



The Bridge



A quarterly newsletter from Michigan's Local Technical Assistance Program



Photo: Courtesy of Bruce Gasaway

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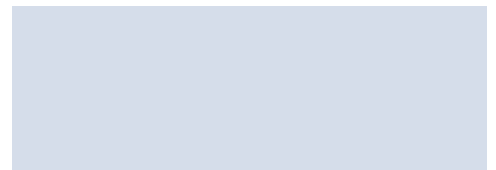
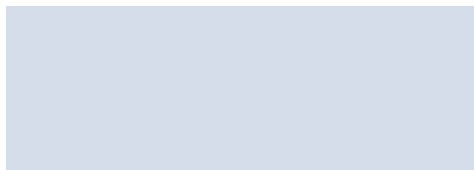
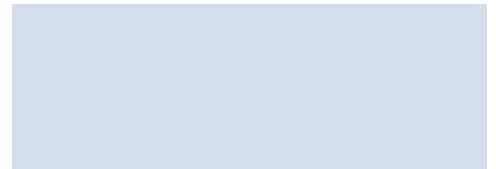
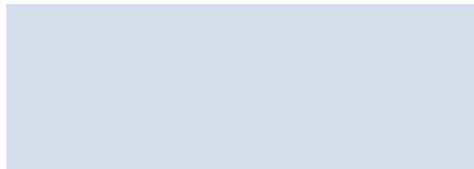
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Michigan's
Local Technical
Assistance Program



Photo: CTT Archive

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 in 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 with your engineering projects, operations and management strategies, shop products and practices, and safety resources.

Victoria



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Strategies to Raise the Next Generation of Local Agency Employees

Victoria Kaplewski, *Technical Writer*
Center for Technology & Training

The US Bureau of Labor Statistics has estimated that civil engineering industries and agencies would require 25,000 new engineers each year for 10 years to help address the country's aging road and bridge infrastructure.¹ Yet, in the past five years, the job market has only seen an influx of approximately 10,700 to 13,700 new civil engineers and 1,300 to 1,600 new civil and environmental engineers each year, leaving a gap between workforce need and potential new hires.² A significant number of mid-level civil engineers also disappeared due to many factors including the 2008 recession, 2020 COVID-19 impacts, and low wages.^{3,4} Retirements are also widening the gap between needed workforce and eligible potential employees, according to Feniosky Peña-Mora, who wrote:

“According to the Brookings Institution’s report, “Seizing the U.S. Infrastructure Opportunity: Investing in Current and Future Workers,” on average, 1.7 million infrastructure workers will leave their jobs each year from 2021 to 2031. The report also states that the Bureau of Labor Statistics has warned of a “silver tsunami” among infrastructure workers, with many employers anticipating that 10% or more of their workforce will retire yearly. This means that over the next decade, approximately 17 million infrastructure workers will need to be replaced, which is more than the current entire infrastructure workforce.”⁵

The labor shortage extends beyond civil engineering to support roles as well, including engineering technicians and educators.⁶

That means it's up to us to bridge the gap between needed workforce and potential hirees. It's up to us to create excitement for civil engineering jobs and raise up a new generation of civil engineers. Now is the time to think about:

selling and benefitting the local agency through internship programs

► see page 5

inspiring youth to explore local agency careers.

► see page 9

Resources

1. Aquinas Engineering. Bridging the Gap: Addressing the Civil Engineering Labor Crisis. LinkedIn, 16 Dec 2024. Available at: <https://www.linkedin.com/pulse/bridging-gap-addressing-civil-engineering-labor-crisis-aquinasengr-zij5c>
2. American Society for Engineering Education. By the Numbers. 2023. Available at: <https://ira.asee.org/by-the-numbers/>
3. Robert Walters. How to Navigate the Current Civil Engineering Talent Shortage. Robert Walters Plc., 11 Aug 2025. Available at: <https://www.robertwalters.us/insights/hiring-advice/blog/how-to-navigate-the-current-civil-engineering-talent-shortage.html>
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6. Sukel, Kayt. Need support staff at your civil engineering firm? The shortage is real. In: Civil Engineering Online. American Society of Civil Engineers, 25 June 2024. Available at: <https://www.asce.org/publications-and-news/civil-engineering-source/civil-engineering-magazine/article/2024/06/need-support-staff-at-your-civil-engineering-firm-the-shortage-is-real>

Selling and Benefitting the Local Agency through Internship Programs

Nate Anderson, *Technical Writing Intern*
Michigan Technological University

Many Michigan local road-owning agencies enlist young talent to help build the foundation for the future of transportation. Students in higher education and young professionals can find summer employment or internships available at a number of the state's local road-owning agencies.

In practice, summer workers or interns find roles running tests, confirming traffic control, and doing PASER ratings, for example. These internship roles also give up-and-coming young professionals meaningful opportunities to work on real-world roadway projects that directly impact the safety and mobility of the communities those agencies serve. At the same time, interns also help form a long-term talent pipeline that already understands local agency standards, tools, field expectations, and workplace culture.

Why Interns Matter

Peak construction season stretches full-time staff thin; interns expand a local agency team's staffing and operations capacity, helping it to maintain efficient operations during the busiest months.

Mariah Kelly, a manager for the Saginaw County Road Commission (SCRC), emphasizes that the internship roles are designed to benefit both the agency and the intern. "We look to place these college kids into a role that not only benefits us but also gets them some entry-level experience in the engineering realm, focusing on data collection," she explained.

Similarly, at Washtenaw CRC, Superintendent Ken Harris says that, while an intern's responsibilities



can vary from day-to-day, their work often begins with critical field tasks. “Usually, their days will start with them setting up a work zone,” he related. “They’ll generally flag the majority of the day and then clean up the flagging zone and the traffic control at the end of the day.” In some cases, interns help with the agency’s forestry operations by pulling brush.

Interns can benefit agencies by bringing fresh perspectives with them. Kelly recalls one engineering student intern that SCRC had. “He designed a training workflow for us for when I bring in new student interns,” she said. “He also created filters in Roadsoft that would pull out our historic data sets for good, fair, and poor in one particular area of our county.” She continued, “These filters made it easier for me to evaluate students’ PASER tasks because I knew the previous year’s ratings of the roads I sent them.” Essentially, the filters gave Kelly “a set of expectations” she could use to evaluate student-assigned PASER scores as along an expected trajectory or outside of the norm.

Kelly’s intern also identified the easiest roads for students to rate—new pavements and poor or failed pavements—and the toughest roads to rate—chip seal pavements that aren’t overlays. Armed with this insight, Kelly is now able to “start students on the easiest PASER tasks and progress them to the hardest tasks”.

Experiences Gained

While agencies benefit operationally, interns gain a meaningful experience of full-time work responsibilities. Harris explained, “People count on you to show up at 6 a.m.; we hold them accountable like everyone else.” He continued, “It’s a lot of responsibility for someone younger but, after two months, you see their growth and how they become one of the team.” This accountability reinforces reliability, an essential aspect of teamwork in the professional workplace. Harris elucidated, “Our crew takes pride in taking young individuals under their wings and providing these interns with a positive experience.”

In addition to professional expectations, Washtenaw CRC interns can get a taste of heavy equipment operations or engineering. “In school, students get taught what a project layout is, but the road commission offers hands-on experience,” explained Harris. “They get an understanding of what goes on in a project day to day: one day, they have a utility strike, the next day they’re checking grade, and the next day they’re staying late because they’re putting in an edge drain and the subcontractor doesn’t leave until he’s done.” He continued, “On the engineering side of things, they learn how projects are set up, the dynamics of design-builds, reading blueprints, working with contractors, doing daily totals, and agreeing upon quantities out in the field.”

At SCRC, interns gain experience with the data collection process and with specialized software like Roadsoft, which is a key element for data collection, and TRAFx, which is a web-based program used for traffic counts. “Specifically with us, they get to do the Roadsoft training webinars with the Center for Technology & Training, and then I walk them through how to do the typical workflow for managing the PASER data in Roadsoft,” noted Kelly, who also educates interns on how to use TRAFx.

