The Bridge

A quarterly newsletter from Michigan's Local Technical Assistance Program
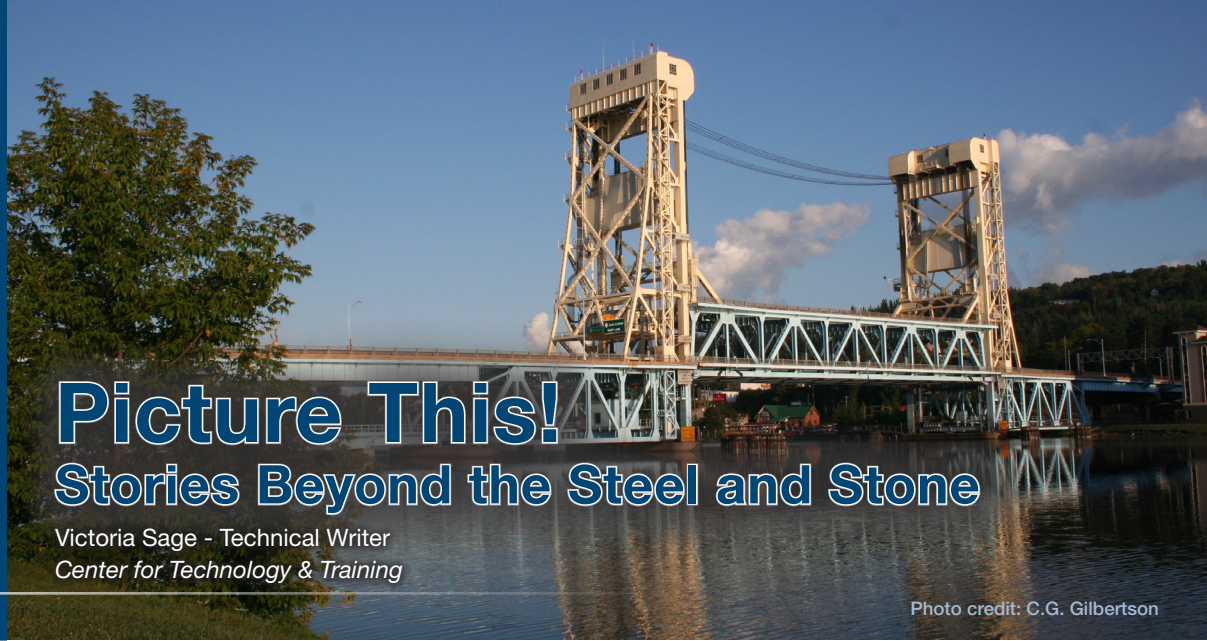
Photos and videos can powerfully connect people from "distant places"… they illustrate the stories behind construction projects and they confirm the documented work done on a project.

Picture This!
Stories Beyond the Steel and Stone

Victoria Sage - Technical Writer
Center for Technology & Training

Photo credit: C.G. Gilbertson

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Michigan's Local Technical Assistance Program

When five o'clock rush-hour motorists come to a halt due to bright orange traffic barrier barrels infringing on the roadway, motorists become impatient and irritable. The public perceives road construction as an annoyance, so much so that everyday conversations sometimes include disparaging jokes about road work. By communicating the stories of our projects better, we can combat the view of construction as an annoyance and help people understand the depth and breadth of our construction feats.

"Construction projects can be frustrating to the motoring public," explained Maura Lamoreaux, who is the communications manager at Kent County Road Commission (KCRC). "So, sharing through images is a great way to tell our story." Images can share, preserve, and validate construction stories; but, the right images can do more: they link agencies to their communities and engaging the community in the complexities of civil engineering.

