



# The Bridge



A quarterly newsletter from Michigan's Local Technical Assistance Program



Photo: Courtesy of Bruce Gasaway

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## Letter from the Editor

Life is like riding a bicycle, to keep your balance, you must keep moving.” The paraphrase of the simile that Albert Einstein used in a 1930 letter to his son provides valuable guidance that can apply to transportation asset management. Our road and bridge assets, to continue providing an adequate level of service, must be managed.

One easy way to manage gravel road assets is through gravel road optimization. Using the right materials, shape, and chemical treatments on a good gravel road can go a long way for keeping it good condition. You’ll learn more about optimizing gravel roads in this issue of *The Bridge*.

Another way of managing transportation assets—bridge deck preventive maintenance—is also presented in this issue. We share strategies like cleaning deck drainage systems and using healer sealer, epoxy overlays, and water-repellant treatments.

These pages also address a significant threat to roadway assets: invasive phragmites. You’ll find strategies and resources for managing invasive phragmites and mitigating damage to the roadway.

Beyond asset management, this issue looks at safety in the workplace with strategies to prevent runovers, backovers, and rollovers, and safety in cyberspace with the fourth strategy in our continuing series on cybersecurity.

In these pages, you’ll get a chance to meet Jerry Byrne, who is the new managing director of Kent County Road Commission and president of the board of directors for the CRA of Michigan.

Finally, we’ll give you a sneak peak at a pilot project that is being headed by the County Road Association of Michigan: the Michigan Local Road Research Program.

As always, the success of our articles depends on your stories—your innovations, and your experiences. We invite you to reach out to us at [ctt@mtu.edu](mailto:ctt@mtu.edu) with your engineering projects, operations and management strategies, shop products and practices, and safety resources.

*Victoria*



Photo: CTT Archive

# Making the Best of What We Have: Gravel Road Optimization

Nate Anderson, *Technical Writing Intern*  
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Gravel roads are a vital piece of transportation networks across the state of Michigan. However, unpaved roads are often susceptible to washboarding, potholes, dust problems, and springtime road failure. With shrinking budgets and increasing traffic demands, local road-owning agencies face growing pressure to maintain these roads without resorting to costly paving alternatives.

One low-cost, but effective way that Michigan local agencies can maintain their unpaved roads is through gravel optimization. Now, road-owning agencies can leverage lab tests, aggregate grading calculations, and innovative blending and treatment techniques to extend the life of unpaved roads and reduce costly re-graveling cycles.

“Our paved roads have asphalt or concrete surfaces holding everything in place,” pointed out David Jones, a civil engineering research engineer and associate director at the University of California (UC) Pavement Research Center and UC Davis. Jones specializes in pavement applications with extensive experience in unpaved roads construction and optimization. “We don’t have that with an unpaved road, so we need something else to hold it together.”

Jones continued, “The easiest, simplest, and cheapest binder is a natural material usually fairly close to the road: clay.” In Michigan, the gravel surfacing specification does not distinguish between clay binder and silt, yet each has advantages. Clay can function like low-strength cement, locking bigger particles in place although too much clay can make a road slippery. Silt helps with manipulating the gravel, but it

provides no strength and can draw in water via capillary action.

However, sourcing clay can be a concern in some parts of Michigan where there’s little access to naturally clay-rich materials. In those areas, clay must be blended into the road material. “If you’re sourcing your material from commercial quarries, it may be difficult to obtain an optimal unpaved road material, and you might have to blend some clay with it to achieve a balanced mix design,” noted Jones. He continued, “As long as the clay content isn’t excessive, the road’s performance remains manageable, and any issues can typically be corrected during routine grader maintenance.”

Erik Tamlyn, an engineer at Huron County Road Commission (CRC) in Michigan, echoed these concerns: “Natural aggregate pits can have a tendency to have either more fines or more silty or clay-type materials so you have to be careful about how you introduce those into your gravel.” He continued, “Through quality assurance testing, we’re making some aggregate blends so that we’re getting the product that we want with consistency.” Since aggregate sourced from Huron County pits is low on clay content and is siltier, they depend upon adjusting gradation to achieve an impervious surface gravel and a drainable base gravel.

### From Lab Data to Two Key Metrics

Historically, gravel road specifications have relied on broad gradation envelopes and proactive maintenance. “If a road doesn’t have good gravel or drainage, it requires a lot of time, fuel, and labor to keep doing fixes on the same road over and over,” noted Dewayne Rogers, manager of Clare County Road Commission (CCRC).

| US vs. MDOT Specifications |             |  |   |                           |
|----------------------------|-------------|--|---|---------------------------|
| Parameter                  |             | FHWA   | USFS<br>Public Use                            | Michigan<br>(Table 902-1) |
| Sieve<br>(in. [mm])        | 1 (25)      | 100  | 100   | 100                       |
|                            | 3/4 (19)    | 90 – 100                                       | 97 – 100                                      | –                         |
|                            | 3/8 (9.5)   | –  | –   | 60 – 85                   |
|                            | #4 (4.75)   | 50 – 78  | 51 – 63                                       | –                         |
|                            | #8 (2.36)   | 37 – 67  | 28 – 39                                       | 25 – 60                   |
|                            | #40 (0.425) | 13 – 35  | 19 – 27                                       | –                         |
| #200 (0.075)               | 4 – 15      | 10 – 16 <sup>1</sup><br>or 6 – 12 <sup>1</sup> | 9 – 16  |                           |
| Plasticity Index           |             | 4 – 12   | 2 – 9 if P#200 is <12%<br><2 if P#200 is >12% | Not specified             |

<sup>1</sup> Range for #200 is 6.0 to 12.0% if PI is greater than zero

Slide from David Jones’ presentation of US (that is, FHWA and US Forest Service) specifications versus MDOT specifications for sieve and plasticity index. MDOT specifications come from Table 902-1 and are sparse. For sieve #4 and #8, federal and MDOT specifications have ranges of 25 and 35 respectively for fines passing sieves. For #200, MDOT’s range of 9-16 is closer to the US Forest Service range of 10-16 than the FHWA’s 4-15. MDOT does not have a plasticity index specified. (Photo: Courtesy of David Jones)

Modern gravel optimization relies on measurable, lab-tested metrics that guide mix design. Two critical parameters—grading coefficient (GC) and shrinkage product (also called weighted clay factor)—are the best indicators for longevity in performance-based gravel selection and blending, according to Jones.

For gradation, rather than depending on a full stack of sieve analyses and generic specification envelopes, Jones promotes a simplified equation that captures the essential balance between coarse, intermedi-

ate, and fine particles. The grading coefficient is calculated as  $(\% \text{ passing 1-inch sieve} - \% \text{ passing \#8 sieve}) \times (\% \text{ passing \#4 sieve}) \div 100$ . Its target range should be between 15 and 35.

“Instead of using a plasticity index range like 4 to 12, we use a shrinkage product,” continued Jones.

Shrinkage product is calculated as:  $(\text{linear shrinkage or } \frac{1}{2} \text{ PI}) \times (\% \text{ passing \# 40 sieve})$ . Its acceptable target range is between 100 and 365. “If you can bring the upper limit down to 240, you’ll start seeing more dust control benefits,” Jones emphasized.

By plotting the grading coefficient and the shrinkage product on an X-Y balance chart, Jones maintains that it is easy to determine whether the material is a good blend (see road performance prediction matrix, next page). The plot helps road managers to select materials not prone to washboarding, raveling, erosion, or slipperiness, and to understand what types of additional maintenance will be required if an optimal material is not used.

“This approach is built around understanding the fundamental properties of the materials and how they’re likely to affect performance,” explained Jones. He says that even if a material falls outside of the ‘good’ performing zone, these metrics will provide a better expectation of how they will perform. The University of California Pavement Research Center offers a free web-based blending tool to support material blending and gravel road optimization (see [www.ucprc.ucdavis.edu/unpavedroad](http://www.ucprc.ucdavis.edu/unpavedroad)).

It’s important to note that treating gradation and plasticity separately can cause issues, argues Jones. “The specification envelopes are often so broad that nearly any material can ‘fit’, which leads to problems like slipperiness, washboarding, and raveling when those specs are applied without considering material interaction,” he explained.

Local agencies that have relied on the grading coefficient and shrinkage product indicators have experienced benefits. In fact, Rogers has been using Jones’ research to optimize gravel. He’s been measuring plasticity and moisture content of materials, which get blended into the surfacing. Blending materials with the right proportions of fines and aggregates is critical.

