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Inside this issue

- 2 From the director: Transformation: Embrace the compost
- 3 Lenzini joins LTAP as program assistant
- 3 Federal Highway Administration launches roadway safety hardware microsite
- 4 Ultra-high performance concrete connections for PBES
- 5 From the Safety Desk: Teamwork & collaboration key strengths of Statewide MDST Program
- 6 Ultra-high performance concrete and bridge infrastructure go handin-hand
- 6 Piling design training in Ames
- 7 Iowa LTAP Tech Corner— USLIMITS2 web-based tool
- 7 Workshop and conference calendar

Iowa Local Technical Assistance Program

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Winter maintenance assessment tool helps reduce salt use

A first-of-its-kind Winter Maintenance Assessment tool (WMAt) is now available. The WMAt is a web-based tool that public and private winter maintenance organizations can use to find opportunities to improve practices, reduce salt use, and track progress. It's also a comprehensive resource of all known salt-saving best management practices (BMPs).

The Minnesota Pollution Control Agency (MPCA) created the tool as part of the Twin Cities Metropolitan Area Chloride Management Plan. Because winter maintenance currently relies heavily on the use of salt, primarily sodium chloride (NaCl), to prevent ice build-up and remove ice where it has formed, the state wanted to decrease these increased chloride concentrations in area lakes, streams, groundwater, etc.

The tool allows users to track their progress over time and show the results of their efforts. When an assessment has been completed, a report can be generated summarizing current practices (as remedial, best, or advanced) and identifying areas for future improvement. Winter maintenance manag-

ers can then use this report to communicate about winter maintenance operations with residents, clients, or elected officials.

MPCA notes that although the WMAt was developed to help minimize the use of road salt on Minnesota parking lots, sidewalks, and roadways, it works for any location where road salt is used as a deicer.

The WMAt website also has helpful links to topics such as smart salting BMPs, case studies, and training and educational resources: stormwater.pca.state.mn.us/index.php/Winter_Maintenance_Assessment_tool_(WMAt).

How to

Create a WMAt account, visit stormwater. pca.state.mn.us/index.php?title=How_to_create a WMAt account.

Use the tool itself, visit www.wintermaintenancetool.com/ (a WMAt new user account must be created first).

Information originally published in Summer 2016 (Vol. 24, No. 3) edition of Minnesota LTAP's *Technology Exchange*.■



Acronyms and Abbreviations in Technology News

AASHTO American Association of State High-

way and Transportation Officials

APWA American Public Works Association FHWA Federal Highway Administration IHRB Iowa Highway Research Board

Iowa DOT Iowa Department of Transportation

ISU Iowa State University

LTAP Local Technical Assistance Program

MUTCD Manual on Uniform Traffic Control

Devices

NACE National Association of County

Engineers

TRB Transportation Research Board



U.S. Department of Transportation Federal Highway Administration



About LTAP

LTAP is a national program of the FHWA. Iowa LTAP, which produces *Technology News*, is financed by the FHWA and the Iowa DOT and administered by the Institute for Transportation at Iowa State University:

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Printed with soy ink

From the director:

Transformation: Embrace the compost

My last column of each year tends to be a reflection of the activities of the previous year. This time I started writing before the banquet at the 2017 Iowa County Engineers Annual Conference and my thoughts immediately went to the large number of transitory and potentially transformational activities and events that have occurred both in my personal and professional life, and, of course, frequently throughout all our lives. Some are expected and some are not. More often than not, I also suspect we'd like these changes to be easy and free of difficulty and hardship. The process or cycle itself, however, has other ideas. To transform something is to "undergo a change in form, appearance, or character." Even the definition kind of sounds somewhat uncomfortable. The transformation cycle often results in something positive and growth, and, in my experience, also often requires or entails disintegration or decomposition before the incorporation or integration into our being. A thread of the "before" or the "now" may transition to the "next," but what is produced is a transformation different than anything previous. I read an article recently in the November/December 2017 edition of the Prairiewoods newsletter called "Composting Ourselves: Embracing Disintegration for Transformation." This is easier said than done, and embracing the decomposition—the compost if you will, a mix of new and old—as part of the system of transformation that leads to growth of the "next" flower, can be, and often is, really very hard. It's part of a process and journey for all of us.