Beyond technical skills, Kelly says SCRC’s program also teaches interns essential soft skills. She says they learn about “meeting professional expectations, showing up on time, and being safe in the work

environment”. And, she says they learn about flexibility: “They might be planning for a nice sunny day to do their task, and then it rains so now they get bumped off a weather-dependent task like PASER rating.” She continued, “They come in with the expectation of doing one task and, after they arrive at work, they get switched to another task.”

Kelly also says interns learn about receiving constructive criticism. “Our criticism is what’s best for the team: it’s the quality of data and work that we’re getting, and it’s not about proving them or me wrong.

Most importantly, Kelly stresses the importance of choosing the right internal mentors to help guide interns and their learning. She noted, “If you have someone within your agency that shows those good teaching traits, explains things well with a vast amount of knowledge, and is personable, leverage it—they could be a good mentor.”

In exit interviews with interns, Harris has learned that interns are “very happy with what they were exposed to and proud of the involvement they have had within the community while working at the road commission”. He added, “I think they really enjoyed the camaraderie within the crew and finding out that our crew members are down-to-earth good people who take a lot of pride in their work and are very safety sensitive when they take someone in who has very little experience.”

Kelly describes the process for incoming interns and how they’re brought into the workflow. “They first get training either from our staff or from outside programs... and then once everyone’s comfortable, they get to be autonomous and go about whatever their task is on their own,” said Kelly. Interns start with structured training that shifts into independent field work once confident with the different processes of the organization.

Future Possibilities

The long-term value of a local agency internship program lies in the pool of qualified candidates it creates for future job opening at the agency. In fact, survey data shows the value in long-term recruiting for internship programs. According to the National Association of Colleges and Employers, employers were able to convert between 51.8% of interns in 2021 and 63% of interns in 2025 into full-time hires.¹

“I never thought my internship in 2007 would have led me into a career like this,” shared Harris. “You just never know where an internship will lead you down the road.”

Harris has since seen other

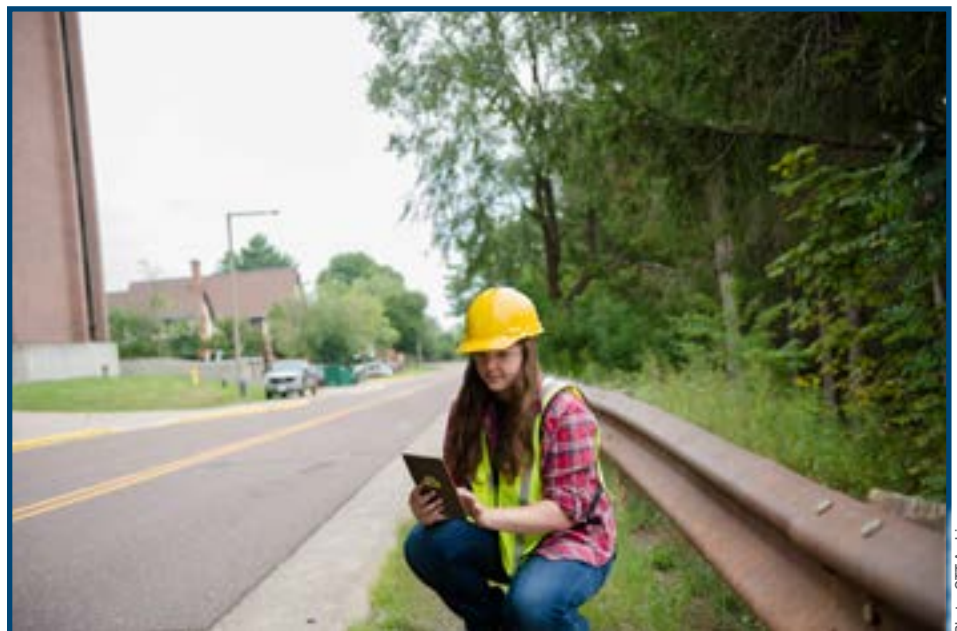


Photo: GTT Archive

Washtenaw CRC interns transition into full-time contributors. He shared, “We had an intern with us who did a couple years as an intern and a lot of good work and then, when a full-time position came open, he was able to transition into the engineering department here.”

To recruit students for an internship, Kelly says it is important to “reach out early”. She explained, “I directly reach out to department chairs and tell them, ‘we have this opportunity, can I send it your way?’, and that’s been successful.” She also heavily relies on word-of-mouth from existing staff and interagency recommendations to find interns.

Harris pointed out, “I think you never know when you’re going to be training the next leader.” He continued, “Internship programs are] an opportunity to share the great things your organization does.”

Ultimately, internship programs are a long-term investment in an agency’s staffing needs. They not only help meet seasonal staffing needs, but they play a critical role in developing the next generation of transportation and construction professionals. Providing hands-on experience and mentorship to up-and-coming professionals can create a logical and smooth transition into long-term local agency careers that begin with the necessary knowledge and skills already in place. ■

Resources

1. Gray, Kevin. Intern Conversion Rate Hits Highest Mark in Five Years. National Association of Colleges and Employers, 3 Apr 2026. Available at: <https://www.nacweb.org/talent-acquisition/internships/intern-conversion-rate-hits-highest-mark-in-five-years>

Advertising Internship Opportunities

Many of Michigan’s local road-owning agencies often spread the word about internships by setting up a page on their website. The State of Michigan advertises its internship program on its site at <https://www.michigan.gov/mdot/careers>. In addition, Michigan road-owning agencies can post internship positions on <https://micountyroads.org/jobs/>.

Agencies may also choose to post their internship opportunities on university job boards and share it with program coordinators/advisors who, in turn, can share it with students.



Photo: Courtesy of MICCD

Inspiring Youth to Explore Local Agency Careers

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

Exposing kids to engineering and other STEM fields provides cognitive benefits including strong problem-solving and creative thinking abilities. This exposure also paves the way for them to consider future engineering jobs that pay well. One way of getting kids exposed to and excited about civil engineering jobs in the surface transportation sector is through local events that offer hands-on activities. These events serve to spark kids' curiosity and early interest in construction and skilled trades. They also give young students practical exposure to equipment and tasks used in road and bridge building and the opportunity to meet mentors on their journey to becoming future road and bridge builders. While a handful of very-popular statewide or regional events are introducing young people to construction careers, local road-owning agencies can also coordinate or collaborate in offering events for kids in their communities.

Statewide and Regional Events

Michigan Construction Career Days

Every year, Michigan Construction Career Days (MICCD) provides thousands of 7th- to 12th-grade students with hands-on experiences while connecting them with contractors, skilled trades organization, colleges, universities, and registered apprenticeship programs, showcasing the many career and educational pathways available in Michigan's construction industry. MICCD is a free two-day event held in Howell in the spring; pre-registration is required. The event's showcase gives students an immersive experience with students being able to "use real tools, materials and heavy equipment under the direct guidance of construction professionals". Students can climb into the cab of an excavator, try out surveying tools, and talk with industry professionals (see <https://www.michiganccd.com/>).

KIDS Building Michigan

Similarly, the KIDS Building Michigan annual event gives young people hands-on experiences like operating heavy equipment, performing on-the-job tasks, and using tools related to construction. This event is open to kids of all ages and their families, helping them to become familiar with opportunities in the construction industry and skilled trades. KIDS Building Michigan is held in Oxford in the fall; registration is required. This event's fun and educational environment raises awareness of construction-related

careers and gets kids excited about future opportunities in construction or skilled trades (see <https://kidsbuildingmichigan.com>).