Rogers has several crew members certified in aggregate testing in an effort to optimize their gravel roads. “When they’re graveling a road and see something off, their education gives another layer of quality control to help catch a problem before it becomes a bigger issue,” he shared. “If they feel like something’s wrong, they have the capability to grab a sample, run a test, and know for sure.”

From their attempts to optimize their gravel roads, Clare County Road Commission actually uses a locally-sourced natural aggregate that’s refined to a specific in-house standard. “We require ‘22A Modified’ spec: it’s a standard MDOT 22A spec, but we modified the amount on the loss by wash because a little bit higher clay content seems to make the road hold up better,” said Rogers. He noted that 23A was previously used but performed poorly in wet weather, which led to his team creating the modified aggregate that has been binding and strengthening the surface better.

## **Routine Maintenance**

“‘Maintenance-free’ gravel roads—it’s not necessarily a thing,” said Tamlyn. “We do maintain all of our gravel roads annually, even if just to clean things up.”

Huron County’s routine maintenance efforts on its 1200 miles of gravel roads require placing approximately 120,000 to 150,000 tons of gravel each year, according to Tamlyn. He reflected, “It’s a large investment.” Because of it, he says Huron CRC is looking for “different ways to optimize their gravel surfacing” to reduce maintenance needs on their gravel roads.

But, sometimes better performing gravel roads need more than optimized materials. “Having drainage and being able to get water away from the surface is really critical,” Tamlyn explained, adding that sometimes “sod” builds up along the sides of the road preventing water from draining into the ditch. “Removing sods and berms, reclaiming material where possible, and placing new material is important to making a good gravel road.”

“If you put down new gravel, I always stress compaction—whether it’s with a rubber-tired roller on our road grader or a steel drum vibratory roller,” said Rogers. “We always make sure we get that initial compaction at placement, and that seems to help with longevity, too.”

Jones agrees. “We don’t want to do compaction with the water tanker or with traffic,” he explained. “We want to make sure we’ve got a roller in there to compact it down, so that our first traffic on the road doesn’t create some ruts.”

Huron County has outfitted its motor graders with wheel compactors, according to Tamlyn. “They’ve helped out quite a bit in terms of long-term performance,” he reflected. The county has also invested in several V-bottom trailers. “With the V-bottom, we’re controlling the thickness of the material as we’re placing it, making it easier to grade, easier to compact, and a more consistent material throughout the entire roadway section,” Tamlyn shared.

Problems like rutting and potholes arise from issues with construction and shape, which affects drainage by ponding the water or channelizing runoff, causing erosion and have a deleterious effect on drainage, “trapping” materials. “We want the water to flow off the road, not down the road,” said Jones. “Compaction is very important.”

Gravel optimization may help maximize the level of service and reduce long-term costs.

## **Chemical Treatment**

Sometimes, however, another problem can arise: gravel roads can also become dusty during dry conditions.

**Features of Unpaved Road Chemical Treatments**

| Treatment                                    | Agglomerate/Binds Particles | Absorbs Moisture | Corrosive Potential   | Application Frequency                   | Natural Origin     | Potential Environmental Impact    |
|--|-----------------------------|------------------|-----------------------|---|--------------------|-----------------------------------|
| <b>Water</b>                                 | Yes                         |                  |                       | Daily or less                           | Natural            | Water resource depletion          |
| <b>Calcium Chloride</b>                      | Yes                         | Yes              | Yes                   | 1-2x per season                         | By-product         | Aquatic, plants, spills, slippery |
| <b>Magnesium Chloride</b>                    | Yes                         | Yes              | Yes                   | 1-2x per season                         | Natural brine      | Aquatic, plants, spills, slippery |
| <b>Petroleum Derivatives (Asphalt, Oils)</b> | Yes                         |                  | Yes (some products)   | 1-2x per season                         | Petroleum          | Spills                            |
| <b>Vegetable Oils</b>                        | Yes                         |                  |                       | 1-2x per season                         | Plant-based        | Low                               |
| <b>Tall-Oil Derivatives</b>                  | Yes                         |                  |                       | Every few years                         | By-product (paper) | Unknown                           |
| <b>Lignin Derivatives</b>                    | Yes                         |                  | Yes (aluminum alloys) | 1-2x per season                         | By-product (pulp)  | Aquatic, BOD                      |
| <b>Molasses/ Sugar Beet Extract</b>          | Yes                         |                  |                       | Limited Data                            | By-product         | Unknown                           |
| <b>Electrochemical Derivatives</b>           | Yes (Clay modification)     |                  | Yes (some acidic)     | Varies (1:100-600 dilution)             | Chemical blend     | Product-specific                  |
| <b>Synthetic Polymer Derivatives</b>         | Yes                         |                  |                       | Product dependent                       | Product dependent  | Product dependent                 |
| <b>Clay Additives</b>                        | Yes                         |                  |                       | 1x during gravel placement/modification | Natural clay       | Unknown                           |

Adapted from Guidelines for the Selection, Specification, and Application of Chemical Dust Control and Stabilization Treatments on Unpaved Roads ([see Resources](#))

For Huron County, their low-clay, silty surfacing means more dust as their roads dry out. They’ve been controlling dust with mineral brine, explains Tamlyn.

Chloride brines play an important role in controlling the dust and preventing washboarding. Aside from these water-absorbing chemicals, other dust control agents include water and surfactants, organic non-petroleum or plant-based oils, organic petroleum-based oils, electrochemical stabilizers, and synthetic polymer emulsions.

“The best approach is to mix in the chemical treatment with the optimized road material—especially when you’re already regravelling,” said Jones. “That’s the most effective way to get strength and longevity.” He continued, “Then, use surface applications for maintenance.” Jones calls this two-step approach the “ideal setup”.

He points to USDA Forest Service studies [shared verbally during an FHWA-arranged national unpaved road scan tour] as an example. The studies have found that mixing in chemical stabilizers during regravelling followed by an annual blading and spray application of the stabilizers significantly decreased regravelling frequency and maintenance needs.

He also stressed the role of fines in chemical treatments in preserving fines: “If you lose those fines, then the road is going to washboard fairly quickly.”

## Conclusion

Jones concluded, “You really want to be taking a good road, getting it right with your materials, with your shape, with your construction, and then put your chemical treatment on it, and keep it in that good condition,” he explained.

“Just choose the right gravel for your area,” Rogers advised. “And focus on the simple things: drainage, cross slope, making sure water can get off the road and away from the subgrade.” ■

## RESOURCES

1. Center for Technology & Training - Michigan LTAP. *2025 Building Better Gravel Roads: Optimization and Performance Standards*. 12 May 2025. Available: <https://www.youtube.com/watch?v=yTnf1fnonPg>
2. *Unpaved Road Material Design Tool*. University of California Pavement Research Center. 2025. Available: [www.ucprc.ucdavis.edu/unpavedroad](http://www.ucprc.ucdavis.edu/unpavedroad)
3. Jones, D. *Guidelines for the Selection, Specification, and Application of Chemical Dust Control and Stabilization Treatments on Unpaved Roads*. University of California Pavement Research Center, Davis, CA. 2017. Available: <https://escholarship.org/uc/item/0347c9zj>