Seeing Stories and Preserving Memories

While photographing road work is still an uncommon practice, Bruce Deter, a concrete plant inspector for the 1957-1959 Portage Lake Lift Bridge construction, received an avant-garde assignment from the Michigan Department of Transportation (MDOT) district engineer. When the concrete plant was closed, Deter's camera was to capture images of pilings, lift cables, balance chains, and counterweights through its lens.[1]

In the early 1960s, a similar record was being made of the International Bridge in Sault Ste. Marie. "Building the bridge was a big deal for this little town back then," explained Karl Hansen, bridge engineer for the International Bridge Administration (IBA). "There were a lot of people camped out watching the construction that was going on." One person who came to watch was a local photographer, Carl Materna, who caught the construction story in a series of photos.

These image archives from the International Bridge and the Portage Lake Lift Bridge projects allowed the public to see these bridge-building projects up close. "Sometimes people just like to see," reflected Lamoreaux, "…and, sometimes, they don't get a chance to see." To give people that chance, Lamoreaux has helped launch a series of web pages featuring mini-galleries of

Construction of the Portage Lake Lift Bridge, Houghton/Hancock, Michigan. Photographer unknown. Photo courtesy of Michigan Tech Archives.

"A bridge is more than a thing of steel and stone: it is a fulfillment of human dreams to link together distant places." – Dr. David B. Steinman

Letter from the Editor

When the Michigan Transportation Asset Management Council (TAMC) released their new website earlier this year, their former employee Elisha DeFrain raved about the site. "The new website," she said, "creates a greater ease in accessing valuable information regarding TAMC activities, the practice of asset management, and data reporting...[helping to] spread the word about sound asset management principles." Elisha's excitement comes from her new-found ability to access critical information about transportation infrastructure. She's finally 'in the loop'—by that access, she's being involved in asset management and kept up to date on asset management details.

That's what communication is all about: it's the sharing of knowledge and information with others in your community. The communication breaks down, according the playwright George Bernard Shaw, when we are under the "illusion that [communication] has taken place." That's something we've all probably experienced. I know I have! Sometimes, we think we've communicated well; but then, others don't understand us. Why? Usually, it's because some detail just didn't get communicated even though we were under an illusion of communicating every last detail in the clearest possible way. In those instances, the message becomes clearer when we take the time to explain again or to show what we mean or, better yet, to open up a dialogue.

This issue of *The Bridge* looks at ways that local agencies can communicate effectively when words aren't enough. "Tell me and I'll forget," said Benjamin Franklin, but "show me and I might remember. Involve me and I will understand." Three articles in this issue present communication technologies, show our construction projects to the public, and encourage involvement. By reaching out to the public through project photos, through online-accessible data and through social media announcements, the public can—in a very unique way—actively participate in a project's story. They can experience a project vicariously through images and they can leverage online-accessible data to advance community initiatives. But, more so, the public gains the ability to voice their concerns and to make decisions that ultimately impact the construction process itself—by adapting their commute routes or by anticipating drive times better.

Maximizing upon different communication media can also make road work exciting. In this issue, we also see how Kalkaska County Road Commission used paint to interest high school students in working with road commission machinery. Making our work fascinating to students is important for building our transportation engineering workforce amidst our aging infrastructure.

Finally, we address strategies that Michigan can use to make our communities safer. By fostering relationships between our agencies and emergency response personnel, we can secure and stabilize a crisis scene quickly and efficiently. MDOT offers multi-disciplinary trainings by request to bolster our emergency response.

Let's look for ways to communicate better and, in so doing, create a better Michigan community and transportation network.

Victoria

TAMC Website 2.0
Dave Jennett – TAMC-IRT Help Desk/Training Coordinator
John Egelhaaf – Council Member—Michigan Association of Regions

By asset management, agencies strive to keep good roads in good condition. It's a form of stewardship for a community's transportation resources, which require cost-effective solutions that align with the unique needs of local communities as well as the broader regional or statewide community. Practicing good asset management, then, means addressing the existing road conditions in relation to community needs. Those practices can vary widely, based on an agency's circumstances, from maintaining the condition of good roads using capital preventive maintenance (CPM) treatments to financing reconstruction projects that are necessary to keep traffic flowing.

