



The City of Farmington Hills designed a **water tower** that, when completed, will not just pay for itself, but other DPW facility improvements as well. The drawback: the ideal construction site for the tower was already occupied by a salt storage facility. Creative, interdepartmental problem solving found a solution that worked well for everyone involved.



Water Tower Pays for Facility Improvements

Melanie Kueber Watkins, PhD, PE, Civil Engineer
Center for Technology & Training

Center for Technology & Training

Inside



Safety peer exchange announced
▶ Page 3



Early engineering study worth the investment
▶ Page 4



Genesee wins national award
▶ Page 5



Alcona CRC recovering from facility fire
▶ Page 6



Innovative sign repair stand
▶ Page 7

Back Page

Upcoming Events

Showcases: GRS-IBS, Bridge Slide



Michigan's Local Technical Assistance Program

What if a water department suggested their new water tower be constructed on the site of a salt storage dome belonging to the street department? Rather than allowing this issue to potentially create a rift between departments, the City of Farmington Hills used a business-minded approach to accomplish three things: construct a new water tower in an ideal location; improve salt and other storage space for the streets department; and save money on both projects in the long run.

Before the end of this summer, the Department of Public Works (DPW) for City of Farmington Hills will begin operating a new, high-capacity, system pressure fed water tower. The construction of the water tower began in 2012 with the goal of saving money. Specifically, the new tower is expected to save \$3.5 million a year, and in five to seven years the project will have paid for itself via the savings on water costs. More importantly though, rather than city departments competing for project funding, the teamwork and creative financing used in this project will ensure Farmington Hills's the best service at the lowest cost for its citizens.

Phase I – Design Water Tower

Currently the Detroit Water and Sewer Department (DWSD) assesses the City of Farmington Hills a peak usage fee during periods when water demand is high. Therefore, even having one very high peak hour means that the entire rate goes up for the next contract period. According to Karen Mondora, PE, Assistant to the Director of Public Services from the City of Farmington Hills, "A water tower will

give us flexibility to regulate the rate we use from DWSD by allowing us to draw from the water tower during the peak." In short, the water tower will allow Farmington Hills to buy water at a low price during off-peak hours, and use the reserved water during high-demand times without increasing peak hour assessment. Mondora explained that their calculations "show that we'll see \$3.5 million in savings each year... the return on investment of building this tower will be achieved in five years." A 20-year, \$16.9 million bond was issued to pay for Phase I of the project, which included tower construction. The bond will be paid off with savings on water.

"The new tower is expected to save \$3.5 million a year."

Several agencies and public entities worked together so that the tower could become a reality. Farmington Hills Public Services, which houses the DPW, coordinated with the city council, managers' office, building department, plumbing, and water resources commission for permits. Farmington Hills also coordinated with DWSD and the Michigan Department of Environmental Quality (DEQ). In order to achieve the required flow rate using no pumps, the tower as designed is 200 feet tall, which required the Federal Aviation Administration to issue a permit for tower height. DWSD and the DEQ

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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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Outside of work I teach Jiu-Jitsu, often to students who come in with little or no experience. If a student trains to feed their ego, they are unlikely to continue after the first few classes. If a student comes to learn, on the other hand, they tend to stick around. The difference is in a student's willingness to accept two things: that while sparring, they can (and will) be bested at any given moment; and that being bested is perfectly OK. A decorated jujitsu practitioner named Rickson Gracie sums up this philosophy nicely:

“Sometimes you don't have to win. You cannot win.
But that has nothing to do with losing.”

Out of the three main articles in this issue of *The Bridge*, we only see “winning” take place in two. In a third article, we see the response to a situation in which it was impossible to win.

In our cover story, the City of Farmington Hills' Department of Public Works innovated a win-win situation among its street and water departments. The streets department gave the site of one of their salt storage domes to the water department; the water department is using the site to build a cost-saving water tower; and the money saved from the water tower is being used to improve deicer and garage storage for the streets department.

In our second article, a city in Wisconsin chose to invest \$30,000 into an engineering study on a pavement they were about to repair. The study paid off: first, it revealed that the sub-base didn't require replacement as originally planned; secondly, the documentation produced by the study aided them in getting grant money to pay for 50% of the project. It doesn't get much better than that!