UP Professional Trades Career Day

The UP Professional Trades Career Day provides students in the western Upper Peninsula with the opportunity to try out construction equipment and learn about careers in the trades. Students can participate in activities like scaffold construction; operating jackhammers, mini-excavators and spider cranes; bending conduit; fusion welding plastic pipes for sanitary lines; and trying virtual reality simulators for electrical, excavating, and welding. The event is held in Ontonagon in the spring. The sponsor, the Upper Peninsula Construction Council, also offers Construction Connect UP for high school seniors and UPCC Building Trades Summer Camp for students 14 to 17 years of age; both are earn-while-you-learn programs (see <https://upconstruction.org/career>).

Future Builders

Like MiCCD and KIDS Building Michigan, the Future Builders event gives kids a hands-on glimpse into careers in construction. While Future Builders is only open to the children of EV Construction and its partnerships, the event is an example of what one agency can do on a smaller scale to introduce the youth to careers in construction (see <https://ev.construction/kids-get-a-real-world-look-at-construction-during-future-builders-2025-event/>). Participating kids can operate mini excavators, climb inside real construction equipment, ride a scissor lift, mix and pour concrete, see how virtual reality works, and watch a construction robot in action.

Local Events

Touch-A-Truck

Touch-A-Truck events are a simple, effective way for communities to spark interest in kids and younger students for careers in construction, public works, and skilled trades. These events, hosted by cities and counties across Michigan, allow kids and families to climb into heavy operating equipment and meet the people in construction and emergency service fields.

Some city and county agencies that have hosted these events include Kalamazoo, Livonia, Flint, Saginaw, St. Clair Shores, Houghton, and Genesee County.

Touch-A-Truck events serve as effective exposure for younger students and families by providing early, positive exposure to construction and public-work careers.

Local agencies can host Touch-A-Truck events by coordinating with law enforcement, emergency services, and even local trucking and construction companies. To get started:

- Establish event committee with an event organizer, a bookkeeper, and chairpersons for involvement (recruits trucks and guides), volunteers (manages volunteers), publicity, printed materials, and sponsorships
- Obtain event insurance
- Choose a venue (e.g., parking lots, public parks, school grounds, your agency location)
- Plan activities (e.g., exploring vehicles, meeting drivers, hands-on demonstrations, games and activities)
- Plan refreshments

- Offer vendor booth opportunities
- Promote the event (e.g., social media, local media, flyers and posters, sponsorships)
- Optionally, the event can raise funds for a cause, even if it is free to enter.

Planning guides are available at <https://nextgentrucking.org/wp-content/uploads/NEXT-GEN-Touch-A-Truck-Event.pdf> and <https://truckload.org/wp-content/uploads/2019/09/Touch-a-Truck-Guide-by-Bestpass.pdf>.

Open Houses

Open houses are another popular way for local road-owning agencies to introduce children to careers in road construction, public works, and emergency services. For example, the Birmingham Department of Public Works (DPS) has hosted a free open house with DPS trucks, fire trucks, and other equipment on display (see https://bhamgov.org/about_birmingham/city_departments/public_services/dps_open_house.php). Oceana County Road Commission has also hosted an open house with the opportunity to meet road commission crew and local police officers and firefighters. Their open house offered a Kids' Zone with games and activities (see <https://oceanacountypress.com/2024/06/03/road-commission-to-host-open-house-thursday/>).

Bring-Your-Kids-to-Work Day

Dating back to the early 1990s, the fourth Thursday in April is Take Your Child to Work Day. By bringing kids into the workplace, they can experience potential future career paths in local road-owning agencies. Local agencies can host a bring-your-kids-to-work day with a little communication and planning for safety considerations and interactive, hands-on learning activities. To get started:

- Set clear objectives
- Choose a date and time that does not conflict with business activities; understand that production may slow on the designated day as employees will need to monitor their children and potentially leave work to take their child back to school or home
- Communicate about the event with employees
- Conduct a hazard assessment and ensure that each work location has sufficient supervision and child-proofing where children will be present
- Create a welcoming atmosphere
- Offer educational talks and activities including interactive demonstrations, workspace tours, and fun workshops
- Allow for parent-child bonding over lunch
- Gather feedback after the event and share highlights.

Guidance on hosting such a day can be found at <https://www.forbes.com/councils/forbesbusinesscouncil/2024/05/30/uniting-work-and-family-tips-for-hosting-a-bring-your-kids-to-work-day/>, <https://www.linkedin.com/pulse/engaging-take-your-kids-work-day-ideas-employers-aditi-gupta-6cpuc>, and <https://www.indeed.com/hire/c/info/bring-your-child-to-work>.

Paint-A-Plow

A popular opportunity for engagement is a Paint-A-Plow event. A number of Michigan local road-owning agencies hold successful Paint-A-Plow events each year (see [The Bridge 30.1](#)). To get started:

- Set a date range for the painting event, keeping in mind that plow blade availability is best between May and September
- Identify plow size and areas on the plow blade where painting will be permissible

- Purchase materials (e.g., primer, oil-based paints [like Rust-Oleum] in different colors, mixing containers, stir sticks, paint can opener, tarp, markers, paint brushes and roller, painter's tape and tray, paper towels, matte clear coat, solvent, disposable gloves)
- Provide project details to participants to allow them to draft designs
- Set a painting period of two weeks
- Drop off clean plow blade, with reflectors removed, on flat, clean tarped ground in a secured area
- Have participants prime, sketch or stencil design, paint, and clearcoat spray the design
- Pick up plow blades and dispose of/disperse remaining materials.

More ideas and considerations on hosting a Paint-A-Plow event can be found in the Izak Walton League of America's "How to Run a Successful Paint a Plow Event" (see: <https://iwla.org/resource/paint-the-plow-guide/>).

Website Webpage: Kid Zone

The Road Commission of Oakland County (RCOC) hosts the "Kids Zone" web page where kids can find activity and coloring books as well as educational videos (see <https://www.rcocweb.org/526/Kid-Zone>). The page also has information about events for kids that RCOC has hosted: Bring Your Kids to Work Day and Paint-A-Plow.

Summer Camps

A number of universities offer summer programs that introduce the youth to careers in civil engineering and construction, including the University of Michigan's Future Ready Scholars (<https://mez.engine.umich.edu/>) and Summer Engineering Exploration Camp (<https://www.seecamp.org/>), Michigan State University's K-12 Summer Programs (<https://engineering.msu.edu/academics/k-12>), Michigan Technological University's Summer Youth Programs (<https://www.mtu.edu/syp/>), and Western Michigan University's Summer Camps (<https://wmich.edu/precollege/summer>). Additional Michigan institutions that offer summer camps introducing kids to careers in construction include the West Michigan Construction Institute (see <https://www.wmcinstitute.com/construction-summer-camp/>) and the Greater Michigan Construction Academy (see <https://gmcam.org/gmca-lansing-summer-camp/>).

Opportunities to Engage

There are many ways that local road-owning agencies can collaborate on or coordinate events that excite kids about careers in road and bridge construction and maintenance. Some effective workforce-awareness efforts are simple and easy to replicate, like open houses, Paint-A-Plow, and Touch-A-Truck. These practical efforts increase young people's awareness of and excitement for careers at local road-owning agencies, helping to raise up the next generation of local agency employees. ■



Painted plow blades from Monroe County Road Commission (Photos: Courtesy of Monroe CRC)



Photo: Shutterstock

Cybersecurity for Local Agencies

Emily Bergman, *Technical Writing Intern*
Sarah Woodworth, *Technical Writing Intern*
Victoria Kaplewski, *Technical Writer*
Michigan Technological University

In this final installment of our 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 (35.4)
2. Protect Passwords (36.1)
3. Back Up Data (36.2)
4. Conduct an Annual Risk Assessment (36.3)

STRATEGY 5: Implement an Incident Response Plan

Creating and implementing an Incident Response Plan (IRP) within your local agency will help prepare all employees to know what to do when a cyber security incident occurs.

“The biggest mistake agencies make is not thinking about incident response until they need it,” said Steve Gradowski, IT manager at Saginaw County Road Commission (SCRC). “By then, it’s too late to plan; you’re just reacting.” An IRP gives an agency a structured way to respond before, during, and after a cyberattack. It does not need to be a lengthy document, but it does need to exist and be tested before an incident occurs.