At this point, you may be asking yourself: What the heck is Keith talking about, and how on earth can it be related to LTAP? Maybe a lot, maybe nothing at all. Transformation occurs all the time and these events sometimes seem to come very quickly and almost constantly. Plus, the new year is a good time to consider transformation, and I personally and professionally hope to "embrace the compost" portion of this cycle more directly and experience the joy that occurs once a transition has been completed.

I will continue to work on embracing both parts of this cycle. Right now, changes, transitions, and transformations have occurred and/or are being planned at the national and state level for various parts of LTAP. I am also exploring some personal transitions, the result of which may be described in future columns. As 2018 advances, we will be offering some new events—just like we did this year-along with our typical and traditional training. And right around the middle of the year, we are hoping that the FHWA will share with the LTAPs what they would like them to do for their funding, and a plan will be put into place to respond. Near the end of the year, the Iowa County Engineers Association Annual Conference will be held in Des Moines. It will be a year of transition and transformation indeed.

Personally, I'll be traveling to New Zealand in 2018 for a series of daily bike trips, hikes, and kayaking. I'll also likely register for some other events of interest and continue to visit family in Montana. I also continue to explore the interrelationship between all people and their training needs. But overall, I'll work to embrace the "compost" and the joy along with the impermanence that allows anything and everything to happen.

I am so thankful for all of you out there, my staff and everyone. Have a great New Year. May you be happy, healthy, safe, and have a life of ease and wellbeing. Let's all have a peaceful 2018.■

La William

Keith

Lenzini joins LTAP as program assistant

Jonni Lenzini, an Iowa State University graduate, joined the Iowa LTAP team as its program assistant on November 20, 2017.

Lenzini says she could not resist the opportunity to return to Iowa State as an employee and looks forward to filling a role focused in her field of study, event management

"Who could pass up working for Iowa State?" she says, noting she has several family members who are also alumni.

Lenzini, who was born and raised in nearby Ankeny, graduated in May 2017 with a bachelor's degree in science and event management, with a minor in sports and recreation.

She comes to the Iowa LTAP most recently from a stint at the Iowa Motor Truck Association, where she was the event assistant and helped with events, including the group's 75th anniversary celebration and its annual truck driving championships.

But her desire to work in event management goes back years earlier and started with a love for making lists and being detail-oriented and organized. Plus, she notes, she likes keeping constantly busy.

"I'm a little bit of a perfectionist sometimes," Lenzini says. "I'll try to make it as perfect as I can."

She looks forward to being involved in the many workshops and events that the Iowa LTAP organizes throughout the year.

Her work will include planning those events, including by preparing outreach materials and organizing contracts, and helping the director prepare for presentations.

Aside from Lenzini's work at the motor truck association, she spent her summer working with Ankeny's parks and recreation department and helped plan many events during her time there. She also works with friends to plan events, like baby showers.



While new in her role, Lenzini says she's already enjoying herself and is looking forward to the new experiences.

"I definitely feel like I fit in a lot and will use my degree to the fullest."

Contact

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Federal Highway Administration launches roadway safety hardware microsite

On May 9, 2017, the Federal Highway Administration launched a "microsite" on the agency's website to provide a central resource for information about guardrails and other roadside safety hardware.

The new site is the latest in an ongoing effort to emphasize the importance of, and improve accessibility to, state guardrail data, including preliminary data from an In-Service Performance Evaluation (ISPE) pilot program.

"Safety is our top priority and enhanced data will improve road safety," said former Acting Deputy Federal Highway Administrator Butch Waidelich. "Our goal is to provide state DOTs with information they can use to make the

right decisions for their states."

Notably, the site makes it possible for state DOTs to share data about in-service performance of roadside hardware by hosting an ever-expanding collection of findings from the states in response to interest about performance guardrail terminals.

The site highlights the FHWA's ISPE pilot, which began in 2015 and will continue through 2019, being conducted jointly with California, Massachusetts, Missouri, and Pennsylvania to find better ways to collect in-service performance data of roadside hardware. The site also serves as the foundation of a publicly accessible database

about guardrails used along America's highways.

Waidelich said federal officials recognize the lack of state-based information on roadside hardware and that the ISPE will improve roadway safety by making it easier for states to uniformly collect performance data on guardrails.