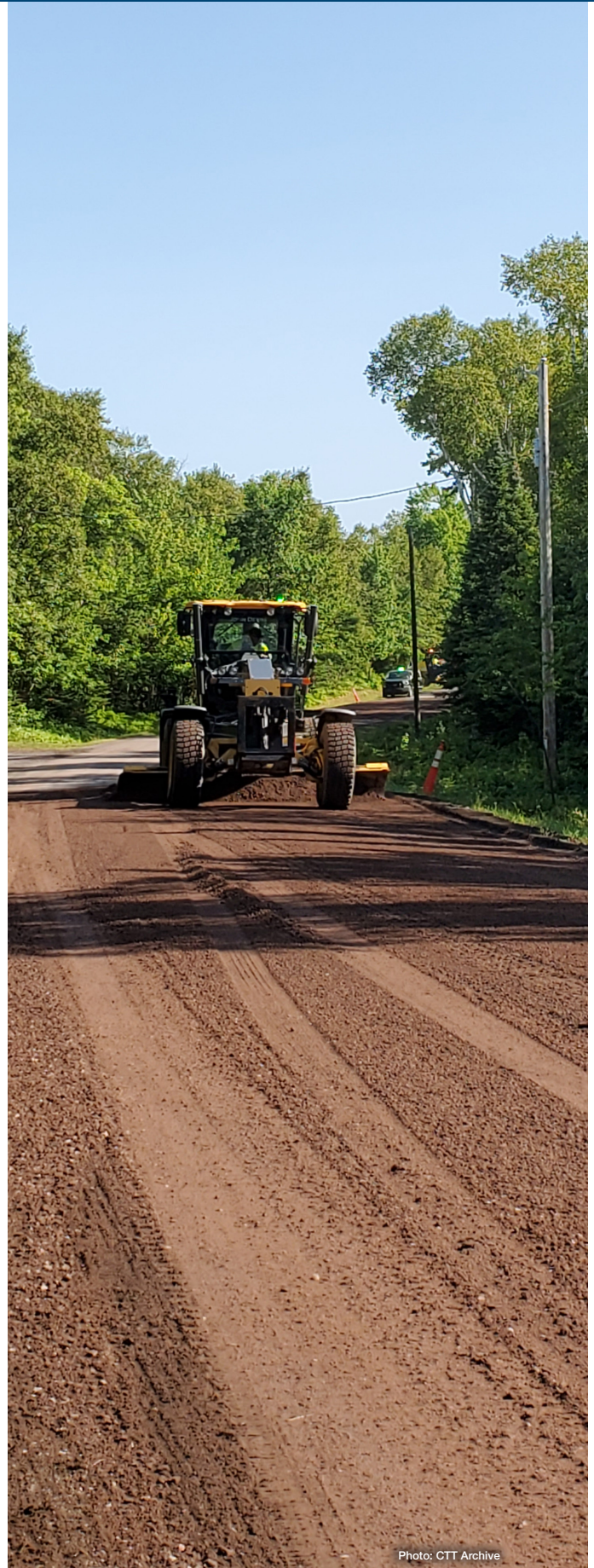


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# Cybersecurity for Local Agencies

Emily Bergman, *Technical Writing Intern*  
Victoria Kaplewski, *Technical Writer*  
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*In this five-part series, we will explore strategies that local road-owning agencies can use to be more cybersecure.*

Previously-covered Strategies:

1. Rely on Trusted Resources
2. Protect Passwords
3. Back Up Data

## **STRATEGY 4: Conduct an Annual Risk Assessment**

Cybersecurity risk assessments are meant to evaluate the threats to an agency’s IT systems and data, while also informing the agency of its capacity to protect their assets from cybersecurity attacks. Using the information from the assessment, agencies can identify and prioritize opportunities for improvement in their efforts to mitigate cybersecurity threats.

Local road agencies may not have the resources or capacity to do this kind of assessment in house, but there are providers that will do it for them. With that, though, comes risk because it requires outside providers to have access to the agency’s network. “I’m not giving them the keys to my home to see if you can break in, and I’m not giving them the keys to my network either,” said Steve Gradowski, IT manager at Saginaw County Road Commission (SCRC). “I try not to just take every salesperson that wants to offer me tools to put on my network, or offer a free evaluation,” instead Gradowski advises local agencies to “go to one of their trusted providers or partners that they already have.”

Additionally, Gradowski stresses that when risk assessments are done, “don’t think of your computers only, think of everything that attaches to the network”. He emphasized, “I’ve got 30 user accounts, but I have over 200 connections to the network.” These other devices could be the TV in the breakroom, or surveillance technology like a Ring camera at the door. This “internet of things” are going to be the “biggest risk”, posits Gradowski.

Based on this, security controls should be set. Security controls include network segregation, anti-malware software, anti-ransomware software, firewall configuration, password protection policies, staff training, and more. These security controls can help agencies to see a reduced amount of chance that a cybersecurity threat will occur. When deciding what options are best for specific local agencies “speak with your provider, whoever’s most familiar, and see what they’re going to support and maintain,” Gradowski advises.

Doing annual risk assessments and having security controls in place could prove more fruitful for local road-owning agencies than insurance policies that simply help to clean up an issue after the damage has been done. “I can’t make that decision for other agencies, but I put my money upfront knowing that I’m doing backups, I’m testing my backups, I’ve got enough tools in place that instead of me paying for cyber insurance, I’d rather pay for additional protection tools upfront” said Gradowski.

Once the security controls are in place it is important to continue to monitor and review the effectiveness of the controls that have been implemented. Monitoring and awareness of potential threats should always be happening within the agency, but it is good practice to do an in-depth risk assessment annually. “The less day to day maintenance and support that’s being done the more often I would do a test to see if security is up to date,” opined Gradowski.

For more information visit: <https://reciprocity.com/blog/5-steps-to-performing-a-cybersecurity-risk-assessment>. ■

Photo: Shutterstock





## Building Hazard Awareness to Prevent Runovers/Backovers

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Center for Technology & Training

While construction season is essential to maintain transportation infrastructure, roadwork often involves major closures and hazardous working conditions. One of the most common serious threats within these work zones is the risk of runovers and backovers. These incidents occur when a worker is struck by a moving vehicle, often due to limited visibility, unsafe practices, or distractions. From 2005 to 2010, nearly half of all worker fatalities were caused when workers were run over or backed over by vehicles or mobile equipment (Worker Safety - FHWA Work Zone).

A runover, backover, or rollover occurs when a worker on foot is struck by a vehicle. Runovers are accidents in which a vehicle or equipment runs over a worker while backovers occur when a worker is struck by a backing vehicle. These incidents happen for many reasons, the most common being distracted drivers or employees, working in the vehicle's blind spot, and faulty backup alarms. These hazards are amplified in work zones, where irregular road conditions and limited space heighten the risk for both workers and drivers.

These accidents are often preventable. "One of the biggest factors is situational awareness-people not paying attention," said Matthew Portfleet, director of Michigan Technological University's Mine Safety Program. "The work area changes by the day, sometimes by the minute, so it's important to constantly

review site-specific hazards.”

Portfleet emphasized, “It only takes a moment of inattention for a site hazard to become a real danger.” He knows the dangers of inattention firsthand. Portfleet often shares a story about when he was using his skid steer to clear debris from around his property. He says “at first he kept a safe distance” while dumping the debris into a 15-foot hole. “After a while, I stopped paying close attention and, eventually, I misjudged and drove the skid steer right into the hole and ended up upside down,” he related. “It’s a perfect example of how quickly things can go wrong when awareness slips.”

Portfleet suggests six things for a safer work site:

**“Conduct daily work site hazard analyses,”** he began.

“People are often in a hurry—that’s a major issue,” reflected Portfleet, who used to own a semi-truck that had a sticker in the rearview mirror that said “GOAL: Get Out And Look”. “Road project work sites change constantly.”

He says, in mining, a workplace hazard analysis is required before each shift or when conditions change. He elaborated, “Someone has to walk or drive around and assess the entire site for hazards before work can start and, if nobody’s doing that exam or it’s being done poorly, it becomes dangerous quickly.” This process helps people on-site to assess risks and evaluate the area—communicating potential dangers and heightening awareness of workplace surroundings.

The mining industry has had success in injury and death prevention with stricter codes and regulations, according to Portfleet. “The industry is forced to comply with more inspections and regulations than OSHA requires for construction, and it pays off.” He says that workers entering a mine site are also required to do site-specific hazard awareness training. “It might be a 90-second chat at a small gravel pit or a two-hour course at a large mine like Eagle Mine in Marquette County—either way, it ensures everyone knows what to expect,” he added.

Complicating work site safety on road projects is contractors delivering material at various times throughout the day. When they come to make their deliveries, they may be unfamiliar with the site and its hazards. “Communication is really important, like being able to tell them if anything has changed since their last visit.”

Additionally, an internal traffic control plan (ITCP) is an important hazard management tool as it coordinates the movement of workers and equipment. A fully comprehensive ITCP will effectively direct vehicles to minimize backing, create traffic-free zones for workers on foot, and clearly define safe areas surrounding the construction area.

**“Seat belts are huge,** they’re not used enough, and they can prevent fatalities from simple rollovers,” Portfleet continued. “Do spot checks and reward for compliance.”

**“Ban cell phone use on job sites**—they’re too distracting and that moment of distraction is all it takes,” he said, recommending radios as “much better for communication”.

**“Make sure safety equipment works,”** Portfleet added.

Technology can fill in critical visibility gaps. Systems like backup cameras, radar-based proximity detection systems, and tag-based systems are readily available and easy to install (see <https://www.osha.gov/>

preventing-backovers/solutions). Portfleet recommends white noise or directional backup alarms, saying that they stay noticeable and don't cause noise fatigue. Other helpful safety equipment includes two-way radios that can alert operators and pedestrians if they are getting too close and visibility-enhancing personal protective equipment. Furthermore, using temporary traffic control devices can help direct motorists and allow workers to safely operate in a construction zone.

**“Reinforce procedures and a safety culture,”** said Portfleet. “Daily five-minute safety talks might feel annoying to some workers, but they matter—they reinforce a mindset of safety.”