The job of an IRP is to classify the security incident and to clarify the roles and responsibilities so that employees know how to report incidents and what to do next.

Common incident types include, but are not limited to, ransomware attacks, information security/data breaches, unauthorized access or usages, malicious codes, service interruptions and network or application

system failures.

When staff encounter suspicious behavior or developments during a cyberattack incident, they must be comfortable reporting it, emphasizes Gradowski. “The last thing an agency needs is for someone to press the wrong button on their computer and then walk away,” he said. “Remember, the sooner IT management gets to the problem, the faster they can get it taken care of.”

For reporting to happen quickly, everyone at the agency must know who to contact and how to contact them at any time of day, night, holiday, or weekend if necessary. For example, Gradowski, by default, serves as incident manager, and staff know to reach out to him when they suspect something suspicious. Other key roles are tech manager, who is the subject matter expert, and communication manager, who disseminates relevant information to staff and other stakeholders.

In some cases, agencies don’t have a person in house with the appropriate experience to address cyberattacks. “If they are using an external provider, the staff should have that information so they know where to go next,” Gradowski noted. He continued, “Essentially, you don’t want to have a breach on Thursday afternoon when Friday is a holiday weekend, and all of a sudden you don’t know how to get a hold of the the key personnel.”

In addition to reporting and roles, an IRP should map out initial containment and eradication strategies. For example, when Gradowski notices a cybersecurity problem, his first incident response step is “disconnecting the system from the world.” Isolating a computer or system from the rest of the network stops all traffic in and out, allowing time for the issue to be located and solved without further damage being done. Systems that can’t be isolated should run continuous monitoring and fail-safe mechanisms. A forensic image may be made of the affected system to preserve evidence of the attack.

Next steps may include scans and removal of viruses and malware, installs of updates and patches, system restores, disabling breached accounts, restores of compromised files from clean system backups, and blocks of communication from suspicious domains or IPs.

After a cybersecurity attack, an IRP may recommend holding a retrospective meeting to discuss what has happened and how to avoid it in the future. Based on this discussion, the plan and other policies should be updated, and the updates should be communicated to all employees.

The most important step for an IRP to be useful is printing the document and posting it in a place that is easily accessible by agency staff.

Before a cybersecurity incident takes place, it is important for leaders at local road agencies to train staff on how and when to report suspicious events. Training your employees on how to recognize threats to your agency’s cybersecurity is important because they can then help with monitoring. Trainings are offered by the Michigan DTMB (<https://www.michigan.gov/dtmb/services/cybersecurity/cybersecurity-resource-hub/cybersecurity-training>) and the Cybersecurity & Infrastructure Security Agency (<https://www.cisa.gov/resources-tools/programs/Incident-Response-Training>).

For more information on IRPs, visit: https://www.cisa.gov/sites/default/files/publications/Incident-Response-Plan-Basics_508c.pdf and <https://www.epa.gov/cyberwater/cybersecurity-planning>. ■

New Michigan Manual on Uniform Traffic Control Devices

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

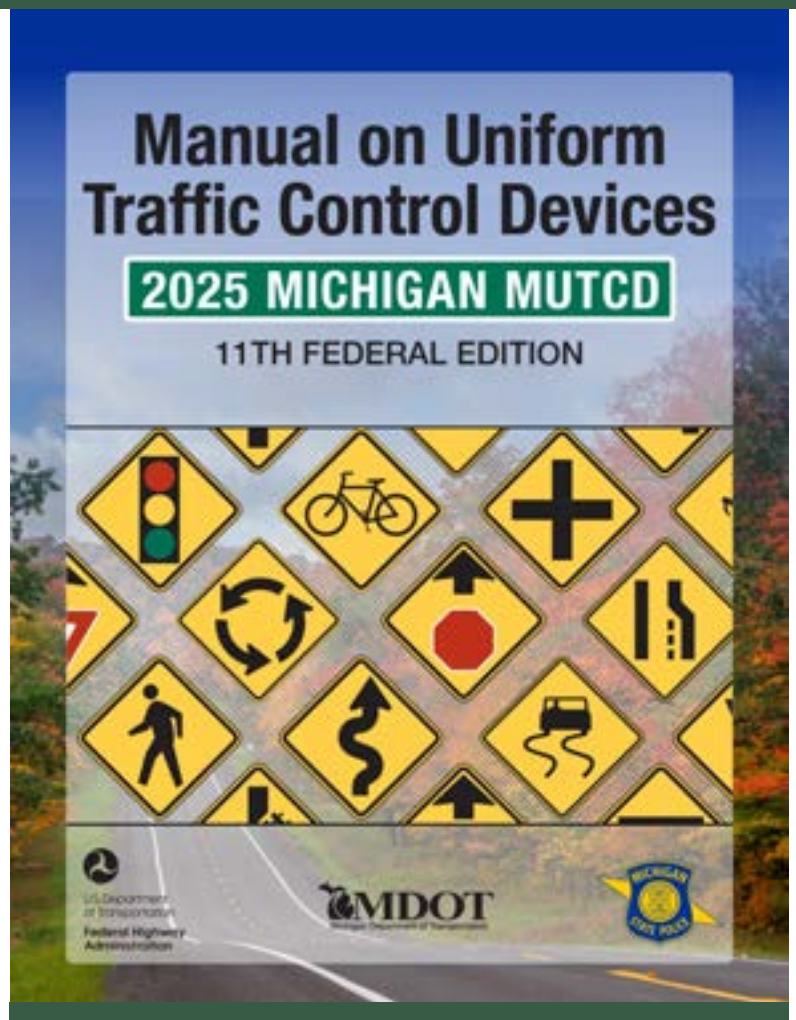
The Federal Highway Administration's 11th Edition Manual on Uniform Traffic Control Devices (MUTCD), first published in 2023, is the first extensive update of the national standard for traffic control devices since 2009. States, including Michigan, are required to have adopted this edition by January 2026. Michigan released its state-specific adoption of the 2025 MUTCD, the Michigan Manual on Uniform Traffic Control Devices (MMUTCD), in mid-January 2026. The manual is available online at <https://mdotjboss.state.mi.us/TSSD/getCategoryDocuments.htm?categoryPrjNumbers=1403854,1403855&category=MMUTCD>.

"It's been 15 years since the previous edition was released," said Garrett Dawe, engineer of traffic and safety at Michigan Department of Transportation (MDOT). "So, a lot has happened in that time."

Dawe underscored the importance of the MUTCD and states' adoption of it, saying "The intent of the MUTCD is to make sure that motorists, when they're driving—no matter on what road, no matter in what state of our union—they're seeing the same traffic control devices". He continued, "That's why it's important for road agencies to adhere to the MUTCD."

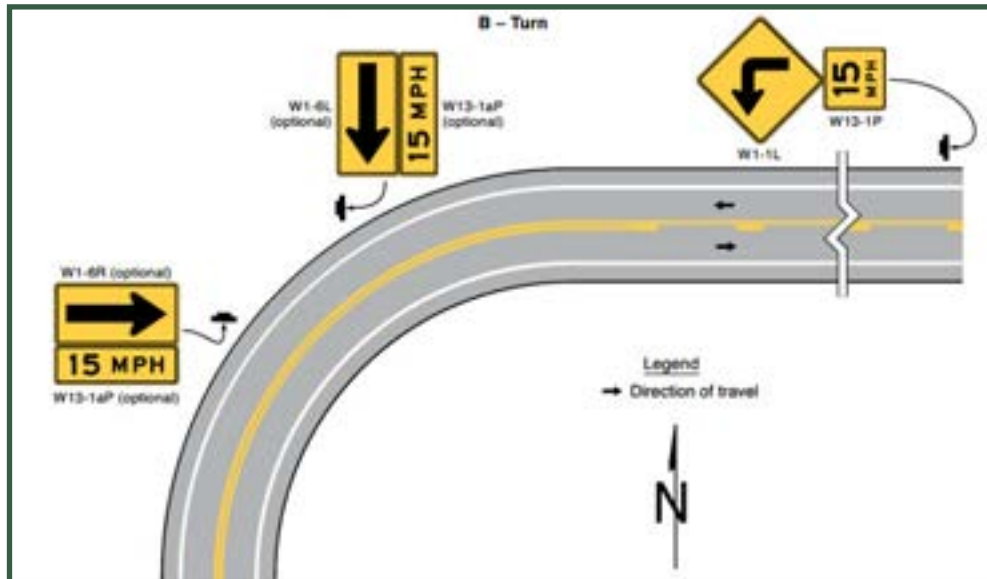
Consistent application of traffic control devices, based on accepted engineering practices and standards, provides uniform roadway signage and messaging and is important for building and maintaining public trust. The new MMUTCD implements updated traffic control standards and guidance to reflect modern roadway conditions, current safety research, and improved sign and pavement markings.

