines, Iowa—were able to participate at the conference through travel funding provided by the Federal Highway Administration (FHWA) peer-to-peer program. A key goal of the program is to encourage the sharing of best practices among rural transportation agencies across the country.

The remaining presenters included a consultant and several practitioners from state, county, and municipal road agencies

## 2011 Michigan Winter Operations Conference Advisory Committee

### Michigan Department of Transportation Roadway Operations Unit

Tim Croze, Manager

### Emmett County Road Commission

Brian Gutowski, Engineer-Manager

### City of Farmington Hills

Bryan Pickworth, Road Maintenance Supervisor

### Southeast Michigan Council of Governments

Angela Ayers, Environmental Planner

Tom Bruff, Manager

### Center for Technology & Training at MTU

John Ryyanen, Editor and Event Coordinator

in Michigan. Each presentation fit into one of four focus areas: Environmental Considerations, Equipment and Technology, Materials, or Operations.

The conference attracted 162 winter operations practitioners from state, county, and municipal agencies in Michigan. Planning for the conference was done through an advisory committee made up of representatives from state, county, municipal, and regional transportation agencies (see 2011 Winter Operations Conference Advisory Committee, above), and was coordinated by staff from the Center for Technology & Training (CTT) at Michigan Technological University (MTU). “We were extremely pleased with the lineup of speakers and the turnout for this conference,” Tim Colling, CTT Director, said. “The advisory committee did a terrific job of choosing presentation topics and identifying great presenters, and the travel funding from FHWA helped keep the registration fee affordable. The event covered a lot of ground and was a great experience for everyone involved; we’re looking forward to working with the advisory committee to plan a similar event for next year.”

**New and improved for 2012**

Based on comments from written attendee evaluations at the conference and a web-based survey conducted after the conference, the advisory committee plans to add two additional elements to the conference for next year: the agenda will tentatively include separate tracks for operations and management, and the committee hopes to invite vendors to set up booths and bring in equipment.

The date and location for next year’s conference have not been determined yet. If you have ideas for topics or if you have a topic you would like to present, please call or email the CTT office: 906-487-2102 or [ctt@mtu.edu](mailto:ctt@mtu.edu). 

# New program will help locals load rate bridges

CTT to provide training and technical support for local agencies and their consultants

By Center for Technology & Training Staff

In March 2010, the Michigan Division of the Federal Highway Administration (FHWA) completed a National Bridge Inspection Standards (NBIS) program review of Michigan's load rating program and issued a report titled, *Load Rating and Posting of Michigan Bridges*. The report stated that "Many local agency bridges may not be load rated in compliance with NBIS requirements, or may not be load rated at all. The number of local agency bridges requiring their load ratings to be revised is between 3,000 to as many as 4,100 or more." In response to the report, the Michigan Department of Transportation (MDOT) created a prioritization schedule whereby local agency bridges requiring load rating assessments were broken down into three tiers which are to be completed by the end of 2012, 2014, and 2016 respectively. The prioritization was communicated to the local agencies through MDOT Bridge Advisory 2011-02 in March of 2011 (see *MDOT Bridge Advisories*, on page 5).

## Assistance for load rating

Load rating—or review of existing ratings—for up to 4,100 bridges represents a significant increase in load rating effort for MDOT and its local agency partners. To help coordinate and manage this effort MDOT purchased a "super-site" license for AASHTOWare's Virtis load rating software. MDOT also contracted with the Center for Technology & Training (CTT) at Michigan Technological University (MTU) to develop a Bridge Load Rating Assistance Program to provide bridge load



*Prestressed concrete bridges, such as the side-by-side prestressed concrete box beam bridge shown above, are among those that can be load rated with AASHTOWare's Virtis software. Other bridges (simply supported or continuous) include reinforced concrete, timber, and steel. MDOT purchased a "super-site" license for Virtis that allows local road agencies and consultants in Michigan to use it free of charge to load rate Michigan bridges.*

rating training and technical support for local road agencies.

The Bridge Load Rating Assistance Program that is being developed by the CTT will provide Michigan local agencies and their consultants with intensive training and on-going engineering technical support for bridge load rating. The training sessions, which will be a combination of in-person and web-based formats, will provide an overall understanding of the load rating process—from the exact information needed in order to conduct a load rating to the documentation of final results. The sessions will incorporate a

great deal of hands-on work on sample bridges in Virtis. The sessions will be held in several convenient locations across the state, beginning in early 2012.

## Best tool for the job

Virtis software has been adopted by a several states (including Michigan) as the preferred load rating software for use on all bridges. Through the "super-site" arrangement with AASHTOWare, Virtis is available to local agencies and their consultants free of charge for use on Michigan bridges. MDOT strongly encourages each agency to adopt this software since all training and support will be centered on load rating with it.

