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### Iowa Local Technical Assistance Program

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IOWA STATE UNIVERSITY  
Institute for Transportation

## Iowa Build a Better Mousetrap winners named

2020 has been a year where everyone has had to learn to adapt and make use of what we have in innovative ways. For city and county essential workers, this is nothing new.

That's why each year the Iowa LTAP Build a Better Mousetrap contest spotlights those public works staffs that have best solved a common problem they encounter with an inventive—and often simple—idea.

This year's contest winners from Page County adapted equipment they had on hand to solve the problem of clearing snow fencing each spring, and all for less than \$25 including parts and labor. The City of Des Moines placed second, Marion County placed third, and Washington County placed fourth.

Public works employees can apply to the contest year-round here: <https://iowaltap.iastate.edu/build-a-better-mousetrap-competition/>. The deadline for next year's contest will be in the spring.

More details about each entry follows. Congrats to all the winners!

### Page County Snow Fence Roller

Snow fence removal is time-intensive and can be difficult to roll up neatly after winter use. Page County solved this problem by using a post hole digger attachment, with its hydraulic-powered rotating power source, on its skid steer machine; by adding a long steel pipe with a bolt, they were able to wind the snow fence around its fence post.



“Using a piece of equipment we already have for another task reduces the cost of our solution and makes the machine more versatile,” reads part of the entry.

### City of Des Moines Grease Slinger

With the aim to reduce the preparation and cleanup time on its microsurfacing sled, the City of Des Moines created a grease slinger that cut the time from up to 4 hours down to at most 1.5 hours. A demonstration of the new tool is available here: <https://youtu.be/RmNBbUVqH10>

### Marion County Social Distancing CMP Banding Tool

Because of the pandemic, Marion County staff needed a way to maintain distance while banding certain corrugated metal pipe (CMP), which typically requires two employees and places them closer than the recommended 6 feet. The county purchased four RV-style scissor jacks that were modified to safely push and pull the flanges.

### Washington County Sign Truck Work Basket

The staff wanted to create an easier and safer way to hang road signs and took inspiration from a bucket truck, adapting their existing chassis by adding a swinging cage on the backside of the truck. ■



Snow fence roller from the 2020 Iowa LTAP Build a Better Mousetrap winner Page County

## Acronyms and Abbreviations in *Technology News*

AASHTO	American Association of State Highway and Transportation Officials
APWA	American Public Works Association
FHWA	Federal Highway Administration
ICEA	Iowa County Engineers Association
IHRB	Iowa Highway Research Board
InTrans	Institute for Transportation (at ISU)
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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## From the Director: The “Known” Stranger

How are you? How are you getting along? Do these questions mean more to you now than in the past? They do for me. Give me a call and let me know. I'm in listening and responding mode more than ever. Call it a silver lining or whatever, but it's a good thing to have these conversations. Of course, these discussions should always have been something more than the typical “I'm fine” and a nod, and we could always tell with someone when they really were. I have recently had many conversations with people that are too important to me not to work on making this shift to deeper conversations permanently.

When we put out our March newsletter, I wrote about being observant of the “comfort line” of those around us, getting comfortable with the uncomfortable and, of course, getting comfortable with the uncertainty and impermanence of everything. Back then, I used the example of how this approach can be used in training and learning. Being uncomfortable, when properly applied in this context, can lead to more learning. I think this is true in the classroom and also in life. Once completed, our most difficult events and tasks are those that often teach us the most. That is, we reached the “friendship” stage of acceptance, and that can take some time for folks. During our current reality of being uncomfortable, however, the impacts have become very personal, as those around us are impacted physically and/or mentally. I'm guessing you've seen it where you are in some form. It becomes personal for all of us, with those we know, and those we don't. I believe it has always been true that strangers save our lives every day, and that is even more obvious now. We are that stranger to others every day. Just humans that we do not yet know. It's that person on the other end of the phone reaching out because of feelings of isolation

and what is perceived as either perpetual impermanence or a continual standstill (maybe it's a combination of both). The adult brain can evaluate risk pretty well but has great difficulty with ambiguous situations. The situation we are in right now is nothing but ambiguous as we redefine life and work every day or every hour. But those we can reach out to and those that reach out to us—that is not ambiguous—that's a friend we know or do not know. Meeting all with compassion and understanding. Who can argue with that? Common ground in a quaking world. Solid.