Good asset management relies on what agencies do with the road condition data they collect. Routinely, Michigan's road-owning agencies have been collecting and reporting critical condition data on their Federal-aid network and sometimes, based on individual agency discretion, on their non-Federal-aid network. Getting this data into the hands of elected officials and the public generates a greater awareness of the funding challenges associated with managing transportation resources. These data can also be analyzed in an asset management tool like Roadsoft to generate models of a pavement's service life and the impacts of CPM treatments—critical information for gaining project support.

What can agencies do to connect their elected officials and the general public with this data and, ultimately, secure the support for taking an asset management approach to their transportation network?

The Information Age of Transportation Asset Management

In the digital age, people can fact check everything; so, just telling the local community to buy into a project won't suffice. People not only want to see summary statistics; they expect to see data. To help agencies gain community support, the Michigan Transportation Asset Management Council (TAMC) unveiled a new website that improves communication of condition data. Information seekers can access interactive maps that show road and bridge condition ratings as well as traffic counts. A dashboard feature allows users to plot data in chart or table form, which is ideal for illustrating a community's asset management circumstances. The new website also provides important information to Michigan residents: who their council representatives are, how to contact their representatives, and where they can attend upcoming TAMC meetings.

Agencies can readily access the data they've collected by using the TAMC's new website. Graphical representations created by the dashboard can be integrated into agencies' own websites. Charts and tables can also be exported for presentation, proposal, or report purposes. Most importantly, linking to the TAMC website can better the stewardship of transportation resources by connecting elected officials and the general public with critical asset management data. While agencies that have similar demographics and budgets can be facing vastly different variables like past practices and soil conditions, the new website's easy access to data resources can provide some initial insight for understanding road networks conditions. ∎

Getting Youth Excited about Road Commissions

When a road commission offered a snow plow as a blank canvas to high school art students, the students were excited to work with the road commission's machinery. And, Kalkaska County Road Commission (CRC) even won an award in the process.

For the 2015 Christmas in Kalkaska Lighted Parade, the employees at Kalkaska CRC decided to paint one of their plows and entered it into the parade. A few months later, they were again inspired to approach Kalkaska High School art students about re-painting the plow for the National Trout Festival's Grand Royale Parade in April. While Kalkaska CRC won the "Most Original" award for their parade entry, Rebecca Hilmert, administrative assistant for the road commission said that the honor was "due to the students' creativity and commitment to painting our plow."

It's a form of functional artwork, that is, art in our everyday lives that serves some useful purpose. But, the power of Kalkaska CRC's functional artwork is how it involved local kids in road commission activities. ■

Photo credit: Kalkaska CRC

Photo credit: Kalkaska CRC

Top: Photo of the road commission's snow plow painted by Kalkaska High School art students for the National Trout Festival's Grand Royale Parade, April 2016

Left : The inspiration for student art on a Kalkaska plow: a plow painted by Kalkaska CRC employees for the Christmas in Kalkaska Lighted Parade.

Tips for Preventing Heat Stress

Excerpted from "Protecting Workers from Effects of Heat"—The Bridge 24.1 adaptation of Technology Exchange 23.2 newsletter published by Louisiana Transportation Resource Center

Preventive strategies are the best way to avoid workplace-related injuries and illnesses, like heat stress. Louisiana Transportation Resource Center provides seven tips, below, for preventing heat stress. But, further, communicating to employees the symptoms of heat stress can help ensure fast medical attention when heat stress does occur.

Acclimatize workers by exposing them to work in a hot environment for progressively longer periods.

Replace fluids by providing cool water or any cool liquid (except alcoholic and caffeinated beverages) to workers and encourage them to drink small amounts frequently, e.g., one cup every 20 minutes. Place ample supplies of water close to the work area.

Reduce the physical demands by reducing physical exertion such as excessive lifting, climbing, or digging. Use relief workers or assign extra workers, and minimize overexertion.

Provide recovery areas such as air-conditioned enclosures and rooms and provide intermittent rest periods with water breaks.

Wear reflective clothing as loosely as possible.