On page six, in our final article, we see a situation when winning was not possible: last September the Alcona County Road Commission had a fire in their maintenance garage. The first employees on the scene acted quickly and selflessly to break into the burning building and drive out two of the trucks. Despite their swift thinking and action, the damage was still widespread. The losses have been significant, and perhaps the only positive angle to this disaster are the few lessons that can be learned.

Rickson's uncle, Jiu-Jitsu master Carlos Gracie, undoubtable informed his philosophy when he said “There is no losing in jiu-jitsu. There is winning, and there is learning.” We at Michigan LTAP hope that all of you in the transportation community experience more “win” than “not losing” this summer, but no matter what happens we are happy to be part of the ongoing process of learning with you.



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.MichiganLTAP.org.

Water Tower (from Page 1)

reviewed permit applications concurrently to save two months of time. Kevin McCarthy, Superintendent of the City of Farmington Hills DPW, explained that the City chose the footprint of an old salt dome for the tank location because of several benefits. “It’s the City’s property and it is already a secure site. The site is one of the highest elevations in the city, which we needed in order to maximize our use of gravity pressure for distribution. It is also in one of the most industrial and commercial areas in the city near the water district that it would benefit the most.” The site is a perfect location, away from residential areas but near expressways,

less time spent ordering. McCarthy added that even though 1,200 yards of space were given up to the water tower, the improved salt management coupled with storage from the remaining salt dome will allow them to maintain the required levels of salt.

Since salt brine manufacturing requires spill containment countermeasures, the new facility will have floor drains that are connected to a large tank to capture deicing material for reuse. The other part of the new building will have sanitary sewer drains.” An added advantage of the new facility is that it complies with Municipal Separate Storm Sewer System (MS4) rules, which are required for new facilities. After the facility

We’ll gain a cold storage facility, new tanks, and deicer containment inside of the building...

freeways, and industrial research including Bosch, Nissan, and Panasonic.

Phase II - Improve Deicer & Storage

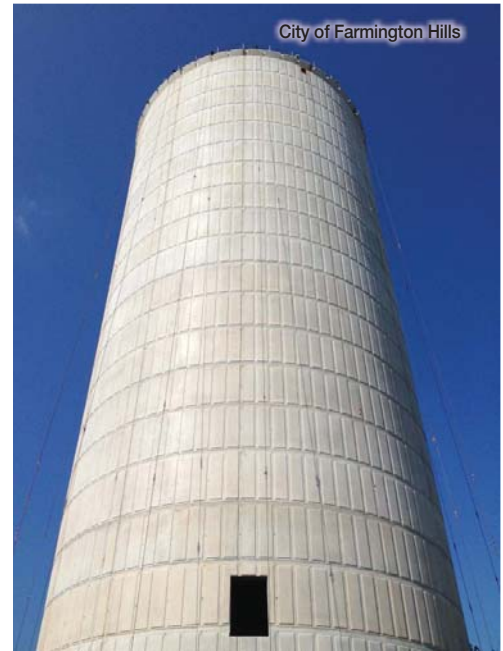
Farmington Hills used the savings from water costs to bid out a second phase for this project for some much-needed site improvements. One of the goals of Phase II is to increase salt brine manufacturing in the city. As it stands, the current facility at the water tower site is limited in size for storage. After the salt dome is removed, the city will gain four protected storage bins which will hold three times as much cold patch, salt, and topsoil. “We lose one of our two salt domes,” stated McCarthy, “but we gain a cold storage facility, new tanks, and deicer containment inside of the building... the cold storage will be used to store winter equipment off season, store brine, fill trucks with brine, and as additional garage space.” The increased capacity means that the DPW will even save money on ordering materials, since larger quantities mean lower prices and

passed an DEQ audit with flying colors, “the DEQ is now referring to Farmington Hills as an example for other agencies to follow as they try to comply with MS4 rules,” said Mondora. To learn more about the Farmington Hills facility, you can contact Mondora at KMondora@fhgov.com.