For more ISPE and guardrail inspection, maintenance, and installation information, visit the actual microsite at safety.fhwa.dot. gov/roadway_dept/countermeasures/reduce_crash_severity/guardrail_ispe.cfm.

Information reprinted from FHWA online press release by Doug Hecox.■







FHWA microsite to assist in increased accessibility to state guardrail data.

Iowa LTAP Mission

To foster a safe, efficient, and environmentally sound transportation system by improving skills and knowledge of local transportation providers through training, technical assistance, and technology transfer, thus improving the quality of life for Iowans.

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Ultra-high performance concrete connections for PBES

Ultra-high performance concrete (UHPC) can be used to create the simple, strong, long-lasting connections needed for successful construction using prefabricated bridge elements (PBEs).

Prefabricated bridge elements are structural components of a bridge that are built offsite then brought, ready to erect, to the project location. Prefabricated bridge elements not only shorten onsite construction time—minimizing traffic impacts and increasing traveler and worker safety—but also offer superior durability.

The durability of prefabricated spans, and how quickly they can be constructed, relies on the connections between the elements. Field-cast UHPC has emerged as a solution for creating connections between prefabricated concrete components with more robust long-term performance than conventional PBE connection designs.

UHPC is a steel, fiber-reinforced, portland cement-based, advanced composite material that delivers performance far exceeding conventional concrete. As UHPC performance exceeds that normally predicted from a field-cast connection, it allows the behavior of the joined prefabricated components to surpass that of conventional construction.

Compared to many solutions in current use, UHPC allows for small, simple-to-construct connections that require less volume of field-cast concrete and do not require post-tensioning. The mechanical properties of UHPC also allow for redesign of common connection details in ways that promote both ease and speed of construction. This makes using prefabricated bridge elements simpler and more effective.

Benefits

 Speed. The mechanical properties of UHPC allow for redesign of common connection details in ways that promote both ease and speed of construction.

- *Simplicity*. UHPC connections are inherently less congested, simplifying fabrication and assembly.
- Performance. Field-cast UHPC between prefabricated bridge elements results in robust connections that can provide better long-term performance than connections constructed by conventional methods.

State-of-the-practice

Technical advancements and policy developments related to UHPC are enabling implementation of prefabricated bridge elements for accelerated bridge construction on a national basis. These deployments are demonstrating the constructability, field performance, and robustness of these systems in bridge inventories across the country.

New York, Pennsylvania, and New Jersey have done work to develop standards for using UHPC PBE connections. The Federal Highway Administration published design and construction guidance for UHPC connections in 2014. In addition, U.S. production of the steel fiber reinforcement commonly used in making UHPC began in 2013, creating more opportunities for use on federally funded transportation projects under FHWA's Buy America requirements.

The third round of Every Day Counts (EDC-3) focused on demonstrating the advantages UHPC offers as an option for connecting prefabricated bridge elements, and this effort is continuing under EDC-4. The EDC implementation team is providing technical assistance and training, including peer exchanges, webinars, and workshops.

To learn more about UHPC research and development at the FHWA visit www.fhwa.dot. gov/research/resources/uhpc/.

Information reprinted with permission of the FHWA. Full article available on the FHWA website under OIPD/Accelerating Innovation/ Every Day Counts.■

Every Day Counts is the FHWA's initiative to advance a culture of innovation in the transportation community in partnership with public and private stakeholders. Every two years, FHWA works with state departments of transportation, local governments, tribes, private industry, and other stakeholders to identify a new set of innovative technologies and practices that merit widespread deployment through EDC.

From the Safety Desk: Teamwork & collaboration key strengths of Statewide MDST Program

"Our program is the first of its kind in the US."

At a dozen locations around Iowa, people are meeting in the name of traffic safety. That's good news for Theresa Litteral, tasked with helping keep the local meetings relevant and the participants talking.

"So far, so good," says the facilitator for Iowa's Statewide MDST Program. MDST is Multidisciplinary Safety Team, and Iowa's 12 local teams consist of various traffic safety-related personnel. They meet regularly to discuss local safety issues, specific projects such as work zones, and ideas for highway safety improvements.

"MDST participants come from several agencies that all have their own missions and ways to conduct business," Litteral says. "It is important to have a platform like the MDSTs for these diverse professionals to come together to improve local roadway safety collaboratively."