Reschedule hot jobs for the cooler part of the day; schedule routine maintenance and repair work in hot areas for the cooler seasons of the year.

Monitor workers who are at risk of heat stress, such as those wearing semi-permeable or impermeable clothing when the temperature exceeds 70°F, while working at high energy levels. Personal monitoring can be done by checking the heart rate, recovery heart rate, and oral temperature. ■

Types of Heat Stress: Signs & Symptoms	Heat Stroke	Heat Exhaustion	Heat Cramps	Heat Rash
	Confusion; irrational behavior; loss of consciousness; convulsions; a lack of sweating (usually); hot, dry skin; and an abnormally high body temperature.	Headache, nausea, dizziness, weakness, thirst, giddiness, fainting or heat collapse	Muscular pains or spasms – usually in abdomen, arms or legs.	Cluster of pimples or small blisters; usually on the neck and upper chest, in the groin, under the breasts, and in elbow creases.

photos that tell the stories of KCRC's major projects. The photos are generating a "nice archive" for KCRC. But, more importantly, image archives act as lasting 'documents' of the construction stories and record the procedures used during those projects.

Transportation-related projects have long used a paper trail of project diaries, plans, specification, submittals, and correspondence to remember the 'as-built' narrative. Photographic and videographic records—or 'photodocumentation'—can be especially helpful for reconstructing project memories. Attorney-at-Law Richard Wilson quips that "a picture is worth a thousand words." While having good documentation can facilitate dispute resolution as well as review and analysis of a project in question, Wilson notes that "photos and videos can also be very helpful in avoiding disputes all together." In fact, he encourages his clients to "take as many photos as they can." To document through images is to link together the times, places, and peoples affected by transportation construction projects.

Bridging Agencies and Communities

Images can span beyond preserving and validating stories. They can share the challenges and excitement of transportation construction. That is important for engaging the community—especially young people—as we face increasing demands for civil engineers who can manage aging infrastructure and tackle the network's evolving issues.

Lamoreaux engages the community by gathering photos from KCRC's project engineers for their project web pages and social media sites. Using those photos gives the engineers "a way to showcase what they've been working on," said Lamoreaux. She knows, by monitoring the web sites with analytics, that the public are viewing the images.

The IBA's images also link their engineers with the public. When the IBA reconstructed their toll plaza in 2014, they leveraged their "existing infrastructure—high res cameras— and adjusted the frames per second and the vantage points in order to capture time lapse video," according to Peter Petäinen, the IBA's general manager. That compressed view of their newest project, which serves as a tool for contractors and MDOT evaluation, is featured on www.saultbridge.com. There, the public can also find still images, archives of rare photos from the bridge's construction, and a video documentary—*Crossing Conversations*— produced by Petäinen and MDOT. Hansen emphasizes their rationale for posting these images: "We wanted to share [them] with the community and whoever wanted to see them."

Sharing innovative video footage of road construction with the public is also something that Jim Iwanicki, engineering manager for Marquette County Road Commission, does. When Iwanicki was working on a $44-million project near Marquette, the contractors flew an unmanned aerial vehicle (UAV) equipped with a camera along the project site.[2] The footage

was "really interesting," noted Iwanicki, "especially being able to see everything from a bird's eye view." Since then, Iwanicki has used the video in presentations to other agencies and the local community.

While some agencies have the ability to use professional-grade video equipment or the opportunity to try UAV-mounted cameras, even the commonplace cell phone provides many possibilities for documenting projects and connecting people. At KCRC, Lamoreaux says that "most of the project engineers are using their iPhones to take the pictures." Gathering images and sharing them with the public is "really a team effort" for KCRC.

Images: More than Steel and Stone

Images show the motoring public what's going on behind the orange traffic barrier barrels, increase their awareness of engineering accomplishments, and involve them in the story itself. For example, the IBA's photo archive shows the transformation of 114,000 tons of concrete and 11,000 tons of structural steel into a two-span truss arch bridge with a suspended deck, and documents the stories behind that transformation. The images preserve a story of "partnerships and human inspiration," according to Petäinen.