"The Virtis software will promote consistency and maintain uniformity among the hundreds of agencies and consultants who conduct bridge load ratings in Michigan," explained Brad Wagner, P.E., manager of the MDOT load rating program. "We're looking for the CTT to work alongside MDOT's internal load rating staff to help local agencies get started with Virtis, while also conveying and upholding load rating

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*"Virtis streamlines the process of conducting initial load rating analyses on a variety of bridges, and also allows users to change parameters and quickly update load ratings without redoing entire sets of calculations. Compared to hand-calculations, Virtis saves hours and hours of work per bridge."*

Chris Gilbertson, Ph.D. P.E. – Center for Technology & Training

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MDOT

## Bridge Advisories

The MDOT Bridge Operations Section publishes bridge advisories to provide guidance and to share information on bridge safety, bridge inspection, bridge management, and bridge load rating issues. All advisories are available as PDFs on the MDOT web site. For a direct link to the site, go to:

**MichiganLTAP.org/publications**

Select "MDOT Bridge Advisories" from the "Other Available Publications" section of the list.



CTT

policies and procedures in accordance with our Bridge Analysis Guide."

### Good now; even better later

Chris Gilbertson, PhD., P.E., senior research engineer and project lead for bridge load rating at CTT, explained that users are sure to appreciate how Virtis simplifies load rating analyses, but an even more significant benefit to using Virtis will come in the future, when existing load ratings must be updated to reflect current bridge conditions. "Virtis not only streamlines the process of conducting initial load rating analyses on a variety of bridges—including simple and continuous spans of steel, reinforced concrete, prestressed concrete, and timber—it also allows users to change parameters and quickly update load ratings without redoing entire sets of

calculations," Gilbertson said. "Compared to hand-calculations, Virtis saves hours and hours of work per bridge."

### Plan ahead for Virtis

Virtis is licensed directly from AASHTO. Those wishing to obtain a Virtis license must fill out a product request form and submit it to AASHTO. Upon approval, a supplemental licensing agreement will be signed between AASHTO and the licensee. AASHTO will then ask the software developer (Michael Baker Jr., Inc.) to issue the software to the agency. For instructions on completing the request form go to [loadrating.michiganltap.org](http://loadrating.michiganltap.org), and click on the "Software" link.

"The Virtis licensing process may take up to four weeks to complete," CTT's Gilbertson explained. "For those interested in

obtaining a license, we advise starting the process well in advance of anticipated need."

Technical support requests for the load rating process and for the Virtis software can be directed to the CTT beginning on January 3, 2012. Contact information is below. 

### CTT Bridge Load Rating Assistance Program

- Email: [loadrating@mtu.edu](mailto:loadrating@mtu.edu)
- Web: [loadrating.michiganltap.org](http://loadrating.michiganltap.org)
- Phone: 906-487-2102
- Fax: 906-487-3409

For more information about Virtis, please visit AASHTOWare's Virtis website: [aashtoware.org/pages/virtis.aspx](http://aashtoware.org/pages/virtis.aspx)



MICHIGAN  
**BRIDGE**  
CONFERENCE

### March 20 – Workshop and Networking

Pre-conference Workshop  
8:00 A.M. – **Bridge Inspection**

Networking and Special Presentation  
7:00 P.M. – **The Mighty Mac: Becoming an ASCE Nat'l Historic Landmark**

#### Cost

#### *Bridge Inspection Workshop*

Employees of Public Agencies . . . . . \$75

Employees of Private Companies . . . . \$95

#### *Bridge Conference*

Employees of Public Agencies . . . . . \$95

Employees of Private Companies . . . \$120

### March 21 – Bridge Conference

#### Agenda Topics

- Non-destructive Testing
- Historic Bridges
- Preventative Maintenance on the Mackinac Bridge
- TAMC Bridge Asset Mngt. Guide
- MSE Abutments & GRS Construction Methods
- Wireless Structural Monitoring Technologies for Bridges
- Zilwaukee Bridge—from the Beginning to the Present

**Clarey University – Johnson Center, Howell, MI**

for more information call 906-487-2102 or visit [michiganltap.org](http://michiganltap.org)

# Stop throwing your deicer budget in the ditch

A grid for measuring the application of deicer can save agencies a bundle

**\$250,000,000**

*Estimated cost of salt wasted in 2009, based on a deicer spreading study done in Denmark. The study found that as much as 34 percent of pre-wetted deicer spread on the road is lost immediately due to bounce and scatter (deicer that isn't wetted scatters even worse).*