Participants vary from team to team, but may include law enforcement officers, first responders, including fire and emergency medical personnel, Iowa Department of Transportation staff, traffic planners, city and county officials, and others such as tow truck service operators.

The Statewide MDST Program is the first of its kind in the US. It is a joint effort of the Iowa

DOT, Iowa Governor's Traffic Safety Bureau, and Iowa Local Technical Assistance Program, which is administered by Iowa State University's Institute for Transportation, where Litteral is housed. She also is an InTrans research scientist who works on other traffic safety projects.

As the statewide MDST facilitator, Litteral assists current teams and helps form new ones. In the past year, she played a role in adding teams in Linn County (Cedar Rapids) and Ottumwa. These teams joined existing ones in Ames, Clinton County, Council Bluffs, Davenport, Des Moines, Dubuque, Fort Dodge, Iowa City, North Iowa (Mason City), and Sioux City. Additional MDSTs are in the works.

Through collaboration, Litteral says participants "gain a wider perspective on safety issues and learn from others outside their areas of expertise." The result can be novel solutions that save lives.

One of her jobs is to encourage teams to follow similar procedures. She promotes, for example, participation in the Federal Highway Administration's National Traffic Incident Management Response Training Program, which instructs emergency personnel how to efficiently respond to vehicle crashes.

Iowa's local MDST teams, some of which were formed to deal with a specific traffic problem, are independent organizations, although they generally have similar goals:

- Improve traffic safety
- · Develop interagency cooperation
- Help resolve local safety issues
- · Identify and mitigate crash causes
- Improve crash response practices

Litteral, who grew up in Great Britain and came to the US for graduate school, plays several roles with the teams. "My job is to support them as they need it." She makes presentations, contributes agenda topics, provides resources and training opportunities, and most of all, keeps teams motivated. She says, however, MDST team members do a good job of that themselves.

"The teams are made up of people passionate about traffic safety," she says. "They give a lot of themselves to their local areas."

Contact

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MDST success story: Addressing wrong way drivers

More than 80 times in a five-year span, drivers were reported going the wrong way on U.S. Highway 30 in Story and Boone counties. The potentially deadly situations prompted Iowa DOT, local law enforcement, and InTrans personnel to form an MDST to address the problem to improve safety. The collaborative efforts led to enhanced signing, painting, and lighting on U.S. 30 in addition to the use of intelligent transportation systems to detect and alert drivers and 911 centers.







Ultra-high performance concrete and bridge infrastructure go hand-in-hand



According to the American Society of Civil Engineers, the average bridge in the United States is 43 years old.

With an intended design service life of 50 years, a large number of the nation's bridges are already considered to be structurally deficient or functionally obsolete.

And Iowa is no exception. Of its approximate 25,000 bridges, 20 percent are considered deficient or posted with a weight restriction. In short, Iowa is one of the top three states in the nation with the most deficient bridges.

"And that's why the work we are doing with the Iowa DOT and FHWA is so important," says Sri Sritharan, the principal investigator on a \$127,500 research project looking at the use of ultra-high performance concrete (UHPC) for bridge deck overlay.

According to Sritharan, the problem isn't just the aging infrastructure, but also the continuous increase in both traffic volume and heavy traffic vehicles, which requires a critical look at the nation's bridge stock.

"Right now, there is an urgent need to develop technologies that are not only economical and durable, but can also be safely and rapidly implemented in practice." And his project, which ended September 2017, is doing just that. Most bridge deterioration starts with deck cracking that in turn causes more severe and extensive damage to the superstructure. That's where UHPC comes in.

In a UHPC study by Sritharan in 2014, he tested a concept of using UHPC as a thin layer on top of a normal concrete bridge deck.

"Since UHPC has a higher tensile strength and low permeability, cracking, as well as water and chloride ingression, can be prevented or considerably minimalized, which in turn will elongate the lifespan of the bridge. Moreover, UHPC is also deemed to have a higher fatigue resistance as compared to normal concrete."

In his newest study, he involved a material supplier to formulate a new UHPC mix to accommodate road crowning and sloping deck surfaces and tested its applicability in the laboratory.

Using this new mix, the thin UHPC overlay concept was successfully implemented on the Mud Creek Bridge in Buchanan County, Iowa.