If we can say that 'partnerships and human inspiration' cement our entire transportation infrastructure, then the photos from Deter, Materna, Lamoreaux's team, and Iwanicki are no longer merely images. They provide transportation agencies with a chance to engage the motoring public in the narrative of our engineering feats. ■
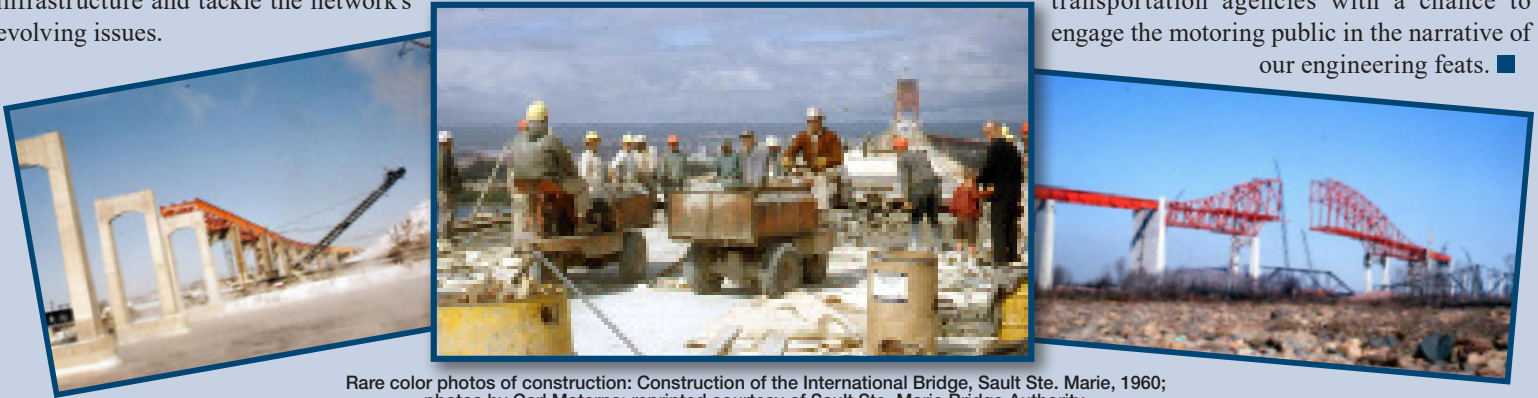

Rare color photos of construction: Construction of the International Bridge, Sault Ste. Marie, 1960; photos by Carl Materna; reprinted courtesy of Sault Ste. Marie Bridge Authority.

1. John Michels, retired from MDOT, related the story of the photodocumentation of Portage Lake Lift Bridge's construction to the author in personal correspondence.
2. Follow Colin Brooks' research on using UAVs for gathering condition assessment footage at http://www.mtri.org/unpaved/.