Iowa LTAP is here. Right now we are offering weekly or biweekly webinars (<https://iowaltap.iastate.edu/ltap-resource-bi-weekly/>), virtual workshops on various subjects about once or twice a month (<https://iowaltap.iastate.edu/events/>), single agency on-site trainings (<https://iowaltap.iastate.edu/single-agency-on-site-training-program/>), and road safety assessments (<https://iowaltap.iastate.edu/safety-circuit-rider/>). We also introducing our “Seven Minute Safety” program (<https://iowaltap.iastate.edu/seven-minute-safety-live-stream/>), which will be using our new YouTube channel for what we currently believe will be early morning seven minute discussions on worker safety issues. These discussions are intended to supplement what you are already doing in the safety area, but it can be accessed on any device (e.g., cell phone) without a registration. Just click and watch. We will be testing a few things out on how best to operate this program, but right now we are thinking a short time period turnaround for advertising. It will only work if people want to use it and pass on the link.

With Gratitude,  
Keith ■

## In brief: Lasting LTAP impacts

The success of this year's 2020 Motor Grader Operator (MoGO) Workshops showcases the ongoing flexibility of Iowa LTAP during the COVID-19 pandemic.

Normally during the summer, the MoGO Workshops are held throughout the state, bringing in motor grader operators and supervisors for in-person programming, which typically includes classroom learning as well as an optional secondary field day.

But because of the ongoing pandemic, normally scheduled programs moved to online-only training starting in May. That meant this year's MoGO Workshops were instead transformed into a virtual town hall event. Three MoGO instructors were brought online to host a 2-hour segment. The training focused on gravel road maintenance, grader operation, and techniques. Held on June 18, there were over 120 participants.

"I was surprised at how many people tuned in for the webinar, and we had many participants that were able to ask questions and provide input. We'll definitely look at doing more of these," said Paul Albritton, LTAP Technical Training Coordinator and MoGO instructor.

LTAP is dedicated to providing as many opportunities as possible during this time, including a number of current and upcoming webinar offerings available on the website, as well as a new, limited and temporary program of on-site and on-call trainings:

- Worker Safety Training Resources—A series of 22 safety training topics have been

compiled to assist local public works and county secondary roads departments with their safety training for employees. Each page has an overview and videos and/or documents on the particular topics, such as PPE Safety and Confined Space Training. Available here: <https://iowaltap.iastate.edu/2020-safety-resources-main-face/>.

- Single Agency On-Site Training Program—This limited, temporary program is set to run from September to December 2020 and consist of single agency hosted, on-site on-call trainings. These trainings will be initiated by the local agency hosts that request it at their location. Local hosts and attendees will have to comply with a list of safety responsibilities (or their local requirements if they are more strict). Attendance will be limited to 10 to 15 people. This program is being offered on a very limited basis and its continuation will be evaluated each month. Trainings currently being offered include MUTCD Overview, Flagger, Work Zone Safety, Chainsaw Safety, Winter Maintenance Safety, Excavation Safety Awareness, Roadside Safety, and Low-Cost Safety Improvements. More information is available here: <https://iowaltap.iastate.edu/single-agency-on-site-training-program/>.
- "Seven Minute Safety" Training—This year has been a challenge for Iowa's local public agencies to gather in large groups for regular safety training and to meet the safety training needs of the workforce.

That's why the folks at Iowa LTAP have developed "Seven Minute Safety." This is a live, short YouTube broadcast that highlights a safety topic, much like a tailgate talk, that is relevant for today's roadway workers. But, with "Seven Minute Safety," workers can access the training without having to download apps or go through login procedures on their devices. Just visit the Iowa LTAP channel here: <https://www.youtube.com/channel/UC1SHWEJmZiSeBOPRoTfmCPg> at the appointed time to tune into the live event and that's it. While this is not meant to take the place of regularly scheduled safety meetings or required compliance training, it will help workers continue to focus on doing their jobs safely in the field. The dates and times of the training are to be announced. More information is available here: <https://iowaltap.iastate.edu/seven-minute-safety-live-stream/>.

Additional free online training and technical information resources are available for use on the LTAP website here: <https://iowaltap.iastate.edu/web-based-training-opportunities/>. For a list of upcoming webinars, presentations, and events, visit the LTAP Resource page here: <https://iowaltap.iastate.edu/ltap-resource-bi-weekly/>. And, as always, please do not hesitate to reach out with suggestions for materials or presentations ([kknapp@iastate.edu](mailto:kknapp@iastate.edu), 515-294-8817).