**“Finally, get experienced workers to help train new ones,”** he said, noting that it emphasizes to veteran operators their value while giving new hires important insights. “Have the experienced operators walk the new ones through dangers and blind spots.”

Preventing runovers and backovers is a collective effort. Road workers, equipment operators, supervisors, engineers, and the traveling public all play a role in keeping the work zone safe. Proper communication is key to reducing risk and can greatly reduce the chances of a serious incident.

Portfleet reflected, “It’s about building awareness of hazards from every perspective.” ■

### **On-Foot Worker Safety**

#### **Eyes up!**

Stay alert and avoid distractions like cell phones and other electronic devices. Make eye contact with operators before entering a vehicle’s operating zone and to help ensure you aren’t in a blind spot.

#### **Vests on!**

Wear an ANSI class 2 safety vest (at a minimum). In low-light conditions or when flagging, a class 3 safety vest is recommended. And, ensure all personal protective equipment is worn properly and is functioning correctly. Use cones, barricades, and whistles to mark safe areas or signal danger.

#### **Exit ready!**

Watch for changes in routine or site conditions. Have at least two exit paths at any location. Stay within the designated safe zones outlined in an agency’s internal traffic control plan.

### **Operator Safety**

#### **Stop!**

Inspect equipment at the start of each shift, checking brakes, mirrors, lights, backup alarms, cameras, and radar/sonar systems. Review blind spots. Plan routes that allow for forward movement and minimize backing.

#### **Look!**

Use a trained spotter when backing. Also use visibility-enhancing technology like backup alarms, cameras, radar/sonar, and tag-detection systems as a supplement for—not replacement to—visual checks.

#### **Communicate**

Communicate with the trained spotter and confirm the path is clear before moving. Never assume the path is clear. Use standardized hand signals or radios for communication. Stay within the designated safe zones outlined in an agency’s internal traffic control plan.

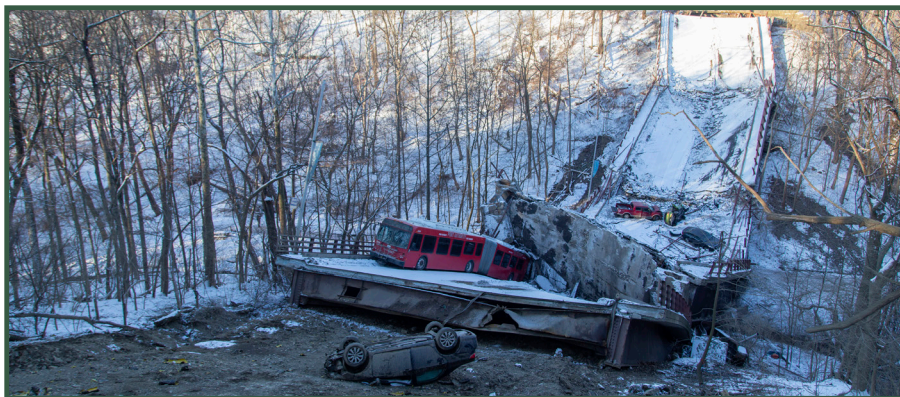
# Preventive Maintenance of Bridge Deck Drainage

Michael H Fleming, ISMF LLC

Reprinted with permission from Pennsylvania Department of Transportation Local Technical Assistance Program Moving Forward (Winter 2025)

Failing to perform scheduled preventative maintenance can and has resulted in bridge failures. The most recent major bridge structural failure occurred on January 28, 2022, when the Fern Hollow Bridge in Pittsburgh, Allegheny County, collapsed. As a result, the 447-foot-long bridge fell about 100 feet into the park below. The collapse began when the transverse tie plate on the southwest bridge leg failed due to extensive corrosion and section loss. The corrosion and section loss resulted from clogged drains that caused water to run down bridge legs and accumulate along with debris at the bottom of the legs, which prevented the development of a protective rust layer or patina. Although repeated maintenance and repair recommendations were documented in many inspection reports, the owner failed to act on them, leading to the deterioration of the fracture-critical transverse tie plate and the structural failure of the bridge. At the time of the collapse, a 2013 New Flyer articulated transit bus, operated by the Port Authority of Allegheny County, and four passenger vehicles were on the bridge. A fifth passenger vehicle drove off the east bridge abutment after the collapse began and came to rest on its roof on the ground below. As a result of the collapse, the bus driver sustained minor injuries, and two bus occupants were uninjured. Of the six passenger vehicle occupants, two sustained serious injuries, one sustained a minor injury, two were uninjured, and the injury status of one was unknown.

The National Transportation Safety Board (NTSB) investigation determined that the probable cause of the collapse of the Fern Hollow Bridge was the failure of the transverse tie plate on the southwest leg of the bridge, a fracture-critical member (nonredundant steel tension member), due to corrosion and section loss resulting from the owner's failure to act on repeated maintenance and repair recommendations from inspection reports. Contributing to the collapse were the poor quality of inspections, the incomplete identification of the bridge's fracture-critical members (non-redundant steel tension members), and the incorrect load rating calculations for the bridge. Also contributing to the collapse was insufficient oversight of the bridge inspection program.



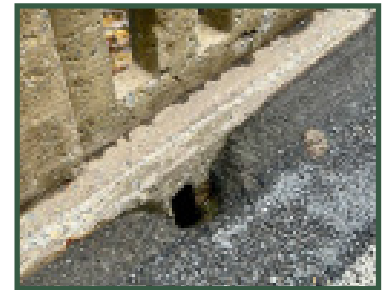
Fern Hollow Bridge collapse.  
Photo: NTSB

The complete investigation by NTSB includes thousands of pages, encompassing 68 dockets of reports and can be found here: <https://www.nts.gov/investigations/Pages/HWY22MH003.aspx>.

Proper bridge deck drainage operation and maintenance of bridge drainage systems are important elements of bridge preventive maintenance. Deck drainage is required for proper maintenance of bridges since the lack of proper drainage affects many elements of the structure. Poor drainage is normally due to the accumulation of antiskid material and other debris within the drainage system preventing proper operation. Backed up water might then freeze and rupture the pipe. Should the drainage water contain corrosive chemicals, this leaked water will attack structural elements of the bridge. Bridge drainage systems consist of the following: scuppers – drop through and piped, gratings (open steel grid floors), open joints with troughs, and all associated piping.

### 1. Scuppers

Scuppers are provided in bridge decks to collect the water on the deck and direct the water through a short drop through pipe or into a closed drainage system of relatively small diameter. Each type of downspout pipe presents its own individual problems; these problems — long downspouts, horizontal runs with inadequate slope, sharp directional changes, and small-diameter discharge pipes—are all conducive to clogging. Short drops through pipes that drain directly under the bridge may cause corrosion of structural steel and concrete surfaces of piers and abutments and erode abutment earth slopes. All scuppers should be examined frequently for proper operation and cleaned when necessary. Antiskid or other debris should be removed by water pressure or metal probes. Particular attention should be applied when flushing antiskid from decks to prevent it from entering the drainage systems and compounding the problem. Protective coating may be applied to piers, structural steel, and any other elements exposed to the corrosive liquids from drop through scuppers to prevent or retard corrosion.



A simple older drop through scupper in a concrete barrier that has been cleaned and maintained. Photo: ISMF LLC

### 2. Gratings

Open grid decks (open steel grid floors) provide particularly good drainage of the deck but do not protect the superstructure and substructure elements from the damaging corrosive elements that accumulate on the structural members below the deck. All debris should be removed from beams, girders, pier caps and bearings. Yearly inspection and cleaning are necessary to prevent this accumulation.



A simple drop through scupper at the base of a concrete barrier that has been cleaned and maintained. Photo: ISMF LLC

### 3. Open Joints and Troughs

Troughs under open joints are susceptible to debris accumulation with subsequent backup of drainage which contributes to the accelerated deterioration of concrete, corrosion of steel, and erosion of earth. These troughs should also be inspected for tears and clogging at frequent intervals and repaired or cleaned as required. ■

#### RESOURCES

Additional information on bridge deck maintenance can be located within PennDOT Publication 23, Maintenance Manual, Chapter 16: Bridge Maintenance. <https://www.dot.state.pa.us/public/pubsforms/publications/pub%2023/pub%2023-chapter%2016%20.pdf>

Additional information on several types of scupper details and installation types can be found within PennDOT Bridge Construction drawings BC-751M. [https://www.dot.state.pa.us/public/bureaus/bopd/bridge/2008/bc/bc751m\\_all.pdf](https://www.dot.state.pa.us/public/bureaus/bopd/bridge/2008/bc/bc751m_all.pdf)

## Bridge Deck Preventive Maintenance in Michigan

A good preventive maintenance (PM) strategy is essential to prevent failures, like the one in Pittsburgh.