By Terance McNinch

Keweenaw Technologies, LLC, ©2011

According to the Salt Institute, 16 million tons of salt was used as deicer on U.S. streets and highways in 2009. That deicer cost agencies \$700 million. Yet if you follow a truck spreading deicer down a road you can see for yourself how much deicer doesn't end up on the pavement. A study done in Denmark found that as much as 34 percent of pre-wetted deicer spread on the road is lost immediately due to bounce and scatter (deicer that isn't wetted scatters even worse). Do the math: that's 5.5 million tons lost in 2009 due to bounce; \$250 million worth in the ditch, or worse, in the storm drain, lakes and rivers. And if that isn't bad enough, the same study found that in the first two hours of traffic, another 20-30 percent is thrown off. Conservatively, that's another \$140 million, wasted. Considering how public works budgets are stretched to the breaking point, this is a problem desperate for a solution.

## Calibration saves money

According to Mark Cornwell, president of Sensible Salting Solutions, LLC, if you want to eliminate deicer waste you have to take control two things: how much gets spread, and where it gets spread. "Proper calibration of every spreader in an agency's fleet is the most cost effective thing an agency can do to reduce deicer waste and save money—big money," says Cornwell. Controlling how much deicer is being discharged is done by calibrating the spreader in the garage. The process is different for every piece of equipment and different materials, so an agency can benefit from having some professional guidance. But once agency personnel are trained, calibration becomes something that gets done regularly before every winter season.

## Calibrating where it goes

As productive as quantity calibration is, Cornwell still saw it as only half of the solution. "Controlling where deicer is being spread really completes the picture," Cornwell noted. "But real-time evaluation—when a truck is rolling down the highway—just isn't practical." While in Europe visiting a spreader manufacturer he saw a large grid being used to measure spreader output. On the return flight he got to thinking about a grid that could test a variety of materials and application strategies, and maybe even provide operator training. The Material Application Grid (MAG) mimics two or three lanes of highway along with a "penalty box" which collects the material that typically ends up on the shoulder and in gutters and ditches. An agency can use the grid to evaluate different pieces of equipment in their fleet, application rates for dry deicer and pre-wetted deicer, various levels of pre-wetting, liquid deicers, and operator behavior (travel speed, spinner speed, auger speed, gate openings, the blast button and more). The grid can be "painted down" in the equipment yard or anywhere there is enough space for the trucks to approach operational speeds. After an application run, selected blocks of the grid are swept up, with the deicer bagged and labeled for weighing. It makes for a good group effort if all the operators get involved. Analysis can be done on the spot, thereby allowing adjustments to be made to the equipment, materials and driver behavior.

## The result: a real eye-opener

The Department of Public Works at the City of Farmington Hills, MI, has taken a hard look at their winter maintenance

*Continued on next page*



## Reduce waste, save money

*"Proper calibration of every spreader in an agency's fleet is the most cost effective thing an agency can do to reduce deicer waste and save big money."*

Mark Cornwell – Sustainable Salting Solutions, LLC

operation and the payoff has really shown; so much so that they received the *2011 Excellence in Snow and Ice Control Award* by the American Public Works Association. They painted Cornwell's deicer grid in their equipment yard during training prior to last winter and ran spreaders through the calibration process. "It's a real eye-opener," says Bryan Pickworth, Road Maintenance Supervisor. "Being able to see the difference in application for various settings really clicked with the operators. It's surprising that no one had thought of this before." Their old way of doing business was plow, salt, plow, salt, but not anymore. Using tight calibration, anti-icing techniques and overall improved operations they have been able to overcome a reduction in workforce and still strive to provide a higher level of service. "You have to consider everything if you're trying to improve your winter maintenance effort, but if your spreaders are not calibrated correctly, you've lost before you even get started," Pickworth explains.

To start money, give the MAG a try. To download a diagram, visit [sustainablesaltingsolutions.com](http://sustainablesaltingsolutions.com).

Terry McNinch is the president of Keweenaw Technologies, LLC. He can be reached at [Terry.McNinch@gmail.com](mailto:Terry.McNinch@gmail.com).



City of Farmington Hills

*The City of Farmington Hills painted Cornwell's material application grid in their equipment yard to test the calibration of their spreaders. "Being able to see the difference in application for various settings really clicked with the operators," Bryan Pickworth, road maintenance supervisor, said.*

## Better-looking and more functional than ever

New LTAP web site is easier to use; includes latest web and communications features

Trevor Kuehl, Assistant Technical Writer  
Center for Technology & Training

A clean, new look and more ways to connect with Michigan's LTAP are a couple of the major differences visitors to [michiganltap.org](http://michiganltap.org) will notice since the site's update in late October. Although the most obvious change to the website is its appearance, less obvious infrastructure changes are allowing for easier management of the site, streamlined access to training information, and enhanced administrative functionality.