"The bridge overlay is periodically monitored, and, so far, there has been no issues found with regards to the UHPC overlay or the interface between the UHPC and the old deck surface,"

says Sritharan.

In addition to the field implementation, three concrete slabs, with and without the UHPC overlay, were also tested in the laboratory. The results showed that UHPC overlay can be designed to increase the deck's stiffness and strength if desired.

So, how does this study impact future research using UHPC overlay and bridge construction?

According to Sritharan, the use of a thin UHPC layer as a deck overlay has been shown to be a viable solution to prolong the lifespan of bridge decks. While its long-term performance in the field needs to be verified, technologies have to be developed to place the UHPC swiftly and uniformly on the bridge deck. Development of such technologies and further refinement to the UHPC mix will enable widespread application of UHPC overlay on our nation's bridges.

For more information

On the use of UHPC, read about how the FHWA is incorporating it into its third round of Every Day Counts (EDC-3) on page 4 of this issue of *Technology News*.

Piling design training in Ames



Design Length of Steel H-Piles for Iowa Standard Bridge Designs is an Iowa LTAP training class that focuses on designing the length of steel H-pile needed—as the name implies—for standard bridge designs in Iowa by considering the following: pile lengths for integral abutments and pile bents, various soil types for assumed borings with assumed blow counts, friction and end bearing and the soil charts, scour, downdrag, setup in cohesive soil, effect of construction control method on design, etc. Held on November 27, 2017, Michael Nop, a transportation engineer specialist at the Iowa DOT instructed 40 county engineers and engineering staff on the subject.

Date	Event Name	Location	Contact
January 2018			
31	Iowa Work Zone Safety Workshop	Ames	Paul Albritton
February 2018			
7-9	ICPA 54th Annual Concrete Paving Workshop	Altoona	Corrie Fisher
8	Iowa Work Zone Safety Workshop	Ottumwa	Paul Albritton
9	Iowa Work Zone Safety Workshop	Cedar Rapids	Paul Albritton
14	County Engineering Research Focus Group	Ames	Keith Knapp
28-2	Greater Iowa Asphalt Conference	Des Moines	Keith Knapp
March 2018			
5	Iowa Work Zone Safety Workshop	Ames	Paul Albritton
6	Iowa Work Zone Safety Workshop	Waterloo	Paul Albritton
14-16	ISAC Spring Conference	Des Moines	Keith Knapp
20	Iowa Work Zone Safety Workshop	Storm Lake	Paul Albritton
21	Iowa Work Zone Safety Workshop	Council Bluffs	Paul Albritton
27	Iowa Work Zone Safety Workshop	Ames	Paul Albritton
April 2018			
5-6	2018 APWA Iowa Chapter Spring Conference	West Des Moines	Peggy Englehart
22-26	National Association of County Engineers	Wisconsin Dells, WI	Keith Knapp

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Event details and online registration

Watch for details and online registration information, by specific dates and events, on the Iowa LTAP Workshops page, www.iowaltap.iastate. edu/workshops/ltap-workshops/.■

Iowa LTAP Tech Corner—USLIMITS2 web-based tool

What is it?

The Federal Highway Administration created USLIMITS2, a web-based tool designed to help practitioners set reasonable, safe, and consistent speed limits for specific segments of roads. USLIMITS2 is applicable to all types of roads ranging from rural local roads and residential streets to urban freeways. However, it should be noted that the U.S. Government assumes no liability for the use of the information contained in this tool as it does not constitute a standard, specification, or regulation.

How does it work?

Before beginning a new project, it is recommended that users read the User Guide (available at safety.fhwa.dot.gov/uslimits/documents/appendix-L-user-guide.pdf) and be prepared to enter the necessary data (e.g., 50th and 85th percentile speed, roadway characteristics, and crash history).

Then users are ready to create a new project (by visiting safety. fhwa.dot.gov/uslimits/new.cfm). At the end of the process, users will be asked to save a project file. The project file can then be revised or updated later.

Where can I get it?

Currently, the tool is available on the FHWA website under Safety/Speed Management/USLIMITS2.

Use the QR code here or visit the FHWA website at safety. safety.fhwa.dot.gov/uslimits/ to use the free tool today.



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