Michael TenBrock, a bridge engineer for Kent County Road Commission, works to ensure proper bridge deck maintenance. He notes that the first step is diligent PM. “Dollar for dollar, PM gets you more than any other bridge expenditure,” he explained.

TenBrock says box-beam bridges in Michigan still rely on a simple scupper, or a hole in the box beam, for drainage. Often, scuppers lack corrosion defenses against salt-laden water passing through them in the winter. “So, we’ll see spalling and reinforcement strand loss around these scuppers,” shared TenBrock. “We have a few bridges like this, and the beam deterioration is terrible.” To combat scenarios like this, TenBrock’s team has installed stainless-steel drain extensions that directs runoff into the stream or valley below instead of running along the bottom of the beam.

“Beyond scuppers, we are passionate about treatments like the use of epoxy flood coating, epoxy overlays, and silane for some bridges,” continued TenBrock. Flood coating, known as healer-sealer, is a low-viscosity epoxy applied to a properly-cleaned and profiled concrete deck. It seeps into cracks and prevents water intrusion. Sand applied to the epoxy provides traction but wears off in a year or so. “Our crew can treat a deck with a flood coat very economically with help from a local contractor with a shot-blast machine,” TenBrock said.

Epoxy overlay is a more expensive treatment that can protect bridge decks from water and plow or traffic abrasion. It consists of higher-viscosity epoxy and sharp, angular aggregate. “You put down a layer of epoxy and apply aggregate, cure and repeat,” detailed TenBrock. While this rugged treatment costs around \$100 per square yard, it may provide 20 years of deck protection if installed properly.

Water-repellant treatment or silane can block 80- to 90-percent of salt intrusion to concrete reinforce-

ment. It is significantly cheaper than healer-sealer and epoxy overlay, and it may last up to 10 years or more. However, it does not seal cracks on bridge decks. “We use water repellent on decks, top horizontal surfaces of pier caps and abutments, and along vertical surfaces on substructures,” he said.

TenBrock reflected, “The most important thing in bridge deck preservation is keeping at the process every year.” He continued, “Bridges are like old cars—you have to work on them to keep them going.” ■

**KEY TOOLS FOR MICHIGAN LOCAL AGENCIES**

**MDOT Capital Scheduled Maintenance Manual: Guidance for inspecting and maintaining scuppers, joints, and drainage systems**

**Local Agency Bridge Asset Management Guide: Strategies for bridge condition tracking and preventive maintenance**

**Michigan LTAP: Trainings on preventive maintenance and bridge inspection techniques**

**Bridge Load Rating Support: Tools and bulletins for load ratings and identifying risks in older structures**

# Michigan's Local Road Research Program

Nate Anderson, *Technical Writing Intern*  
Center for Technology & Training

The newly-established Michigan Local Roads Research Program (MLRRP) supports local-agency-driven transportation research with an aim to help innovate and develop new specs and best practices for local road-owning agencies. Michigan's program aims to generate research projects focused on providing long-term solutions for the unique needs of the state's local road-owning agencies, much like neighboring states' local road research and innovation programs.

Over the past 66 years, the highly-visible Minnesota LRRB has sponsored thousands of research projects. Recent Minnesota LRRB projects have addressed everything from optimizing snowplow routes using GPS data to finding cost-effective pavement marking strategies that improve roadside safety in low-visibility areas and managing impacts on vegetation from winter deicing practices (see *The Bridge 32.2*). Other states in the region have local road research bodies as well, including Iowa Highway Research Board (1950), Ohio's Research Initiative for Locals (2013), and Indiana Local Technical Assistance Program's Innovation and Research Program (2021).

In 2021, Michigan hosted a two-day local roads research peer exchange, bringing together these local road research bodies from Minnesota, Indiana, Iowa, and Ohio to lend ideas on implementing a similar program (see <https://www.michigan.gov/mdot/-/media/project/websites/mdot/about-us/commissions/fhwa-partnership/stic/local-road-research-board-peer-exchange-report-2022.pdf>). "We heard from them: what benefits did they get? why did they do this? how did it start? what types of projects do they do? and, how do they market it?" explained Tim Colling, executive director of the Center for Technology & Training and a non-voting member of Michigan's new LRRP. "Basically, we were figuring out the business case for doing something like this in the state of Michigan."

Denise Donohue, the chief executive officer of the County Road Association (CRA) of Michigan, shared, "The CRA of Michigan lobbied the Michigan Legislature for a one-million-dollar legislative appropriation after we gained support from all 83 counties to pilot a similar program in Michigan." In May 2025, the CRA of Michigan established an LRRP advisory team of seven, which includes licensed professional engineers and a finance manager from member county road agencies, to help guide the pilot. "The team put together a timeline and a process for doing research projects," she continued.

Understanding how to efficiently and effectively approach investments on infrastructure unique to local agencies is important for local road-owning agencies. Colling explained, "For example, the state Department of Transportation doesn't own a lot of gravel roads, and local agencies own a lot of gravel roads." Yet, most research on roads has been done for infrastructure that is predominantly owned and managed by state DOTs, according to Colling. This gap in research showcases the growing need for local road research promoted through an entity like the Michigan LRRP.

## Research Priorities and Projects

The \$1-million legislative appropriation will allow Michigan's LRRP to fund three to four research projects starting in spring/summer 2026, says Donohue, who has been driving the effort to establish the Michigan LRRP.

She says the Michigan LRRP's focus is on research that directly benefits the day-to-day work of local road agencies. Key priority areas, which are still being established, include improving pavement performance through preservation techniques as well as drainage and stormwater infrastructure.

To ensure that research remains relevant, the CRA of Michigan surveyed its county agency members on the projects that they would like to see implemented. About 36 ideas were received. From them, the LRRP advisory team picked three: 1) best practices for aggregates in roadways, 2) best practices for working with HMA or chip seal, 3) using artificial intelligence in PASER ratings. Donohue says the LRRP advisory team is "developing problem statements" and will begin laying out the impact and metrics that will be solved with further research.

County road agencies in Michigan will play a direct role in shaping research efforts. Agencies that propose research projects may help guide them. Colling emphasized, "The biggest need right now—and in the future—is idea generation." He continued, "Every project has its own team that manages the research and someone acting as the client, an informed consumer." This helps to ensure that problems are clearly identified and measurable and aligned with the everyday challenges faced by Michigan's local road-owning agencies.

## Implementable Innovations

A key strength of the LRRP is the focus on turning research into real-world, implementable solutions. Projects are designed not just for academic study but for practical implementation.

"It's not just enough to do great research," noted Colling. "Everybody expects the research will be done well, will be applicable, and will be useful to people." The LRRP advisory team has a focus on turning research into practice with its deliverables. Some outcomes may include best practice documents, field guides, or construction specifications.

Michael Townley, an engineer of research at the Michigan Department of Transportation and a non-voting member of the LRRP advisory team, emphasizes the importance of practical local roads research. He said, "If we set up a robust program that's successful and has a lot of good implementable results, then there's a greater chance that there will be an investment in research for the future."

## Research Funding Opportunities

Like Minnesota, Iowa, Ohio, and Indiana's local road research bodies, Michigan's LRRP will be a primary avenue for applied research partnerships, where local agencies collaborate with university researchers to address transportation innovation and challenges.

Funding mechanisms available through the LRRP include technical assistance funding to support smaller agencies with limited resources; matching funds to leverage external grants or cost-sharing initia-

tives; pilot implementation grants that allow agencies to test new materials and designs in the field.

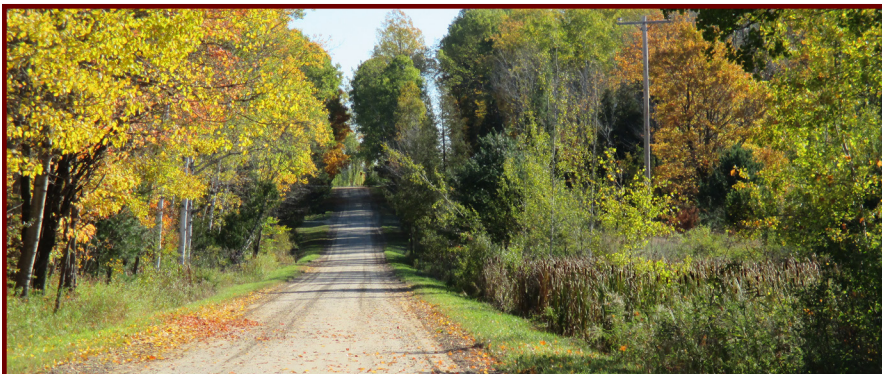
Colling notes that funding comes with accountability to the legislature: “One of the things the advisory team is very focused on is that there’s money being offered to go do research,” he shared. “So, how do we show there’s payback for this?” By demonstrating measurable cost savings and improvements on local roads, the LRRP will become a trusted resource for Michigan’s legislature and local road-owning agencies.