As a result of the new water tower, the citizens of Farmington Hills are expected to save approximately \$185 per year over the next 20 years. It’s also easy to see the benefits for the City of Farmington Hills in terms of money saved. However, since funding for public works projects is limited in general, the largest victory of this project comes from the crossing-over and collaboration of departments. By investing wisely in a project that in turn saved money and resources for other projects that will benefit its citizens, Farmington Hills is able to have their cake and eat it too. ■

Off the Grid

According to Mondora, Farmington Hills is still studying to install “turbines that would convert water flow into electricity, and take the DPW off the grid”. Initially the turbines were included in the cost savings of the plan, but Farmington Hills was concerned about fluctuations in water flow pressure from DWSD Detroit and decided to wait and conduct a more in depth study after construction. Once the new tower is online, Mondora says Farmington Hills will monitor pressures in and out of the tower to find energy potential and return on investment.



Community Involvement

Before the tank was installed on top of the tower, Farmington Hills allowed community members to tour the site and, for a \$5 donation, sign the bottom of the tank. They raised \$2,600 in all, which they donated to charities. After the tower is installed, the names will not be visible, so a plaque with the names will be installed near the bottom of the tower. Aside from raising money for a good cause, these tours created a sense of community ownership.

MDOT Sponsoring Safety Peer Exchange

MDOT will host a local agency safety peer exchange in Lansing on October 14th and 15th, 2014. The event will bring together transportation professionals from Michigan local agencies, MDOT, and FHWA to discuss challenges, opportunities and best practices in traffic safety.

MDOT is currently looking for local agencies to attend or present at this event, and will be providing travel expenses for all invited attendees. For more information regarding this event contact Heidi Spangler at: spanglerh@michigan.gov.

Specifics on the exchange will be posted on the CTT website as details are available.

Engineering Study Helps Town Save on Road Project

From "Crossroads", Spring 2010
By Wisconsin LTAP



This article was originally published by Wisconsin LTAP in the Spring 2010 issue of "Crossroads". It shows that spending money in the right places sooner rather than later—whether it's preventative maintenance or an preliminary engineering study—usually pays off in the long run.

An important truck route in the Town of Maine went from rough road to tough road last year thanks in part to an engineering study that helped local officials in the Marathon County Township decide what kind of improvement to make. The town board also used study results to secure a grant from the state that offset project costs by 50 percent.

Maine's experience demonstrates how valuable it is to do an engineering investigation early in the planning process on a road reconstruction project. The resulting information was critical to the board's decision making.

Borings reveal strong base

The two-lane road in question runs adjacent to a quarry 3M owns where the company mines rock for use in roof shingles. Town Chair Betty Hoenisch says it is no surprise the steady convoy of trucks hauling heavy loads out of the quarry along a one-mile stretch put stress on the road. Rutted and cracked, it was in poor condition.

Initial proposals were to dig out and replace the sub-base before resurfacing with traditional asphalt. Before agreeing to that approach, Hoenisch asked the board to approve an engineering study so they could learn more about the road and what level of

reconstruction it needed. "Local residents had talked for years about how well built the road was and I thought it was time to find out exactly what we had."

According to Andy Walters, a geotechnical engineer with the Wausau office of Tetra Tech who conducted the preliminary study, what they had was an original road built on a sub-base of granite blast rock from the quarry. Tetra Tech's soil borings revealed a strong foundation that did not need repair. What did need attention was the pavement surface, 10 inches of sequential asphalt overlays, some of them pulverized from the impact of the heavy loads.

Wausau-based REI Engineering then analyzed the results of a traffic study, documenting daily traffic loading from the quarry trucks and other vehicles. Their findings indicated that the heavy truck traffic equaled 250,000 cars per day compared to an average of 200 actual cars per day on the road. With 3M in the process of requesting an allowance

TEA (Transportation Economic Assistance) grant program. Administered by the Wisconsin Department of Transportation, the grants cover up to 50 percent of the cost for transportation facility improvements that encourage business and industry to remain and expand in the state.

"3M was a real partner with the town on this project, they were with us every step of the way," Hoenisch says. Ultimately, the town and 3M shared the \$400,000 cost of the improvement project. The TEA grant covered \$198,000 of the total.

REI co-owner and Registered Land Surveyor Tom Radanz notes that TEA grants demand more pre-planning and documentation. He and REI Project Manager Alan Farrell prepared the required design study report that includes information on the road's functional class, its current condition and why it needs improvement. REI also explored sight lines and stopping distances on the road to determine if the speed limit met

"...\$30,000 invested in preliminary studies and grant documentation saved the town at least \$600,000."

from the town for exceeding the 80,000 weight limit, everyone saw the improvement project as an opportunity to rebuild the road for handling heavy loads.