The MMUTCD serves as both a technical and legal guide for Michigan's local road-owning agencies. "In Michigan, there is no tort liability for signage under the state's exceptions to governmental immunity," shared Gayle Cummings, chief executive officer and administrator at the Michigan County Road Commission Self-Insurance Pool (MCRSIP). "But, just because there's no tort liability, we are not relieved of the duty to follow the law." She continued, "There is a ton of thought at every local road agency about what sign goes where; they know they have to get it right."



Key Safety and Signing Updates

Several updates in the 11th edition directly affect how local agencies install and maintain signs and markings in an effort to improve visibility and advance sign warning for drivers and pedestrians. Most changes may be implemented as traffic control devices reach their service life and require replacement with the exception of additional advance weight limit signs (2B.64), advance low-clearance signs (2C.25), low-clearance signs on structures with varying clearances (2C.25), maintenance of minimum retroreflectivity (3A.05), high-profile grade crossings (8B.16), and highway traffic signals at or near grade crossings (8D.09 to 8D.12).



Example of updated warnings for drivers in the new MMUTCD: warning signs for horizontal alignment (Photos: 2025 MMUTCD)

Increased Engineering Judgment for All-way Stops

All-way stop warrants based on crashes have been updated, points out Dawe. “The threshold of crashes that you need to have within a 3-year period is less than it has been in the past,” he noted. The overall change gives local agencies “more flexibility” to use best engineering judgement for all-way stop control installation (see MMUTCD section 2B.13 and 2B.11).

Tim Haagsma, director of Traffic and Safety at Kent County Road Commission, added, “The update puts more emphasis on engineering judgment particularly in the signal warrant area.” He continued, “It was five crashes in 12 months, but now it’s six crashes in 36 months—that’s a very significant change.” The updated manual, explains Haagsma, places greater responsibility on local road-owning agencies to document and justify decisions made. “But, even though the warrant says when you put in an all-way stop, it’s not necessarily a ‘shall’ condition—it goes back to engineering judgment.”

The warrant language, as Dawe further explains, was “softened slightly from ‘shall’ conditions to guidance or recommended language”.

Understanding when and where traffic control devices are required is important because traffic control devices are a communication medium that provide drivers with key, and even critical, information. Thus, the MUTCD emphasizes that traffic control devices must be applied consistently and only in situations where their use has been shown by research and experience to provide a safety benefit. Inconsistent or ineffective traffic control device use comes at the cost of decreased overall safety as drivers disregard or misunderstand the device's intent.

Installing signage is often further complicated by public requests. “We have two or three situations a year where local people want additional signage, and the road commission gets very concerned,” shared Cummings. “If you have too many signs, people are more likely to ignore them, but if you don’t have enough, you are going to have other issues.” She added, “One of the worst thing that you can do is create information overload with excessive signage so that drivers get confused, distracted, or tired of it.”

Cummings cautioned, “There are a lot of things to consider before you place signage on any of the roads: it’s engineering judgment.” The updates reinforce the importance of placing the right sign in the right location.

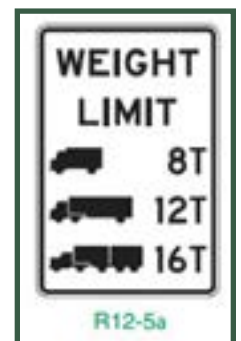
Advanced Warning for Low Clearance and Weight Restrictions

Dawe points out that low-clearance warning signs are now required “anywhere where the vertical clearance is less than 14 feet, 6 inches” (see MMUTCD section 2C.25). Previously, the MMUTCD only required low-clearance warning signs on structures that were 13 feet 6 inches or less. With this low-clearance threshold increase, Dawe says “there’s going to be more of these low-clearance warning signs that need to be installed”.



Not only that, but the updated MMUTCD requires advance warning signs (W12-2) for these low-clearance structures.

Similarly, advance warning signs will now be required ahead of weight restricted roadways and bridges (see MMUTCD section 2B.64). “There are now requirements for weight limit signs to be placed in advance of structures or roadway sections that have those restrictions in order to give vehicles the opportunity to take a different route,” explained Dawe.



The previous edition included the same language but as guidance, so agencies following the guidance will see little impact with the new requirement. Haagsma reflected, “We should have always done these advance warning signs before, but now it is a ‘shall’ condition, and there’s an actual compliance date in the manual for them.”

At railroad grade crossings, the MMUTCD now recommends agencies to evaluate a need for “low ground clearance” or vehicle exclusion signage if vehicles might scrape or drag across the surface due to slope or vertical change in the road (see MMUTCD section 8B.16).



Retroreflectivity Minimums for Required Longitudinal Markings

In terms of minimum pavement marking retroreflectivity, the 11th edition standards seek to ensure that markings remain visible at nighttime. Agencies will now have to “maintain retroreflectivity of longitudinal pavement markings” in specific instances, says Dawe. He noted, “It really is very important that pavement markings are able to be seen by drivers as they’re traversing down roadways.”

Haagsma says that retroreflectivity requirements were a major discussion point among local agencies and the national committee of local representatives set to advise federal MUTCD policy and traffic-related guidance. As a committee member, Haagsma helps to ensure that policy is both achievable and realistic for local agencies. He shared, “Many local agencies said, ‘Please do not make pavement marking retroreflectivity requirements a requirement for every line that’s there.’” The costs associated with that kind of requirement would have been staggering for local agencies, says Haagsma.

According to both Haagsma and Dawe, the new retroreflectivity requirements “only apply to longitudinal pavement marking lines that are required” and for “roadways that have annual daily traffic volumes of 6,000 or more and roadways with speed limits of 35 miles per hour and above” (see MMUTCD section 3A.05). These markings will need to be in compliance for retroreflectivity by September 6, 2026.

So, agencies can still add optional longitudinal pavement markings without those lines being held to the retroreflectivity requirements. “At least a line is better than no line, even if it doesn’t have that level of pavement marking retroreflectivity,” noted Haagsma.

New Devices and Warrants Approved for Use

In addition to signing and marking updates, 11th edition incorporates several traffic control devices previously under interim approval. These devices include pedestrian-actuated rectangular rapid-flashing beacons (RRFBs) at uncontrolled crosswalks (MMUTCD 4L), green-colored pavement markings to indicate bicycle lanes (MMUTCD 3H.06), red-colored pavement markings for newly incorporated transit lanes (MMUTCD 3H.07), and a new traffic signal warrant based on crash history rather than solely relying on traffic volume thresholds (MMUTCD 4C.01 and 4C.08).

The 11th edition also expands pedestrian and bicycle safety provisions to include updated guidance on pedestrian pushbutton placement at signal crossings (MMUTCD 6C.03), revised crosswalk marking patterns (MMUTCD 3C), improved pedestrian accommodations in work zones, and expanded bicycle traffic control devices such as bicycle boxes (MMUTCD 9E.12), two-stage turn boxes (MMUTCD 9B.18), bicycle signal faces (MMUTCD 4H), and a new U.S. Bicycle Route sign design (MMUTCD 9D.04 to 9D.07).