### Driving Innovation

The LRRP advisory team is establishing meeting dates and developing an overall timeline to produce results for Michigan’s legislature and local road-owning agencies, says Donohue. “Our objective in any project is to support innovation and development of best practices and even specification development so we can move away from one-off trials by county road agencies,” she emphasized.

“Good research will improve decision making and make it easier for local road-owning agencies to prioritize projects, especially from a smart investment standpoint,” reflected Townley. “They’ll be able to do things in ways that are data driven and safer and help them in making investments in new technologies—the LRRP will drive innovation.”

As Michigan’s Local Road Research Program begins its first projects, its leaders are focused on proving the model’s value. “We just told the legislature we want to try this. We need to see if this works for Michigan,” Donohue said. Early results from the pilot could determine whether the pilot grows into a larger landscape. If successful, the LRRP could become a model for local transportation innovation and research. ■



Michigan LTAP

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# Jerry Byrne: Road Building and Relationship Building in Kent County and Beyond

Victoria Kaplewski, *Technical Writer*  
Emily Bergman, *Technical Writing Intern*  
Center for Technology & Training



Growing up, Jerry Byrne was used to not seeing his father at home on Christmas. “He was working because of snow,” Byrne recalled. “It was part of [his] public service.” Byrne’s father worked at Kent County Road Commission (KCRC), and both of his grandfathers worked at road commissions, too—KCRC and Ottawa County Road Commission.

Naturally, Byrne started working at KCRC right out of high school. His first job was doing equipment service—changing oil, changing tires, and working on equipment. Over time, he moved up to becoming a truck driver, winter maintenance vehicle and snow plow operator. Then, he progressed to being a road construction worker, building roads, patching potholes, and fixing guardrail. As he climbed the ladder, Byrne took advantage of KCRC’s tuition reimbursement program and acquired a four-year degree in business administration from Aquinas College.

Eventually, Byrne progressed into a position in the traffic and safety department. “It was at a point when lawsuits were prevalent amongst public agencies and we couldn’t get insurance, so we had to be self-insured and we had to investigate all serious personal injury and fatal accidents,” he shared. He took additional training in police accident investigation through Michigan State University and spent the next four to five years documenting crashes and the road conditions at the time of the incident. “That got us to a point that we could be insured again,” he shared.

Byrne then became the assistant director of the Maintenance and Local Construction Department for 8 years, followed by the director for the same department for 25 years. “That department now has about 130 to 140 employees,” he said. “It does all the winter maintenance, pothole patching, and road work activities that the general public sees road commissions do.”

Since the time he started at the road commission, Byrne has witnessed numerous changes. “When I started, we did most of the asphalt repairs by hand, by shoveling,” he said. “Now, we have a full-size paver—a full rotomill operation so we can do paving ourselves cheaper and more efficiently.” He also notes that 20 years ago KCRC stopped contracting out pavement preservation services like chip seals and now handles these in house. “It gives the employees a little more pride and a little more ownership, and we can compete with the private side on price and quality of workmanship,” he said about that change.

Then, in October 2023, Byrne became managing director of KCRC.

“I worked up through the ranks so I have an understanding of the entire organization from the bottom to the top,” reflected Byrne. While he acknowledges that things are being done differently in his previous position, he says the basic functions are the same. Nonetheless, he says it’s important that he steps back and lets them do their job. As part of that stepping back, he’s had to transition long-time contacts he’s worked with for 20 or 30 years away from contacting him for day-to-day issues and to the new individuals who fill his previous positions. “It’s a slow, hard process,” he reflected.

The shift away from day-to-day tasks related to road commission operation has come with more political responsibility. Presently, Byrne is working on securing funding for road and bridge projects, managing less income alongside greater expenses, determining how electric vehicles and hybrids impact the road network, and educating state and federal representatives on the challenges the road commission faces in managing transportation assets. “We want to see results instantly at the county or township level but, the higher the level of government, the more complex it is so sometimes I need to have a little patience when I don’t see those results right away,” he shared.

He’s also had to assume responsibility for disciplining employees and taking corrective action. “That’s what the job is also,” Byrne said. Despite having to do that, Byrne still believes he’s “no better than they are” and is just as responsible as they are for stopping and clearing road hazards like dead deer, for instance. “While I steer the operation of the road commission now, the employees are the driving force that get the work done,” he emphasized.

Although he’s the “head” of the road commission, Byrne recognizes that his employees are the ones doing the essential work. “So, probably take the ‘I’ word out of the vocabulary and make sure you’re using the ‘we’ word, unless things go bad,” he suggested for others in a leadership role. “If things are going bad, you as the managing director need to take responsibility and be the ‘I’ person but, when things are going good, you need to be the ‘we’ person and give credit to the employees that make a difference.”

That mindset has made Byrne stand out, not only to KCRC employees but to others beyond the walls of KCRC. Cameron Van Wyngarden, manager for Plainfield Charter Township, shared, “Jerry has a way of speaking to everyone as if he can relate to them very closely: you never feel like he’s talking down to anyone, or that he’s the person with all the knowledge.”

In Montcalm County, the road commission's recently-retired superintendent manager Mark Christensen observes that Byrne is a good example of "finding ways we can be efficient and do the best job with the resources we've got". "Sometimes we have a specialty piece of equipment that Kent County doesn't have and, while we're the first ones to share, KCRC is the first one to share back," shared Christensen. "Jerry is a true team player when it comes to partners around the state."

Michelle LaJoye-Young, the Kent County sheriff, agrees. She noted, "KCRC is a worthy partner in helping us to make sure everybody stays safe in every way, making sure the roads and their periphery are safe and clearing a public safety impact as soon as possible." In fact, Byrne's ability to "think around a problem and pose resolutions" as well as his networking with partner agencies proved central to a post-tornado response effort in Kent County. Van Wyngarden recalled, "Not only did Jerry have all the relationships built with leaders from various communities but, being who he is, he took the leadership role in coordinating the effort."

In 2025, Byrne became the president of the board of directors for the County Road Association of Michigan.

Byrne's early days of managing the road commission came with another unique challenge: moving out of a 100-year-old complex and into a new 50-million-dollar facility (see *The Bridge* 34.4). "Getting all the employees onboard with the move and into a new building, working the bugs out of it, and getting it truly operational, efficient--it has been rewarding," he related. "There are benefits both from a safety and efficiency standpoint, and everybody has to work together now because it's all open space." He continued, "There has been some animosity and some feeling of loss of control, but the new facility has worked out well."

Outside of work, Byrne relishes cottage life on the lake and working on the 80-year-old family beef farm. He also enjoys spending time with his two sons and his granddaughter.

Reflecting on his career at the road commission, Byrne shared, "It is a public service, and it's being a public servant." He says during interviews he reminds potential employees that road commission work "isn't necessarily a glamorous job but they will be critical—they'll be in front of law enforcement and fire services on a snow day". He reflected, "That commitment needs to be there." And, for Byrne, it is. ■



Photo: Shutterstock

## Resources for Controlling Invasive Phragmites

Nate Anderson, *Technical Writing Intern*  
Center for Technology & Training

In the 1800s, sailors traveling from European countries used soil as a ballast to stabilize the weight distribution on their ships. Cargo would be unloaded at ports along the East Coast of the United States, leaving the soil discarded along the shoreline to rebalance their ships. This discarded soil is considered the most likely reason for the introduction of *Phragmites australis*—a subspecies of common reed—to North America. Invasive phragmites, which can often only be distinguished from native phragmites through genetic testing, can damage asphalt roads and wooden structures (see *The Bridge* 36.1), making it problematic for local road-owning agencies.

This invasive subspecies can be found in ditches, wetlands, and habitats with a high salt concentration. Today, *Phragmites australis* occupies approximately 60,000 acres of shoreline and other inland areas across the Great Lakes region. Because it reproduces asexually, the species spreads rapidly and densely, creating a need for consistent and effective phragmites management on the East Coast and in the Great Lakes region (see <https://www.greatlakesphragmites.net/blog/20181212-phragmites-invasion/>).

### Invasive Phragmites Across Michigan

“People are often surprised to learn that we have a formal phragmites treatment program—and surprised by how much time and money we spend on it,” shared Bob Batt, a resource specialist for the Michigan Department of Transportation University Region. “Overall, we spend several hundred thousand dollars a

year on herbicides as part of our program at MDOT.”