Article written by Brandy Haenlein, a communication specialist with InTrans. ■

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*—Paul Albritton, LTAP Technical Training Coordinator and MoGO instructor*

## 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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# CP Tech Center releases *Guide to Cement-Stabilized Subgrade Soils*

A new guide developed by the National Concrete Pavement Technology Center (CP Tech Center) in collaboration with the Portland Cement Association (PCA) offers the latest advances in cement-stabilized subgrade (CSS) soil, a compacted, engineered mixture of pulverized in situ soil, water, and moderate proportions of portland cement that results in a semi-bound to bound material.

The *Guide to Cement-Stabilized Subgrade Soils*, completed in May 2020, updates and expands on the information presented in the PCA's 2008 publication *Guide to Cement-Modified Soil (CMS)*. The new guide is available at [https://intrans.iastate.edu/app/uploads/2020/05/guide\\_to\\_CSS.pdf](https://intrans.iastate.edu/app/uploads/2020/05/guide_to_CSS.pdf).

CMS and CSS typically describe soils treated with a relatively small proportion of cement to provide improved characteristics, such as reduced plasticity and volume change. While CMS and CSS are similar, CSS has all the benefits of CMS and also substantially increases soil stiffness and strength to the point where the treatment can provide structural benefits to pavement and building foundations.

The guide describes the characteristics, uses, and benefits of cement-stabilized subgrade and presents methods for geotechnical evaluation, mix design, construction, and field testing that will help to produce a satisfactory final project.

“CSS is a more economical and sustainable alternative than removing and replacing unstable or expansive untreated soils. It reduces not only costs but also construction time,” said Jerod Gross, of Snyder & Associates and one of the lead authors on the project.

“CSS aids in extending the service life of a pavement system by providing a non-expansive and stable subgrade that will last under different climactic conditions. The increased service life of the pavement minimizes the costs and materials that would otherwise be consumed to rehabilitate or reconstruct the pavement system,” added Wayne Adaska, of the PCA and the other lead author on the guide.

While CSS has applications beyond stabilizing problematic soils, the guide focuses on the use of cement to enhance the engineering properties of subgrade soils beneath both rigid and flexible pavements, as well as building floor slabs.

The guide's intended audiences include design engineers, testing laboratory personnel, contractors, and owners. Readers can use the document to determine which applications are appropriate for CSS and what are the proper steps for its uses in a pavement system project.

More information about the latest in concrete pavement technologies can be found at the CP Tech Center's website: <https://cptechcenter.org>. ■



Compacted subgrade (Jeff Wykoff, California Nevada Cement Association)

# Successful strategies for pavement preservation

Pavement preservation strategies help to save money and extend the service life of a road system, but there's a secret to their success.

"It's all about choosing the right pavement at the right time, and choosing the right treatment," said Ashley Buss, assistant professor in the Department of Civil, Construction and Environmental Engineering at Iowa State University.

Buss recently wrapped up a research project that looked at the pavement preservation treatments used in Iowa and their effectiveness. She's now working on developing a pavement preservation guide for Iowa agencies. Her previous research is available at <https://intrans.iastate.edu/research/completed/effectiveness-of-pavement-preservation-techniques/>.

## Right Pavement, Right Time

Buss recommends using the Road Resource Toolbox from the Pavement Preservation and Recycling Alliance to assess what pavement treatments will work best for the road condition. The toolbox is available at <https://roadresource.org/toolbox/criteria>.

The tool allows users to enter the pavement condition, primary distress, road type, and surface type, and then see what types of treatments would be most suitable for the roadway.

Buss also offers another secret to success: One does not simply preserve their worst pavement.

She said many stories about certain pavement treatments not performing well or not getting a full lifespan are due to poor pavement selection.

Other challenges include matching performance and project data to justify the treatment, limited quality assurance for non-hot mix asphalt (HMA) projects, and getting performance-related specifications.

## Right Treatment

As part of her research, Buss conducted a survey of Iowa counties to determine what treatments they were using. A total of 66 out of the 99 counties responded, showing crack sealing and crack filling were the most common and the ones that best works for agencies. They've also employed microsurfacing and slurry seals.



Microsurfaced pavement in Hamilton County, Iowa

Buss noted that some of the more minor treatments, such as those most commonly employed, should be used on roadways in better conditions. Though they don't always give demonstrable data, Buss said those treatments showed marked improvements during in-person tours of counties.