Automated Vehicle Technologies

At present, driver assistance technologies like lane keeping (warning when a vehicle crosses lane boundaries) and lane centering (centering the car within the lane) already rely on the presence of good lane markings.

In preparation for automated vehicle technologies and driving systems, the newly-updated MMUTCD contains considerations for consistency and safety, along with clarification regarding patented and propri-

etary traffic control devices.

“Part 5 now is about connected and automated vehicles,” Dawe said. “Future editions of the MUTCD will continue to expand on the language in Part 5, and probably slowly roll out new requirements, new guidance, and new recommendations.”

Haagsma added that future MUTCD editions will likely work to continue expanding guidance related to automated vehicle systems and roadway communication technologies.

Implementing the MMUTCD

Michigan road-owning agencies should begin using the 2025 MMUTCD upon adoption. Design and Construction Advisories are in the process of being sent out and will provide direction for projects currently in final design or construction, which may continue to apply the 2011 MMUTCD until further updates are posted. Supplemental material from MDOT will also be updated and released as they become available to aid local agencies in compliance with the new updates contained within the newest MMUTCD 11th edition. ■



Photo: Shutterstock

Setting Speeds with Digital Ball Bank Indicators

Nate Anderson, *Technical Writing Intern*
Victoria Kaplewski, *Technical Writer*
Michigan Technological University

A critical component of Michigan’s highway safety program goals is safe advisory speed limits. Advisory speeds provide a recommended speed for all vehicles operating on section of roadway based on its design and operating characteristics. Accurate advisory speeds reduce run-off-road crashes and improve overall safety.

The Michigan Manual on Uniform Traffic Control Devices (MMUTCD) provides guidance on use and placement of advisory speed signs and other curve-related traffic control devices. They are mounted below a warning sign and often used for changes in horizontal alignment; on horizontal curves, the posted speed and sign placement is determined by the curve radius (see MMUTCD Table 2C-5).¹ The MMUTCD emphasizes that advisory speeds “call attention to unexpected [roadway] conditions...and to situations that might not be readily apparent to road users....in the interest of safety and efficient traffic operations”. “In other words,” writes Troy Robillard, engineer at Ayres Associates Inc., “SLOW DOWN.”²

“The laws of physics do apply to advisory speeds,” Robillard explained. He continued, “Taking that 35 [mile per hour] curve too fast could cause you to lose control of your vehicle, causing [a crash].” While engineers try to avoid advisory speeds by designing roads without sharp curves and steep hills, sometimes curves and hills can’t be avoided, according to Robillard. When warning signs are needed, they must accurately reflect roadway conditions and be consistently applied to best assist road users in terms of attention, perception, and reaction.

For setting advisory speeds, local agencies have made use of ball-bank indicators (BBIs). BBIs, which date back to the 1930s, are a curved liquid-filled tube with a moving ball. The indicator measures the impact of force a driver feels when navigating around winding roads.³ By quantifying lateral accelerations



Traditional and digital ball bank indicators (Photos: Courtesy of Kansas LTAP and Iowa LTAP)

experienced by vehicles, BBIs help engineers to establish advisory speeds specific to driving conditions. For example, the MUTCD correlates a BBI reading of 16 degrees with 20 mph or less; 14 degrees with 25 to 30 mph; and 12 degrees with 35 mph or greater.⁴

“A lot of this was very manual,” explained Adam Kirk, safety engineer with the Kentucky Local Technical Assistance Program at the University of Kentucky. “You had somebody out there with a clipboard taking notes.”

Now, however, newer methods of curve assessments offer electronic readouts that reduce human error and improve consistency. Kirk says that digital BBIs improve documentation and efficiency. Digital BBIs allow the user to set deflection angles, set alarms, and record data directly to a computer.⁵ They typically cost over \$1500. With these systems, it’s possible to “collect more data, more quickly, and probably with fewer errors”, notes Kirk. “When you move to digital systems, you also have reviewable data,” he continued. “You can look back and say, ‘Did this meet requirements or not?’”

Kirk also says that digital systems can reduce staffing needs for roadway curve evaluations. “Instead of using two people, you do the evaluations with one person,” he explained.

Some newer methods of setting advisory speeds integrate digital ball-bank systems with GPS data. For example, Texas Department of Transportation (TxDOT) has a “GPS method” that uses a GPS receiver and digital BBI to collect geometric data—curve radius and deflection angle—while driving along the curve. Once collected, the Texas Roadway Analysis and Measurement Software (TRAMS) calculates curve radius and superelevation rate, which can be referenced in the Texas Curve Advisory Speed (TCAS) spreadsheet in order to select advisory speed and traffic control devices. The software, spreadsheet, and an installation manual are available through TxDOT’s Traffic Operations Division.⁶

In addition to digital BBIs, some local agencies are using a free iOS app called “Ballbank”, developed by Christopher Dry at Arizona DOT. The app relies on the iPhone’s built-in GPS and meters to measure superelevation, vehicle roll, and lateral acceleration in order to provide a continuous angle reading and speed, maximum smooth angle, average speed, and lateral g force for a curve. These data points are correlated to video recordings of the curve (see <https://apps.apple.com/us/app/ballbank/id1097362070>).

Having accurate curve assessment data can justify local agencies’ decisions in posting advisory speeds. “The advisory speeds are meant to accommodate the majority of road users,” Kirk said, adding that they especially help drivers who are unfamiliar with the roadway or are operating a vehicle in poor weather conditions. Roadway geometry, particularly curve radius, is a primary factor influencing advisory decisions on local roads.

Two considerations that local agencies need to weigh before adopting digital systems, apps, or GPS integrations are the costs of implementing the technology and training. “When you move from a very traditional process to something digital, your staff has to be comfortable using the technology and has to understand how to interpret the data,” noted Kirk. Training is important for gathering accurate data, he says.

“I think the biggest consideration for curve assessments is making sure that you’re applying the process consistently and documenting your decisions,” reflected Kirk.

Agencies can make use of MDOT's Advisory Curve Speed Study form, available at <https://mdotjboss.state.mi.us/webforms/GetDocument.htm?fileName=1518.pdf>, which provides a documentation tool for recording ball-bank data and setting advisory speed limits. A Michigan-specific FAQ/guidance document is available at <https://www.michigan.gov/msp/divisions/spec-ops/inside-sod/traffic-crash-reconstruction-unit/establishing-realistic-speed-limits>. ■

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Photo: CTT Archive

Preserving Pavements While Protecting Commerce: Seasonal Weight Restrictions

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

Seasonal weight restrictions are an important tool used by Michigan road agencies to protect pavement structures throughout the spring freeze-thaw cycles. In the late fall or early winter, any moisture in a pavement structure will freeze, starting from the surface down. As the frost depth increases, the pavement becomes stronger, so much so that some states allow for heavier loads on selected roads.

Then, as average air temperatures increase in the spring, the pavement will undergo frequent freeze-thaw episodes as temperatures “fluctuate above and below freezing”.¹ Freeze-thaw cycles generate melting ice beneath the pavement surface. This ice melt, or water, becomes trapped between the upper pavement layers and frozen lower layers, causing the soil underneath the road to become more strained with normal load passes.

As a general rule of thumb, the fourth power law, based on AASHTO road test findings, suggests that, when a load is doubled, pavement damage may be 16 times worse. That damage can be even more substantial for thaw-weakened pavement. One study that relied on image-based modelling found that deformation and damage of thaw-weakened pavement was “particularly considerable with high load”.² Such damage may include cracking, frost boils, potholes, and other damage to the pavement, all of which make the road potentially less safe to drive. The most cost-effective way for local and state agencies to avoid pavement damage due to freeze-thaw cycles is by instituting weight limits for larger, heavy-weight

trucks. These weight limits rely on tools like weather forecasts, frost depth measurements, and physical condition assessments to protect roadway infrastructure.