Resources

Your Cell Phone—A Photodocumentation Power Tool
Use an app like Camera 360 (Android), Vignette (Android), or EvidenceCam (Android and iOS) for adding information to your photos. Or, produce time lapse video with Lapse It (Android and iOS), TimeLapse (iOS), TimeLapse Pro (iOS), or O Snap! Time Lapse & Stop Motion (iOS). *Manage your image archives* easily, too, with Adobe Lightroom (Windows and Mac) or with an open-source alternative, digiKam (Windows and Mac). – VS
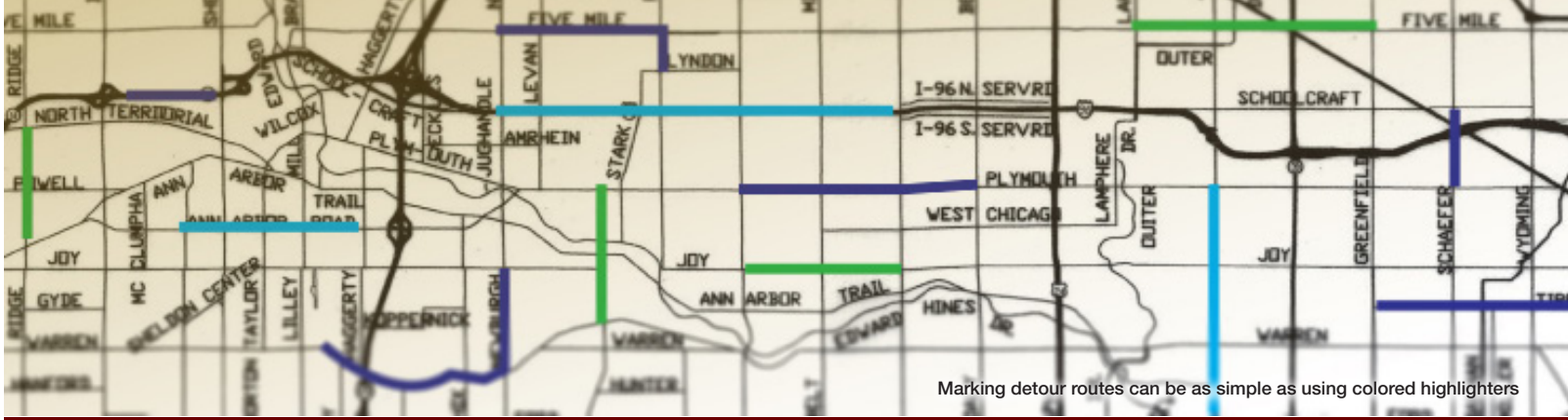
Marking detour routes can be as simple as using colored highlighters

Making Construction Information Accessible

Cassandra Matchinski – Technical Writer
Center for Technology & Training

As construction season approaches, are you sharing your construction project schedule with the public? Whether it's on the agency website, or through social media sites like Facebook and Twitter, sharing construction dates, project details, and detour routes online is a great way to spread information and connect with constituents. Drivers who have easy access to that information can better plan their daily commutes and summer travels, potentially avoiding bottlenecks at construction zones. Better informed drivers can also mean increased safety for construction crews; there were over 4,500 crashes in Michigan construction zones in 2014. Even with the most effective safety practices in place, road workers have no control over driver behavior. Informing drivers of construction zones before they get behind the wheel may help to decrease the number of unaware and distracted drivers on the road.

Social Media Sites Net Participation

Andrea Herman, finance and business manager at Wexford County Road Commission, says that Facebook is their primary communication tool. Their Facebook page, which can be accessed from the homepage of the Wexford CRC website, typically has a new post every day detailing the work being done that day. "We try to put out information we think our followers would like to know, and information they might be trying to find," says Herman. That information ranges from tips for driving in poor conditions, to listing sections of road that are being graded or patched that day. Alerts about work locations help drivers to watch for road workers and inform homeowners of improvements being made near them.

Gaining Transparency through the Web

While Facebook can be useful for posting updates as they happen, a dedicated page on the agency website can offer a more comprehensive solution that requires less frequent updates. This space can host maps of upcoming and current projects, and can be linked to the agency budget. The Macomb County Department of Roads offers a Road Projects page on their website that boasts an interactive county map, their 2016 construction project schedule, and weekly updates. They also use Facebook and Twitter to send out regular updates on traffic interruptions, and they are active with the county newspaper, the Macomb Daily. "It's all about transparency," says Director of Roads Bob Hoepfner, "We want to be able to explain what we're doing and why in everything we do. That includes our budget, our planning, anything that impacts the public."

Macomb County uses Esri ArcGIS software to generate their interactive map; for agencies without access to that type of software, there is a simple yet effective alternative already being used by some Michigan agencies – print a county map and use colored highlighters to mark construction projects and detour routes. That map can then be scanned and uploaded to a website or Facebook page where constituents can share or print it.