"It's too subtle to actually pick up on the full benefits," Buss said. "For example, if we seal a crack, and it's keeping the water out, the data aren't going to be picking up on the benefit that the crack sealing is having on a crack by crack basis."

She said the more expensive and invasive treatments show significant benefits in the data, but also carry the costs that can make them prohibitive for some counties. Buss endeavors to study those treatments that are relatively cost-efficient but also show demonstrable data, particularly slurry seals and microsurfacing.

She said data indicate microsurfacing treatments on average are extending pavement life by 55 years for Iowa roadways.

## Pavement Preservation Planning

While acknowledging budget challenges, Buss also stresses the importance of having a dedicated funding stream specifically for preservation.

To do that, Buss plots out the steps. Planning starts by aspiring to the ideal program based on research from other agencies, then identifying needs, and then developing a vision. Implementation starts with intent and commitment and continues with data analysis to understand the return on investment.

The survey conducted as part of Buss' research showed 50 agencies have an informal program, 8 agencies have a formal pavement preservation program but not dedicated funding, 3 have dedicated funding and policies, 3 have an informal program that is nearly non-existent, and 2 didn't reply.

"Road work is something that is ultimately inevitable in the life-cycle of the pavement," Buss said. "You're going to construct that road, and its performance is going to decline over time, and then, it's a cycle of having to come back and perform road work."

Interested in more? Watch a webinar Buss recently did on this topic at <https://iowaltap.iastate.edu/pavement-preservation-webinar/>, and read up on the research project at <https://intrans.iastate.edu/research/completed/effectiveness-of-pavement-preservation-techniques/>. ■

# ATSPMs make traffic signal management proactive, not reactive

Traffic signal management is an ongoing struggle for local municipalities. The desire to improve safety and service is often at odds with congestion and costs. That is where ATSPMs, better known as automated traffic signal performance measures, come in.

The FHWA recently promoted ATSPMs in their fourth round of Every Day Counts (EDC-4) as a means to improve on traditional retiming processes by providing continuous performance monitoring capability.

But what does that mean? Here is a little background.

According to the FHWA, there are more than 330,000 traffic signals operating in the US, and highway agencies typically retime these signals on a three- to five-year cycle at a cost of approximately \$4,500 per intersection.

And how are a large portion of these signals monitored? Citizen complaints, which are only reactive at best, result in added congestion when traffic signals fail and increase public dissatisfaction.

According to Christopher Day, an affiliate researcher with the Center for Transportation Research and Education (CTRE) at ISU's InTrans, who has worked with various Iowa cities and counties in adopting ATSPMs, the

manual collection of traffic data and continued dependence on software modeling often result in huge losses.

“Short-term data collection methods typically last for no more than 48 hours and can usually only capture traffic volumes and no other operational data. ATSPMs are able to develop a fuller picture of the signal operation over a longer time period,” said Day.

But with ATSPMs, signal retiming efforts now can be based directly on actual performance, which can speed up an agency's data-logging capability to proactively identify and correct deficiencies.

“Agencies are now able to make a change to the signal timing and confirm its effects using data, rather than a short-term field observation,” added Day. “ATSPMs also make it possible to begin identifying and addressing issues before they become severe enough to generate complaint calls.”

That is because ATSPMs can be applied to a wide range of signalized intersections as well as use existing infrastructure. Recent research, as part of a collaboration between the FHWA, AASHTO, and various state DOTs, have shown that ATSPMs also support the validation of other technologies and operational strategies (such as adaptive signal control and emerging connected vehicle application).

Ultimately, ATSPMs are beneficial because they provide targeted maintenance, improved operations, and increased safety.

“Traffic signal systems have different components working together at various levels to serve a variety of objectives. ATSPMs offer a way to help keep these systems in working order and ensure that they continue to meet those objectives,” said Day.

A Transportation Pooled Fund study, “Traffic Signal Systems Operations and Management,” led by the Indiana DOT with participation from the FHWA, 11 state DOTs, and the City of Chicago, produced a series of reports documenting applications of ATSPMs. The Utah DOT developed an open source software option for a web-based processing and delivery of ATSPMs that provides a framework for continued innovation in data analysis techniques. The collaborative development of ATSPMs has produced a number of implementation options to fit a range of agency capabilities and resources.