TEA grant covers half

3M had a history of reimbursing the Town of Maine for a portion of maintenance costs on the road from the quarry. The prospect of a major upgrade prompted the company to suggest the town apply to the

state specifications. At REI's recommendation, the town lowered the posted limit from 35 to 30 mph.

Radanz and Farrell also participated with Walters in meetings with the town board and 3M to discuss all options, and submitted project drawings and specifications to support the grant application. Radanz recalls, "It was important for us to communicate what all the findings told us and help everyone at

► Continues next page

the table understand the design approach that fit those findings.”

Highway-level solution

Radanz says knowing as much as possible about the existing road helped REI develop a feasible design and create a better product. “In this case, the facts we had about the sub-base, traffic loads and safety issues led us to a pavement design that will stand up to current and future loads a lot longer.”

The final design was for a road that will require minimal maintenance over the next 15 to 20 years. After milling off the top 6 inches of old asphalt—set aside to use on other town overlay projects this summer—the contractor, American Asphalt, then pulverized the remaining asphalt and blended it with 2 inches of 1¼-inch base aggregate to create the finished base. The aggregate composition helps transfer pavement moisture to the ditch.

Over the base aggregate, the asphalt design featured a 4-inch layer of binder (large rock mix) that meets WisDOT pavement type 37.5 mm and 2 inches of tough surface asphalt, an E10 mix that reduces rutting, a major concern due to the heavy truck traffic on the road. Tetra Tech provided construction oversight on the road project and conducted materials testing during base preparation and asphalt placement, an investment the town made to ensure good construction practices and the use of high-quality materials.

Follow the facts

Hoenisch estimates the \$30,000 invested in preliminary studies and grant documentation saved the town a minimum of \$600,000 on the project. Following the facts gleaned from the soil borings and traffic study, the town steered away from a more-complex project that would require closing the road completely and spending to prepare an alternate route for the quarry trucks. Instead, the contractor kept one lane open throughout the project, allowing traffic movement and commerce to continue.

Hoenisch adds, “The test bores told us exactly what we had and sent us in a different—and better—direction than we were headed. It was the best money we ever spent.” ■



The results of the engineering study revealed that the Town of Maine should focus on a rebuild of the pavement surface rather than an expensive removal of the sub-base as was originally planned.

Genesee County Wins National Award

Last November, the Genesee County Road Commission was recognized by the Roadway Safety Foundation and the Federal Highway Administration with a National Roadway Safety Award.

The award was given for a study on the benefits that the United States Road Assessment Program (usRAP) would have on Genesee County. usRAP is a program of the AAA Foundation for Traffic Safety that, according to the usRAP website, seeks to “reduce death and serious injury on U.S. roads” through a system of risk assessments that form the basis of road improvements and safety standards. The award was presented by Deputy Secretary of Transportation John Porcari at a ceremony in Washington, D.C..

The Genesee County study was a part of a pilot program that spanned eight states, and is now proceeding to the implementation stage. “Our absolute top priority,” said Road Commission Manager-Director John Daly in a press release, “is the safety of the motoring public in Genesee County... It gives us an independent look at risks associated with driving on our road system and provides recommendations for specific countermeasures to reduce crash risk and make our roads safer. It will aid in our selection of the right fix for the right location and it strengthens our request for federal safety dollars.” The full press release can be found at

<http://safety.fhwa.dot.gov/roadwaysafetyawards/>





CRC Recovering from Devastating Fire

Enneesa Ewing, Technical Writer
Center for Technology & Training

Alcona County Road Commission

Jesse Campbell, Managing Director of the Alcona County Road Commission, was one of the first people called to the scene as fire consumed the road commission’s 15,000 square-foot maintenance garage on September 28, 2013. “We broke into the building and I drove out one truck. Other employees got to the second truck. We couldn’t get the third one, and the trucks outside next to the building were on fire,” said Campbell. “It was devastating...I never felt so low in my career as I did at 4:15 that morning.”