Choosing the Right Tools

Because no two agencies have the same resources or constituents, there is no one right way to share information with the public. Even with nearly 700 people following the Wexford CRC Facebook page, Herman says they still field phone calls every day. "The people calling aren't necessarily in the same demographic," she says. Hoepfner agreed, stating that the website, social media pages, and county paper are all used by different demographics in Macomb County.

Choosing a central location for construction information and referencing it on all web pages and social media sites may be the place to start, though. Whether that location is the agency website, a Facebook page, Twitter account, or other online presence, it comes down to choosing the method that is easiest for your agency to maintain, and is most useful to your constituents. If you aren't sure which websites or pages are being accessed most frequently, Google Analytics can help you track your web traffic. No matter how you choose to communicate, reaching more people can mean safer roads for drivers and road workers. ■

Web Analytics

Knowing who is viewing your web pages is useful because it can tell you which pages people access most frequently and which information they use the most. Google Analytics is a free tool that can be installed on a website to track information about visitors. This infographic shows the basic steps for getting started with Google Analytics on your website. – CM

Start analyzing your site's traffic in 3 steps

1 Sign up for Google Analytics
All we need is some basic info about what site you'd like to monitor.

2 Add tracking code
You'll get a tracking code to paste onto your pages so Google knows when your site is visited.

3 Learn about your audience
In a few hours you'll be able to start seeing data about your site.

Start using Google Analytics
Sign up
Sign up now, it's easy and free!
Still have questions? Help Center

Find a full set of instructions at www.support.google.com/analytics.

Preparing for Emergency Means Fostering Relationships

Jeanne M. Jensen, MPA, PE — Sr. Project Manager
Gilbert, Arizona
Reprinted from *APWA Reporter* (December 2014) with permission

It is often said that "knowing is half the battle," and rarely is that more true than when it comes to handling an emergency operation at the municipal or higher level. As the economy has retracted and expanded, each department carries the mantra to do-more-with-less and it is rare that we have the time to go much beyond the daily tasks and projects that keep us busy to connect with our fellow departments. However, when it comes time to respond to those extraordinary events that cross departmental lines, knowing our resources, our colleagues and our capacities could save precious time, improve response, and reduce waste. The challenge for us is to encourage and foster the relationships and understandings between asynchronous departments so that when we are called to serve we can do so in a uniform and intentional capacity.

A lack of understanding when it comes to functional capability can lead to the mis-allocated resources and inefficiencies of response that are easily avoidable. When it comes to emergency response, the best planners in the world cannot work without a full accounting of the resources at hand. In order to help provide a better cross-agency knowledge and understanding, this article serves as a high-level discussion of plug-in opportunities to better integrate all first responder capabilities to serve the needs of the public.

The largest first response departments in most municipal operations are police, fire, and public works, but it is uncommon to have much interaction between these operations outside of large-scale response events. Creating opportunities to cross-train and develop personal connections can help build those communication networks that will come in handy when you need to activate your Emergency Operations Center and get to work. Much of this comes from shifting the paradigm of first response being limited to police and fire with public works simply bringing the trash bins and street sweepers to the aftermath.

Though there are many ways to bring the parties to the table the reality is that without building and communicating value to all involved parties, there is unlikely to be much depth to the relationships. Some ways to help build mutual understanding is through cross training. Many public works employees require specialized training through programs such as OSHA HAZWOPER, HAZMAT, confined space entry, etc. and these opportunities to share training helps build personal and professional relationships in a genuine environment that encourages the exchange of information and ideas. When possible, the lesser-known department, typically public works, should be leading these events through becoming certified trainers, hosting refresher courses, and sharing workplace examples of applying the principles conveyed.

Additionally, in the field training and exercises can utilize common facilities such as wastewater or water treatment facilities, solid waste collection sites, recycling centers, major industrial facilities, etc. and should have mixed teams of police, fire, and public works employees. The natural tendency to flock to what is familiar should be prevented and teams should be per-selected or drawn to help encourage intermixing of employee groups. Training at existing city facilities can also help in training other departments about what the public works department does, or can do, to support or lead in emergency events. These sites are ideal for conducting confined space entry training, recovery and reconnaissance, etc. because they are already on the home turf of one of the departments, providing insight and deeper understanding of the capacities of the facilities and the staff therein.