The time and money is warranted, though, because invasive phragmites can be detrimental to road and bridge infrastructure. “The most common impact we see is interference with water flow in our roadside ditches,” explained Batt. “Other issues are visibility, as phragmites can grow tall and block drivers’ views at intersections or obstruct our signs; displacement of native vegetation and landscape plantings; and in rare cases, growing up through shoulder pavement and barrier walls.”

Invasive phragmites is most common on the eastern side of the state, says Batt. He notes that it is especially problematic in Monroe, Lenawee, and Washtenaw counties, in the Bay and Metro regions, and throughout the Upper Peninsula.

At Monroe County Road Commission (CRC), Michael Smith, a civil engineer, has been tackling invasive phragmites along roadways. “Our invasive phragmites treatment program started with a 4,000-gallon trial application on a few of our primary roads in 2015,” he detailed. “We did not begin treating all of our primary roads until 2018, but have treated them annually since then.”

Since Monroe County began treating invasive phragmites, Smith notes that herbicide costs have fluctuated with need, especially with a decrease in the invasive phragmite population in Monroe County. “In 2018, the contractor used 9,700 gallons of herbicide at a cost of just over \$26,000,” he shared. Over time, the costs have decreased alongside shrinking quantities of invasive phragmites. “In 2024, the cost for treating roadside ditches was \$16,225, with 1,525 gallons of herbicide used to cover approximately 30 acres,” Smith continued. Over that time, Monroe CRC also adapted its payment approach from a per-gallon rate to a per-mile since it reimburses contractors’ efforts in scouting and applying targeted treatment rather than simply accounting for volume application.

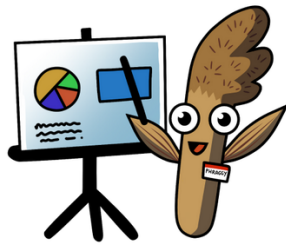
Smith notes that starting with a small-scale pilot program provides an opportunity to evaluate management strategies and make adjustments before committing to network-wide treatment.”

### **Collaborative Efforts to Control Phragmites**

As part of their management efforts, Monroe CRC has joined their local Cooperative Invasive Species Management Area (CISMA) and has interacted with the Great Lakes Phragmites Collaborative (GLPC) through its Phragmites Adaptive Management Framework (PAMF). “Their insights have strengthened our efforts and improved the effectiveness of our treatment strategies,” Smith shared.

The GLPC works directly with federal, state, and tribal agencies in their work to manage invasive species. “We promote best practices, and we advocate for long-term funding for phragmites management and identify it as a priority invasive species needing sustained attention,” shared GLPC’s Aquatic Invasive Species (AIS) program’s project manager Samantha Tank. “We also provide resources to local municipalities to help them develop ordinances—like local noxious weed laws—to address phragmites at the municipal level, and we offer briefings on the issue and track management progress.” The GLPC also offers guidance to local agencies for identifying and managing invasive phragmites.

## Webinar Series



Our webinar series focuses on sharing the latest research and management techniques to foster dialogue and technology transfer throughout the region. All statements made by webinar presenters are their own and do not necessarily reflect the opinions of the Great Lakes *Phragmites* Collaborative. If you are interested in presenting a webinar in our series, [contact us!](#)

### RESOURCES:

- [Webinar Series](#)
- [Invasive Species Organizations Map](#)
- [Contractor Database](#)
- [Case Studies](#)
- [Newsletter and Listserv](#)
- [Reference Library](#)
- [Phragmites Ordinances](#)
- [Mapping and Monitoring Tools](#)

## Upcoming Webinars

**Presentation:** Great Lakes Region Ecological Conservation: Assessing the Impacts of Invasive *Phragmites* on Wetland Health and Greenhouse Gas Flux in the Great Lakes Region Using Earth Observations

**Presenters:** Diya Kamnani, Carly Thompson, Sloane Poppei, & Melissa Bruzzano of Analytical Mechanics Associates

**Date:** August 7th from 1:00-2:00 EST



[Register here](#)

Screenshot of Great Lakes Phragmites Collaborative website

The GLPC invites local road-owning agencies to participate in PAMF, according to Tank. “We collect data from real-world managers actively treating phragmites and use that data in an adaptive management cycle,” she explained. “The model can suggest optimal treatments based on real-world outcomes; however, it only learns from the management actions it has data for—so the more participants, the better it becomes.”

Tank continued, “The most efficient management approach generally combines herbicide with some

type of removal—whether mechanical, controlled burns, or other techniques.” She says that flooding or hydrologic manipulation can also be extremely effective, and spading is effective but very labor intensive.

“Can invasive phragmites be managed? Yes,” she reflected. “Do we think it can be eradicated regionally? No.”

### **Timing Is Everything**

Batt emphasizes getting ahead in mitigation efforts. “In other parts of the state, we focus on early detection and rapid response—EDRR,” he said. “That means identifying small patches before they turn into large ones.” Stopping the spread of phragmites in early detection can be a potential cost saver while the invasive species are still small in size on interstates, roadways, and drainage systems.

Treating phragmites is best done during the translocation phase, which is when nutrients, or photosynthetic byproducts are moving from the leaves downward to the rhizome. While this occurs throughout the life cycle of phragmites, the intensity is strongest during the fall, generally between August and November. Smith explained, “Applying the herbicide during this phase ensures that the active ingredients are translocated to the rhizomes, effectively targeting the plant’s reproductive and regenerative structures for more complete control.”

For herbicide treatment, Monroe CRC relies on a combination of glyphosate and imazapyr mixed with a surfactant to improve absorption targeted application, says Smith

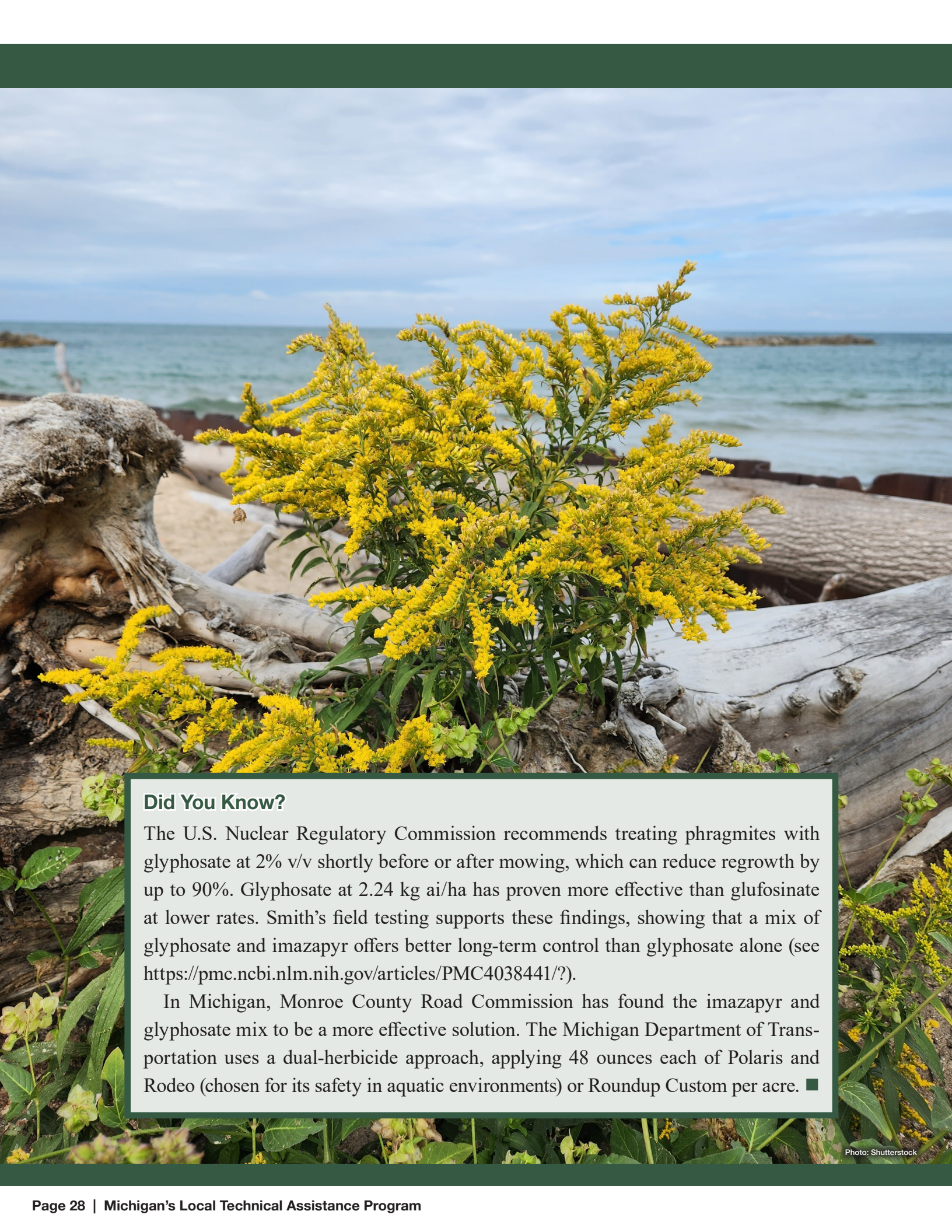
“Glyphosate and imazapyr each have benefits and drawbacks,” noted Tank. The GLPC does have recommendations for quantities of each herbicide based on the targeted area.