Balancing Preservation and Economics in SWR Policy

Public and private economic interests intersect with the applications of roadway infrastructure. For example, industries like logging, construction, and agriculture depend on transportation of large quantities of goods. Weight-limit-related disruptions to the road network increase the cost of transportation associated with these goods, and those cost increases are often passed on to the consumer. They even prompt truck drivers to limit the jobs they accept; for example, those carrying timber will typically only choose Class-A road jobs to avoid additional costs and timing delays when seasonal weight restrictions go into effect.³ Ultimately, any damage to roadways will further increase costs to industries, agricultural producers, and the motoring public who rely on road networks, and these higher costs are passed on to consumers.

To balance these economic interests with a road-owning agency's need to protect and preserve pavements and manage network assets with limited funds, Michigan law allows weight reductions of 25 percent on concrete pavements or pavements with a concrete base and up to 35 percent on all other types of roads during thawing periods.⁴ These policies help to protect roadway infrastructure while still allowing goods to be transported.

This tradeoff highlights the importance of accurate timing. Restrictions that are implemented too late can result in pavement damage. Conversely, overly conservative restrictions can unnecessarily constrain local and regional economic activity. Therefore, optimizing these elements is critical for local agencies during the freeze-thaw period.

CTT Thawcaster Tool

The way to ascertain thaw-compromised pavement is with tools like frost depth measurements, weather forecasting, and visual conditions.

“The problem,” said Pete Torola, a research engineer at the Center for Technology and Training (CTT), “has been that the amount of moisture in the ground is very difficult to model at a network-wide level and originally the available weather data was airport-based from the National Weather Service.” He pointed out, “That weather data is designed for aviation, not pavement conditions.”

So, the Center for Technology & Training (CTT) developed Thawcaster, a tool to help local agencies in making data-driven decisions regarding seasonal weight restrictions. Thawcaster converts air temperature forecasts into pavement temperature estimates.

Thawcaster provides recommended dates for when restrictions should be applied based on thawing and pavement thickness. It relies on multiple weather sources that model virtual weather stations that dot the state of Michigan in an approximate 16-mile grid pattern. These data are evaluated using Thawcaster's included models.

Thawcaster incorporates six freeze and five thaw models. These models include the Federal Highway Administration (FHWA) model, which is based on actual national data collected by the University of

Washington about forty years ago; some newer models developed by the Michigan DOT and university researchers that are based on clay soils and sand soils and account for freeze variants; and the Minnesota model, which is similar to the FHWA model but accounts for changing sun angle in the spring.

“Some years, the freeze/thaw is modelled closely in Thawcaster,” shared Torola. “But still, institutional knowledge is important because agencies know which roads thaw first and which thaw last.” He continued, “North-south roads get more sun, so they thaw earlier than east-west shaded roads.”

While Thawcaster provides recommended dates for when restrictions should be applied based on thawing and pavement thickness, Torola cautions that it does not determine when to lift restrictions. “It only specifies when thawing is complete,” he explained.

Even with the tool, engineering judgment is a critical part of the process. “You have to interpret the outputs to decide if they make sense,” said Torola. “You still need to go out and look at the road and see how it is performing; for the most part, you rely on visual observation.”

Most agencies will use Thawcaster and engineering expertise to establish county-wide seasonal weight restrictions. “Restrictions are set at an agency level,” explained Torola. “It would be time-consuming and costly to collect and analyze data and apply restrictions selectively by road.” That being said, some agencies with large variances between different parts of the county have split restrictions. For example, Dickinson County Road Commission has restrictions set for the northern part of the county and different restrictions set for the southern part. Other counties may prefer to coordinate restrictions regionally. For instance, Keweenaw, Houghton, Baraga, and Ontonagon counties usually try to apply and lift restrictions at the same time.

Local agencies can access Thawcaster through the CTT portal and create a free account at thawcaster.cttportal.com. Thawcaster can be used on a computer or phone since it is web-based.

While it was “meant for local agencies”, the Michigan Department of Transportation has also adopted its use, according to Torola. “They use Thawcaster exclusively for seasonal modeling and verify the data using their Road Weather Information System stations and frost tubes,” he noted.

Why Thawcaster

Seasonal weight restrictions encompass a complex balance of engineering, asset management, and economics. Compared to traditional tools for determining weight restrictions, like RWIS sensors or NOAA forecasts, Thawcaster stands out by integrating predictive modeling with minimal user input. Based on geographic information input by the user, Thawcaster generates outputs such as frost depth, thaw progression, temperature, allowing agencies to make informed, data-driven decisions. ■

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Pruning with Purpose: How Road Agencies Can Protect Trees and Infrastructure in the Right-of-Way

Sarah Woodworth, Technical Writing Intern
Center for Technology & Training

Any driver who has missed a stop sign obscured by an overhanging branch, or a pedestrian who has stubbed a toe on a sidewalk heaved by a root, has experienced firsthand what happens when tree management in the right-of-way falls behind.

As such, road-owning agencies are tasked with maintaining trees in the right of way. Two of the most consequential decisions they make are how and when to trim trees in the right of way. A cut made incorrectly today does not fix the problem, it can accelerate decline and turn what should have been a routine trim into an expensive removal a few years down the road.

To the untrained, practices like topping the tree (cutting back large branches or entire top of tree to stubs), making flush cuts against the trunk, leaving stubs that are too long, and over-pruning or removing too much foliage might yield in cleaner looks or more conservative cuts.¹ But, in reality, these practices damage the tree: they produce weak sprouts that break easily; they remove the branch collar, which is pivotal for a tree's ability to self-heal; they leave dry, brittle stubs that are ideal environments for fungi and insects; and they strip the tree of leaves, which is the site of photosynthesis and food production for the tree.¹

The damage from a bad or poorly-timed pruning cut can be invisible for years, progressing quietly inside a trunk before a branch drops onto a roadway without warning.

Photo: CTT Archive



Bert Cregg, professor and extension specialist in horticulture and forestry at Michigan State University (MSU), has spent his career studying trees in landscapes and urban environments. His work has included collaboration with the Michigan Department of Transportation (MDOT) on roadside vegetation along I-696 in the Detroit metro area. From Cregg’s perspective, the root of the problem leading to bad or poorly-timed pruning is “not having the time or the resources to do it the right way, or perhaps the training”.

How to Prune Properly: The Cut that Counts

The most common pruning mistake Cregg sees along roadsides is what arborists call a stub cut: removing a branch partway rather than taking it all the way back to its natural junction with the trunk or a larger limb. “When you cut a branch and leave this dead end,” he said, “that’s improper pruning because that’s a place where the tree does not heal properly.”

Worse yet, Cregg identified the use of rotary mowers or bush hogs turned on their side to clear vegetation along roadsides as especially problematic. “They cause all kinds of wounds and damage that are difficult for trees to heal from,” he explained. While this approach is faster and cheaper in the short run, it inflicts random, ragged cuts that disregards the self-healing anatomy of trees.

The correct approach is branch collar pruning, which removes the branch just outside the slightly swollen ring of tissue where it meets the trunk. That collar tissue contains the cells that help a wound to callus and close. Leave it intact, and the tree has a fighting chance. Remove it or leave a stub beyond it, and the wound may never fully seal, opening a pathway for decay fungi to work inward over time.

For larger limbs, the three-cut method prevents another common problem: bark ripping. If a heavy branch is taken off in a single cut at the trunk, the weight of the falling branch can tear a strip of bark downward along the trunk of the tree before the cut is complete. This kind of wound can be far larger than the branch itself. The three-cut method removes the bulk of the branch weight first with an undercut and a top cut a few inches out from the trunk, then finishes with a clean cut at the branch collar. Landscaping contractor Roger Cook demonstrates the three-cut method and branch collar pruning in an Ask This Old House video (https://www.youtube.com/watch?v=7JgvA_0BpBw). The U.S. Forest Service publishes an illustrated guide, available at fs.usda.gov/nrs/pubs/na/NA-FR-01-95-Rev-2012.pdf, that overviews these techniques, which road agency staff may find useful for training purposes.