### Easy to access content

Beyond the new look, the biggest difference between the original Michigan LTAP site and the updated site has to do with how training events and all associated materials are handled. The new "Training Events" section of the site lists all upcoming workshops, conferences, and webinars—complete with dates and locations for each. Past events are also accessible through the training events page, and all materials associated with each event can be downloaded as PDFs from that same page.

"Basically, everything associated with each event is now available in one place," explained Enneesa Ewing, technical writer at the Center for Technology & Training (CTT) at Michigan Technological University (MTU). Ewing spearheaded

the redesign of the site. "Our goal for the events part of the site was to minimize the clicks necessary to find information."

The new training events pages can also be added and edited by staff very quickly and easily, which helps keep materials up to date.

### Instant updates

Visitors can also receive updates from the new site's RSS Feed. The RSS feed automatically notifies subscribers of updates to the "Training Events" page. Subscribing to the LTAP RSS Feed is easy; all a visitor has to do is click on the "LTAP News RSS" link at the bottom left of the home page. RSS readers are available in most email programs and dedicated applications are also available for most smartphones.

The calendar, accessible from the training events page and from its own menu tab, is a great way to visually identify what times of the month training events are taking place. Clicking on an event record in the calendar opens the complete event announcement, which contains all details about the event.

### Data aids decision-making

Behind the scenes, the new website uses Google Analytics™ web analytics service to help staff members make operational decisions about LTAP efforts. For example, the service might indicate that a particular

page or subject is especially popular. Based on this information, LTAP staff can plan topics for training events or articles for the newsletter. "When making decisions about where to invest our time, having this type of real data is very helpful," Ewing said.

Google Analytics does not capture or store any personal information about site visitors. Rather, it only tracks generic "hits" on pages.

### Looking forward

In the future, visitors will have the option to register for events online. Other updates, including quick response (QR) code tracking and integration, are still being refined, but will eventually provide visitors with even more options for accessing information on the site.

With the update, the groundwork for future enhancements has been set, giving way to a site that can be easily managed and updated to suit local agency needs for years to come.

"The new site certainly looks nice and it's much easier to use, but the structure is the most exciting thing," Ewing said. "Integrating with new web and communications technologies has opened up some neat possibilities."

If you have comments or suggestions regarding the new web site, please call or email the CTT office: 906-487-2102 or [ctt@mtu.edu](mailto:ctt@mtu.edu).



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## Upcoming Events



### Workshops and Conferences

#### Michigan County Engineers' Workshop

##### Construction pedestrian facilities for accessibility

*February 27 – Okemose*

##### Michigan Bridge Conference & Workshop

*March 20-21 – Howell*

##### 2012 PASER Training

*Multiple dates and locations are available for in-person and web-based sessions; please visit [michiganltap.org/workshops](http://michiganltap.org/workshops) for all the details.*



### Webinars

#### MMUTCD Update

*January 30 – 10:00 am to 12:00 pm*

#### Using Chip Seals and Fog Seals in Pavement Maintenance

*February 2 – 1:00 pm to 3:00 pm*

**For more information call 906-487-2102  
or visit [MichiganLTAP.org](http://MichiganLTAP.org)**



## Michigan County Engineers' Workshop & HMA Mix Design Training

### Who should attend?

Engineers, managers, and technicians from County Road Commissions, Cities and Villages, and Associate Members of the County Road Association of Michigan (CRAM). For info on associate membership, go to [micountyroads.org/assocmem.php](http://micountyroads.org/assocmem.php).

### When and where?

February 14-16 at the Comfort Inn & Suites Conference Center in Mount Pleasant.

### How much?

\$195.00, which includes HMA Mix Design professional development training, all workshop materials, break refreshments, and meals. To register, call Michigan's LTAP at 906-487-2102.

### Agenda Topics

- When Heavy Loads Travel on Local Roads
- Sources of Funding – MDOT Office of Econ. Dev.
- Good and Bad Experiences with Recycled Asphalt Shingles
- Legal Issues Facing Local Transportation Agencies
- How to Rehab a Culvert Without Using a Backhoe
- Choosing, Processing, Stockpiling, and Using Aggregates
- Summary of Changes in the MDOT 2012 Spec Book
- Building an Asset Management Plan
- Updates from Partners

[michiganltap.org/workshops/CEW-2012](http://michiganltap.org/workshops/CEW-2012)