For more information related to recent ATSPM case studies, as well as workshops and resources, visit the FHWA website here: [https://ops.fhwa.dot.gov/arterial\\_mgmt/performance\\_measures.htm](https://ops.fhwa.dot.gov/arterial_mgmt/performance_measures.htm).

*Article written by Brandy Haenlein, a communication specialist with InTrans. ■*

## “A Great Big Thank You” from Iowa LTAP



City and county essential workers

The Iowa Local Technical Assistance Program put together a short video showcasing the work of city and county staff as a “great big thank you” to them for all that they’re doing during these unprecedented times.

When the COVID-19 pandemic hit this spring, many people's workloads and workplaces changed. That wasn't the case for city and county staff who described their work as “business as usual.”

Since Iowa's local transportation agency staff includes essential workers, they have continued to work throughout this period, and with that comes the need for the same level of support.

“This is a difficult time, but we will continue to serve. I want to look back at this period and know we did everything we could,” said Iowa LTAP Director Keith Knapp.

While that has included virtual events, regular webinars, and hybrid conferences that allowed for some socially distanced in-person options, it's also important to take a step back and recognize all those people Iowa LTAP serves.

As the video concludes, and to reiterate, “Thanks for all you do and for keeping us moving and safe during this time.”

Watch the video here: <https://vimeo.com/447860657>. ■

# Workshop and conference calendar

[Information current as of September 21, 2020] Due to the ongoing COVID-19 pandemic, many of our usual events have moved to an online format as staff consider how and when to safely return to typical in-person trainings, workshops, and conferences. The fluid nature of our current moment means that the virtual events have not been scheduled as far in advance as is typical for this quarterly format, and the events listed below as scheduled to be in person are subject to change.

Events that staff may consider scheduling in person may also offer a registration of interest to gauge potential participants' willingness to hold events in a variety of formats. Anyone who registers for such events will be notified as the situation changes and will be given guidance as needed.

For the most up-to-date information, please check regularly at <https://iowaltap.iastate.edu/events/> and consider subscribing to our mail list from the Iowa LTAP home page at <https://iowaltap.iastate.edu/> to get regular email updates.

October 2020	Event Name	Location	Contact
9	Road Diet Overview	Webinar (12:00 p.m. CT)	Keith Knapp
16	2020 Chainsaw Safety Overview	Webinar (12:00 p.m. CT)	Paul Albritton
23	OSHA's Here, Now What?	Webinar (12:00 p.m. CT)	Paul Albritton

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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, [iowaltap.iastate.edu/workshops/](https://iowaltap.iastate.edu/workshops/). ■

# Granular Roads Asset Management System (GRAMS) tool can aid agencies

Gravel roads account for more than 60 percent of the roads managed by Iowa counties. However, until now, there haven't been readily available tools to help agencies evaluate granular material costs versus field performance.

To help agencies evaluate and optimize their operational strategies for their granular material purchases and use, researchers recently created the Granular Roads Asset Management System (GRAMS) spreadsheet tool.

Local agencies can use the tool to estimate annual gravel loss on a system-wide basis. The tool provides a range of options for varying budget conditions to estimate aggregate requirements under different roadway levels of service.

"Local agencies have traditionally used their previous experience and quick visual inspections to estimate their annual aggregate needs," said

Bora Cetin, who was the principal investigator on the GRAMS project. "We hope this tool will significantly help local agencies to better maintain and manage their granular roads, and further help them to defend their estimated materials needs and budget requests."

The required input values are county name; roadway system properties such as length, width, and condition; and unit costs such as materials and hauling. There are additional optional input values, including material properties, desired level of service, and a range of maintenance options. The tool is sensitive to the roadway drainage condition, so caution is advised with that particular input parameter.

The tool was developed largely based on survey responses, empirical opinion, and a limited amount of historical performance data. To continue to improve the tool, researchers

recommend that counties collect more data on their granular roadways and created a roadway condition report as part of its research project to assist operators in that effort.

The spreadsheet tool, user manual, and full report are available here: <https://intrans.iastate.edu/research/completed/development-of-granular-roads-asset-management-system/>. In addition, a tutorial video on using the tool is available here: <https://www.youtube.com/watch?v=Jt9G2ut05wY>.

Cetin, who is now an assistant professor at Michigan State University, is continuing his work with the IHRB to lessen wear and tear on granular roadways. One project is looking at using a material that can make soils water repellent, and another is looking at using new machinery to conduct strength tests on soil. ■

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