In the seven months since the fire, Alcona CRC has endured no shortage of difficulty, starting off with a long, cold winter spent working outdoors while short-staffed. Preparing to rebuild has also proven a test of patience for Campbell and his crew, but they have accepted the challenges and are working through them. The maintenance garage that was destroyed was built in 1930, so although their insurance through the Michigan County Road Commission Self-Insurance Pool (MCRC SIP) covers building

tinued setbacks. “We’re currently following precautionary measures and getting permits done for removal of the septic tanks, the storm water drains, and also the ground floor drains—separator tanks also.” Zoning setbacks have also proven challenging to work with. “We have one structure that is going to have to come down for us to maintain a 60-foot area around the new structure,” said Campbell.

Despite all the challenges associated with this fire, Campbell feels they have been very lucky and says they are doing really well. Assistance from other counties and the Michigan Department of Transportation was instrumental after the fire, as was the Alcona CRC crew. “My crew’s experience actually got us through this. That was most of it. I don’t think I have anyone who has been here less than 10 years. Five or six of my crew members could actually retire at any time. For them to stay on board and deal with this and the cold weather—it’s made a huge difference.” This is especially impressive

room was spared from the fire. Valuable data that could have been lost was not.

Alcona CRC is doing well with the equipment they have now. They purchased two trucks from Midland County, and just got two new trucks within the last month. They also go a dump truck from Roscommon County Road Commission. Acquiring this equipment has helped out a lot, and Campbell expects they will have a busy summer since they have 11 townships with millages and have other projects coming in.

Looking forward, Campbell says he wants to have an emergency plan drawn up that will give adjacent counties written support from Alcona CRC. “I’m hoping to help out some other counties because this fire was one of the worst feelings of my career... If we have that communication with other counties, it will help out.” ■

I’m hoping to help out other counties because this fire was one of the worst feelings of my career...

replacement at 100% of current value, their costs for a new building that meets today’s requirements will unfortunately exceed this. “There’s a lot of work that has gone into trying to design a building” said Campbell. This is especially challenging if the new facility will last the 80 years that the previous facility had. Campbell hopes they will finalize a design and have it up for bids by May 15. He expects their funding will be sufficient to construct a building that meets their needs, but he doesn’t think they’ll be in the building until next year because of con-

considering they are operating with only 23 employees said Campbell. “When I took this position [Managing Director] we had seven more employees, with Harold Truman, my superintendent retiring that makes eight.”

Campbell says his luck has never been the best, but believes they were very lucky not to have had all of their trucks parked in the garage. “We thought about moving all the trucks in that weekend, but we didn’t do it. We were really lucky.” It was also fortunate that their small office building which houses the accountant, manager, and a small board

Avoid Disaster: Back up your Data

Fortunately, Alcona CRC’s important documents and data were located in a small office building not damaged by the fire. Losing this information would have been devastating. Off-site backups of data are essential for any agency. Detailed information on methods for backing up data is at:

MichiganLTAP.org/BackUpData

This page contains information on four backup options:

- Cloud backups
- Windows backups
- Portable hard drives
- Scanned documents ■



Center for Technology & Training

Sign Repair Stand Makes Work Safer

From FHWA LTAP/TTAP & WZ Clearinghouse
By City of Cherry Hills Village Public Works

This idea was originally published in the National LTAP/TTAP 2012 “Build a Better Mousetrap” booklet. The entry was submitted by the City of Cherry Hills Village Public Works Street Department, in Colorado. It demonstrates one more way that local agencies can increase safety and save money with a little bit of time and ingenuity. We hope it inspires you in your own work!

Entry booklets from previous years can be found at ltap.org/resources/mousetrap.php

Problem Statement

Two of the Street Departments many tasks include maintaining all of the City’s information and regulatory signage (name signs, speed limits, stops, etc.) and low to the ground right of way tree trimming around signage and other structures. Unfortunately the City is not resourced with a vehicle (bucket truck) specifically designed for these duties. As a result we would end up with somebody standing in the back of a pickup or climbing a ladder to do these low-to-the-ground maintenance repairs. We feel climbing a ladder always represents a risk factor, especially on uneven rights of way, during all forms of weather conditions. We further felt that climbing in and out of a pickup bed, reaching out over the edge of the bed,

and just standing in a wet or snow covered pickup bed while doing repairs was too great a risk for staff members to continue doing. A new truck, mounted with the appropriate attachments and safety protection, was not a feasible option. We needed a low budget solution that was both practical and safe.