Following herbicide application, Smith shared, “We wait at least two weeks before mowing to allow the herbicide to move from the foliage to the rhizomes, maximizing its impact on the root system and preventing regrowth.” Mowing too early could disrupt herbicidal treatment during the natural translocation process, he cautions.

Tank emphasized, agencies should submit management and data collection to the PAMF annually in order to generate higher quality data for training scientists and tracking progression.

### **Control is Crucial**

Controlling the spread of invasive phragmites and their detrimental effect to Michigan roadways, wetlands, and Great Lakes shorelines is crucial. The evolving strategies and significant financial investments—both at the local and state levels—underscore the importance of using the most effective treatment methods available and sharing data with organizations like the GLPC. By participating in the GLPC’s adaptive management framework, control methods of invasive phragmites will continually improve. ■



### **Did You Know?**

The U.S. Nuclear Regulatory Commission recommends treating phragmites with glyphosate at 2% v/v shortly before or after mowing, which can reduce regrowth by up to 90%. Glyphosate at 2.24 kg ai/ha has proven more effective than glufosinate at lower rates. Smith's field testing supports these findings, showing that a mix of glyphosate and imazapyr offers better long-term control than glyphosate alone (see <https://pmc.ncbi.nlm.nih.gov/articles/PMC4038441/>).

In Michigan, Monroe County Road Commission has found the imazapyr and glyphosate mix to be a more effective solution. The Michigan Department of Transportation uses a dual-herbicide approach, applying 48 ounces each of Polaris and Rodeo (chosen for its safety in aquatic environments) or Roundup Custom per acre. ■

Photo: Shutterstock

# Great Ideas—Where They Are Today

## In Focus: Strategies for Safety Improvements and Data Collection

Nate Anderson, *Technical Writing Intern*  
Center for Technology & Training

In 2024, the City of Ann Arbor won the Michigan LTAP Great Ideas Challenge with their “Quick Build” submission. Their “Quick Build” aims to reduce driver speeds in order to provide safer roadway crossings for everyone, but especially pedestrians, bicyclists, and wheelchair users.

Quick builds are low-cost, rapidly deployable roadway safety improvements that use accident prevention mechanisms: hardened centerlines that help drivers align their left-hand turns, bump-outs that shorten pedestrian crossing distances, buffered bike lanes that improve cyclist protection, high-visibility pavement markings that alert drivers, and left-turn boxes that support safer bicycle navigation.

Quick builds use interventions like hardened centerline or bump-outs with a goal of helping drivers turn more slowly and predictably. “They help to remind the drivers that there is another space here and to expect people,” said Suzann Flowers, transportation program manager for the City of Ann Arbor. Quick builds also offer accessibility benefits. “They allow people with mobility challenges to have a much shorter crossing distance and also reduce their exposure to a traveling vehicle,” she explained

The city’s project targets “high priority” intersections, which have elevated crash rates. These intersections make up roughly 1.98 miles and 10 intersection legs.

Flowers noted that these treatments have allowed the city to “try before we buy,” giving them a way to test new roadway configurations before making long-term investments. “The goal is to take those kinds of temporary, semi-temporary treatments and make them permanent,” she continued, reinforcing the project’s long-term intentions.

The quick builds support the City of Ann Arbor’s “Vision Zero” plan, a commitment to zero recorded deaths in the city by 2025. “City council has just this past spring 2025 reaffirmed its commitment to Vision Zero in the community.” Ensuring the long-term goal and commitment to zero pedestrian deaths.

This ambitious plan came in response to fatal traffic accidents that claimed 13 deaths and caused 97 injuries in Ann Arbor from the years of 2018-2022. As part of that plan, the City of Ann Arbor has invested about \$500,000 in quick builds, with a majority of the costs being pavement markings and some costs for posts, other materials, and staff time. Residents and city staff have observed reduced turning speeds at intersections, improved visibility and crossing safety for pedestrians, clearer travel pathways for bicyclists, and visual



Above: Hardened centerline made of rubber speed bump and bollards. Below: Curb bump out made from bollards. Photos: Courtesy of City of Ann Arbor.



markers that help to encourage slower driving.

“Vision Zero and quick builds are not designed just for pedestrians and bicyclists,” said Flowers. “They’re designed for everyone to get to their destination safely.”

## Second Place Honorable Mention

Also in 2024, the Saginaw County Road Commission (SCRC) earned a second place honorable mention in Michigan’s LTAP Great Ideas Challenge with an innovative approach to Pavement Surface Evaluation and Rating (PASER) data collection. Their solution focused on evaluating road conditions more frequently despite budget constraints.

Mariah Kelly, a geographic information system (GIS) analyst at SCRC, highlighted the agency’s strategy of hiring Michigan Tech students as temporary summer staff. These students, many of whom live locally during summer break, received PASER training directly before road evaluations were set to begin. Kelly explained, “I try to have them do PASER training over their spring break if they are willing.” She continued, “The PASER training polling is very competitive, and the kids loved it because they were competing to not only be right, but to be first.”

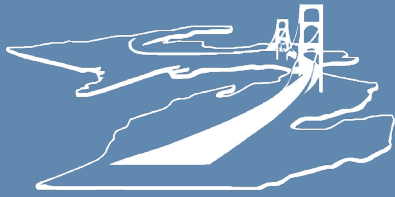
“Then, I give them sections, starting with rural areas where I’m expecting 2s and 3s, which are easy to spot, and then some 8s, 9s, and 10s,” she explained. “I avoid chip seal at the beginning because it’s harder to rate but, once they kind of have a grasp of the rating ranges, I get them into chip seal.” She points out that chip seal can be especially challenging if it has a fog seal because it “looks so good that they may mistake it for asphalt”.

To fund data collection using full time staff was “a bit much of an investment for something that we use as a tool”, says Kelly. Using student interns reduces costs while ensuring up-to-date pavement data could be shared with regional planning groups, associations, and legislators. Prior to implementation, SCRC evaluated only 50% of the county’s roads each year—meaning most roads were rated just once every two years. “In a span of three months, the summer interns make it through 1,400 miles of road,” Kelly noted. With this innovative staffing solution, SCRC has successfully reduced the evaluation cycle and timeframe while operating within budget constraints. “It’s allowing our full-time staff to focus on their core duties, and it gives us the opportunity to mentor the students,” said Kelly. “That’s a significant value overall.” ■



Above and below: Summer intern PASER data collection teams. Photos: Mariah Kelly.





## Michigan's Local Technical Assistance Program

Michigan's Local Technical Assistance Program (LTAP) serves state, county, and municipal transportation personnel. Its mission is to bridge the gap between research and practice through trainings, engineering technical assistance, and information on state-of-the-art technology in the construction and maintenance of roads, bridges, and other transportation infrastructure. For more information, visit [michiganltap.org](http://michiganltap.org).

## CENTER FOR TECHNOLOGY & TRAINING

The Center for Technology & Training (CTT) is housed at Michigan Technological University in Houghton, Michigan. The mission of the CTT is to develop technology and software, coordinate training and conduct research to support the agencies that manage public infrastructure. In support of this mission, the CTT houses Michigan's Local Technical Assistance Program, which is part of a national effort sponsored by the Federal Highway Administration to help local road agencies manage their roads and bridges. For more information, visit [ctt.mtu.edu](http://ctt.mtu.edu).

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# The Bridge

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## About LTAP

The Local Technical Assistance Program (LTAP) is a nationwide effort funded by the Federal Highway Administration and individual state departments of transportation. The goal of the LTAP effort is to foster a safe, efficient, and environmentally sound surface transportation system by improving skills and increasing knowledge of the transportation workforce and decision makers.

## Steering Committee

The LTAP Steering Committee makes recommendations on, and evaluations of, the activities of Michigan's LTAP.

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