Timing Matters, Especially for Oaks

Aside from technique, timing is critical in right-of-way tree management. As a general rule, pruning is best done when trees are dormant. The reasons are both practical and biological. “It’s easier to see what’s



Example of damage to a tree (see limbs) cut by rotary mower (Photos: Courtesy of Pete Torola)

going on with the tree when leaves are down,” Cregg explained, adding that it is simpler to assess branch structure and identify the right cuts. Dormant pruning reduces sap bleeding, minimizes stress-induced sprouting, and lowers the risk of disease transmission since insects and organisms aren’t as active in the winter months.

That last point carries particular urgency for oaks. Oak wilt is a fungal disease spread by a group of beetles attracted to fresh pruning wounds. In Michigan, the highest-risk window runs roughly from May through July or August, when the beetles are most active. “Sometimes within minutes of a wound, they will find those wounds, and ... new infections for oak wilt will start,” Cregg shared. If crews must prune oaks during the active growing season for safety reasons, Cregg recommends covering the cut surface immediately with wound sealant. It’s the only time he recommends wound paint, which can interfere with the tree’s own healing process.

One other guideline for dormant-season pruning is to cut maples and birches earlier in the dormant season. Maples and birches are prone to heavy sap flow in the late winter when temperatures range from freezing at night to warm during the day. Crews working in late February or early March on these species may find sap running freely down the trunk after a cut. For maples and birches, pruning earlier in the dormant season is preferable. For most other species, any time the tree is fully dormant is generally acceptable.

Trim or Remove? A Cost-Benefit Question

One of the most challenging decisions regarding tree maintenance that road agency staff face is whether a tree in decline should continue to be trimmed or whether removal is the more responsible long-term choice. Cregg says the answer to that question lies in a cost-benefit analysis. “When the tree has become more of a maintenance issue than anything else,” he explained, “it becomes a cost-benefit sort of analysis with two components: the condition of the tree itself and the target.”

Regarding the tree’s condition, arborists trained in Tree Risk Assessment Qualification, or TRAQ, (see <https://www.isa-arbor.com/Credentials/Types-of-Credentials/ISA-Tree-Risk-Assessment-Qualification>) can evaluate crown vigor, the presence of dieback, fungal conks on the bark or trunk base, and other indicators of internal decay. “Little details like mushrooms around the base of a tree can be indicative of a more significant problem, like a rotting root structure,” Cregg elaborated.

In terms of target, one would ask: what would be affected if the tree failed? For example, a declining tree in an open field carries a very low risk. “If you’ve got a similar declining tree next to an intersection or a busy roadway, then that’s a different story,” noted Cregg. Road agencies do not need a TRAQ-certified arborist to recognize an obviously failing tree but, when a tree’s condition is less clear, bringing in a qualified professional before problems escalate is a smart investment.

Roadside Trees: Surviving Under Stress

Roadside trees grow in a challenging environment. “The plants are challenged because of the below-ground environment, which consists of compacted soils, roadside pollutants, and road salt,” said Cregg.

“And then you’ve got the above-ground environment, with elevated temperatures, reflected heat load, and more pollutants that are coming off the roadways.”

Trees under that kind of ongoing stress are already working harder to survive. Improper pruning adds to that burden. This is part of why Cregg emphasizes getting the basics right: proper cuts, appropriate timing, and informed decisions about when removal is the better option.

However, he points out that the best time to minimize future trimming conflicts is before a tree goes in the ground. While the hot and dry conditions of roadsides are a consideration for roadside tree survival, Cregg asserts that the more limiting factor is soil compaction, which reduces the air space that roots need. “Trees that have evolved and adapted to flooding or bottomland conditions actually over time have been shown to be the better selections for roadsides,” Cregg said. These kinds of trees, as opposed to drought-tolerant species, have evolved to function in compacted, low-oxygen soils.

Some species that have good performance in urban and roadside conditions include London plane trees, honey locusts, hackberry, and Kentucky coffee tree. Conifers, on the other hand, prefer well-drained, aerated soils, and are typically poor candidates for roadside planting near pavement.

As part of an MDOT project, MSU graduate student Maddie Dubelko developed a searchable online database for roadside plant selection that road agencies can use as a planning resource. The MSU Roadside Plant Selection Database is available at <https://tinyurl.com/MDOT-Plant-Manual>.

Hiring Tree Trimming Contractors

When road agencies need to contract out tree trimming work, Cregg says agencies should look for contractors who have ISA certification. The International Society of Arboriculture certifies arborists and maintains a searchable directory at <https://certificates.directory.isa-arbor.com/>. ISA-certified arborists are trained under ANSI A300 pruning standards, the professional baseline for what proper pruning looks like.

Additionally, Cregg advises looking at whether a company is active in its local ISA chapter. “The better companies are not just going to these things, but actually leading some of these trainings,” he said. He also emphasized that low bid price should not be the deciding factor. A crew without adequate training, proper personal protective equipment, or safe practices around chainsaws and aerial lifts creates liability risk, not savings. “You get what you pay for, just like everything else,” Cregg said. “Look past the dollar signs and really look at the professionalism of these people.”

For agencies that want to build in-house capacity for safer tree work, Indiana LTAP has released their Arborist Skills Series at <https://www.youtube.com/playlist?list=PLsU8EbLVTPAV6Moz0ueo4KIkkYQuP3nxV>. The free video series covers job briefings, personal protective equipment, chainsaw maintenance and sharpening, and aerial lift operations.

Worth the Effort

Trees in the right-of-way are also a genuinely contested resource. Engineers often want them cleared from the clear zone altogether, since a mature trunk is a fixed object that can turn a survivable run-off-road crash into a fatal one.² Maintenance crews frequently want the canopy opened up so sunlight can dry

pavement faster each spring.² However, research has documented benefits ranging from noise abatement and stormwater management to air quality. “There’s a huge amount of literature out there on things you wouldn’t even think about,” added Cregg. “Having diverse vegetation along landscapes reduces highway hypnosis and improves driver concentration.”

“Try to be advocates for the roadside vegetation,” he reflected. “Make sure that your staff have the knowledge and the resources to do things properly because roadside trees are a huge, valuable resource and need to be protected.” ■

RESOURCES

1. Atlanta Arbor Tree Care. 7 Pruning Mistakes That Slowly Kill Your Trees. 13 July 2026. Available at <https://www.atlantaarbor.com/blog/pruning-mistakes/>.
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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.

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.

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Michigan's Local Technical Assistance Program

Center for Technology & Training
Michigan Technological University
309 Dillman Hall
1400 Townsend Dr.
Houghton, MI 49931-1295

Telephone..... 906-487-2102
Fax..... 906-487-3409
E-mail..... ctt@mtu.edu
Website..... MichiganLTAP.org

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Michigan LTAP Staff

Administration

Tim Colling, PhD, PE..... Director
Christine Codere..... Sr. Support Specialist
Cynthia Elder..... Sr. Events Specialist
Noah Rule..... Marketing Specialist
Amy Spahn, MS..... Center Coordinator
Lori Krings, MSW..... Business & Training Support Specialist

Writing

Victoria Kaplewski, MS..... Editor, Technical Writer
Nate Anderson..... General/Technical Writing Intern
Sarah Woodworth..... General/Technical Writing Intern

Engineering

Chris Gilbertson, PhD, PE..... Associate Director
Pete Torola..... Research Engineer II
Ingrid Sandberg, MS, PE..... Research Engineer
Daryl Gotham, PE..... Senior Research Engineer

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.

Federal Highway Administration

TBA

Local Program Engineer, FHWA

Michigan Department of Transportation

Bruce Kadzban, PE 517-449-8689

Local Agency Programs, MDOT

County Road Association of Michigan

Larry W. Brown, PE 616-813-5538 lbrown@alleganroads.org

Allegan County Road Commission

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