Solution

The Street Department is fortunate to have a Crew Leader that is very knowledgeable in the area of steel fabrication. When faced with the task of building some kind of a sign repair stand, it was desired to find a low cost solution that would fit in the bed of a pickup, be easily installed or removed by two men, and provide the safety measures needed for personnel doing repairs. Crew Leader, Josh English, talked with other crew members and quickly came up with repair stand.

Labor/Materials/Cost

Total Cost of Sign Repair Stand: \$380.00

Savings/Benefits to the Community

Having knowledgeable manpower, all power tools needed, and budgeted time, the City feels it saved somewhere in the neighborhood of \$2,000 on this project. Professional welding fees alone could have exceeded these costs. Of far more importance to the City than savings is the tremendous increase in safety for its street personnel.



City of Cherry Hills Village Public Works

With a tailgate ladder to enter and exit the bed of the truck, nobody has to climb over a tailgate. The sign stand has a railing at just below waist level, allowing a worker to reach beyond the edge of the truck. The grip strut decking allows for sure footing while inside the stand and on the step while entering and leaving the stand. There is a safety chain to close off the entrance to the stand to eliminate accidental falling backwards out of the stand. The stand is bolted to the truck body to prevent it from moving when in use. The stand also elevates the worker an additional two feet from the pickup bed floor, allowing an expanded work area without having to dangerously reach for signs or tree limbs. ■

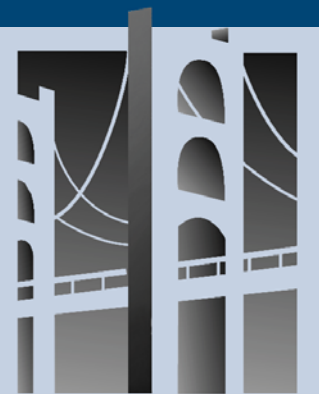
Record attendance at Bridge Conference

The 2014 Michigan Bridge Conference saw a record number of attendees and both the Conference and the Pre-conference Workshop.

	Workshop	Conference
2014	144	205
Local	33	48
State	48	55
2013	115	159
2012	122	149
2011	98	104

Attendee Awarded \$50

Robert Lothschutz was awarded a certificate worth \$50 in LTAP Bucks for submitting his idea for a future topic at the 2014 Michigan Bridge Conference. His idea, “Overview of preventative maintenance procedures and rehab fixes for bridges”. Lothschutz’s idea was drawn from a pool of other submissions, all of which will be used to determine agenda items for next year’s Bridge Conference.



The Bridge

Bridging the gap between research and practice since 1986

Vol. 28, No. 1 – June 2014

- ▶ [Water tower pays for other improvements](#)
- ▶ [Safety peer exchange announced](#)
- ▶ [Genesee CRC wins national safety award](#)
- ▶ [Early engineering study saves money](#)
- ▶ [Alcona CRC's road to recovery after fire](#)
- ▶ [Sign repair stand is safety on the cheap](#)



Michigan's Local Technical Assistance Program

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Upcoming Events

Register at ctt.mtu.edu/training

Load Rating a Box Culvert

June 10 – Webinar

Asset Management for Elected Officials

June 24 – Big Rapids

June 26 – Bay City

PASER Training: Final Session

June 25 – Big Rapids

Advanced Maintenance Welding

June 26 – Kalamazoo

June 30 – Howell

July 1 – Jackson

Presentation Skills

July 8, 9 – Webinar

Local Safety Peer Exchange

Oct 14-15 – Lansing

Fall 2014 Transportation Asset Management Conference

Oct 23 – Marquette

2014 Winter Operations Conference

Oct 28-29 – Gaylord

Upcoming Showcases

Summer 2014 will have two showcases for projects in Michigan. Each showcase will feature a presentations, discussions and a site visit.

GRS-IBS Showcase

July 22 – Sunfield

MDOT is hosting an open house for locals to discuss and review Ionia County's completion of a geosynthetic-reinforced soil integrated bridge system (GRS-IBS).

Bridge Slide Showcase

August 14 – Grand Rapids

This event will feature presentations from MDOT, FHWA and local contractors focusing on slide-in bridge construction.