The obvious place to bring these groups together is during the tabletop exercises many communities frame to practice emergency response strategies and scenarios in their emergency operations centers. One of the challenges tends to be that public works finds themselves seated at the logistics table and cannot readily weigh in for the other areas such as planning or operations where their expertise may be better suited. A properly developed tabletop exercise will challenge interdepartmental communication and should provide momentum into post-exercise hot-wash discussions that invigorate a mutual desire to better understand the other players in the tabletop.

Planning a tabletop exercise can be extremely daunting and the first reaction of many communities is to simply copy the scenarios used by other groups; but a scenario with unrealistic injects will quickly cause participants to disconnect, lose interest, and check out. In order to really drive a tabletop that highlights potential areas to improve, communication should focus on a realistic, encompassing event that has a sufficient timeline to exceed the standard response

mechanisms of the community. A major water main break, a dangerous four-alarm fire, or a terrorist event may seem a good baseline event but these may not engage all the departments in a team-based approach. Larger-scale and longer duration events are more likely to engage each area's specialty and force some creative teamwork so scenarios involving regionalized flooding, long-term power outages with associated social order challenges, or loss of major infrastructure due to criminal activity are ideal.

After framing the larger scenario, tailored injects can be used to route discussions or engage groups dynamically through the event. Instead of pre-planning the entire scenario, use this opportunity to turn the event into a "choose your own adventure"-style discussion. If the teams lead with a fire department response, throw out an inject that engages police; if police have stretched many of their resources to one area of the scenario, consider an inject that moves crowd control to public works and requires communication during the situation. Though the goal of a tabletop exercise should not be to needlessly fluster participants, a little excitement to keep heart rates up makes the event more memorable and more likely to carry real changes forward in how your departments come together to solve community problems.

It can be tempting for departments to silo their work areas and only begrudgingly share resources and intelligence even within a single agency or city and this tendency should be redirected into a communal energy that acknowledges and values each area's strengths and abilities and makes the whole greater than the sum of its parts. Freeing up time and budget as available to bring departments together in both the structured, formalized setting of a tabletop exercise and the more informal training scenarios will help foster those one-on-one relationships that could really change the tide of a situation in practice.

Taking the time to personally acknowledge the value of each individual and department will bring the agency together. Conducting regular events that bring disparate resources together and careful management of inter-agency events will grow and foster relationships that extend beyond a late night shared in the emergency operations center. This sense of camaraderie and joint-focus can save resources and efforts which results in a better outcome for the communities we have been called to serve. Acknowledging and respecting our differences, capacities, and dedication gives the multifarious departments a solid foundation for working together. Opportunities to leverage expertise both vertically and laterally within the organization create a respect and understanding that day-to-day operations cannot achieve in our modern lean approach. ∎

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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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Center for Technology & Training

The Center for Technology & Training (CTT) is a part of the Department of Civil & Environmental Engineering 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 **www.ctt.mtu.edu**.

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Upcoming Events

Register at ctt.mtu.edu/training

Limit Project Risk Using QBS Vendor Selection Webinar
July 14

Presentation Skills Webinar
July 25

HEC-RAS Training
August 16-18 — Lansing

2016 Motor Grader Training
Available by request — May through September

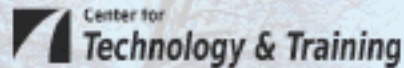**2016 Bridge Load Rating Webinar Series & Workshop**
Sept. 8, Sept. 16, Sept. 29, Oct. 6 (Dimondale), Oct. 27

2016 Winter Operations Conference
October 18-19, 2016 — Bellaire

SAVE THE DATE: 2017 County Engineers' Workshop
January 31 - February 2 — Sault Ste. Marie

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MICHIGAN **Winter** Operations Conference 2016

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