Local Technical Assistance Program

The Bridge

Linking Transportation Research and Practice

Vol. 21, No. 4 May 2008

County Maintenance Crew Replaces a Bridge Using Prefabricated Components

Prefab components yield significant economic and environmental benefits

by Ann Kitalong-Will, Technical Writer, Michigan's LTAP
Photos courtesy of Tricon Engineering, Ltd.

When the Monroe County Road Commission (MCRC) needed to replace the deteriorating Suder Avenue Bridge in September, 2006, they looked at alternatives to the conventional box culvert or three-sided culvert replacement options to minimize cost and construction time. By choosing innovative prefabricated structural elements, the MCRC was able to replace the bridge using their own road crews, thereby saving cost and improving overall structural performance.

Remove and Replace

The existing bridge consisted of a 16-foot span, cast-in-place concrete slab that was supported by full height abutments. Approximately one foot of fill and bituminous pavement covered the cast-in-place slab. The MCRC's goals for the bridge replacement project were to maintain constructability by the county maintenance crews, to minimize construction duration and cost, and to minimize overall environmental impact. The MCRC had $227,000 budgeted for the project, funded in full by Erie Township.

"We opted against using a culvert because there was an opportunity to do something innovative while using our own drainage crews," explained Coleman Brown, MCRC Director of Maintenance. "Typical culvert installation requires working in the water. However, with this design, we were able to work within the limits of the existing abutment walls due to the fact the existing footings did not require demolition."

Replacing the bridge, which is located over the Hooper Run Drain only a mile from Lake Erie, presented some environmental concerns as well. "The proximity of the bridge to Lake Erie raised some concerns about sedimentation," said Brown. "It was important to avoid disrupting the stream bed as much as possible."

Advantages of Prefab Components

To address the issues of cost and environmental impact, the MCRC took an innovative approach, choosing the Con-Struct Prefabricated Bridge System, designed by Nelson Engineering (now Tricon Engineering, Ltd.) and manufactured at ADL Systems in Portland, MI. According to Tricon Engineering, the Con-Struct bridge system's span depends on application. For vehicular bridges, standard span is up to 60-feet, with special construction up to 100 feet. Pedestrian bridges can be built with a standard span of up to 100 feet. Prefabricated bridge systems provide ease of installa-

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From the (new) Editor

Every new beginning comes from some other beginning's end.
— Closing Time, Semisonic (1998)

So far, 2008 has seen a couple of notable ends and new beginnings at Michigan's LTAP. The end of John Velat's career here ushered in the beginning of Ann Kitalong-Will's career. (You'll find some of her work in this issue). And when John stepped away from editing *The Bridge*, I took his place. Another end, another new beginning.

In this issue you'll find three stories about new beginnings that could impact your work, and a fourth story that could improve your life. First, on the cover: Monroe County Road Commission maintenance crews replaced a bridge using innovative pre-fab components. MDOT, Michigan DEQ, and the U.S. Army Corps of Engineers were all delighted with the construction process, and Monroe CRC is happy with the results. Could this be the end of cast-in-place construction for some bridges?

Next, turn to page three to get the latest information about new sign retroreflectivity requirements from the FHWA. MDOT is currently looking over the new standards to determine how the changes will impact the Michigan MUTCD. Watch for more on this subject from MDOT and LTAP in future issues of *The Bridge*.

Then, flip to pages four and five to read about how cooperation among all segments of the construction industry enabled almost 2000 young people to explore careers in construction for two days in April. The first-ever Michigan Construction Career Days was a huge hit. Middle and high school students from 46 schools all over Michigan now know what we all know: construction work is very cool. And that was just the beginning! Plans are being laid for another event in 2009. Stay tuned...

Finally, go back to page three, where you'll find a story about exercising. We all know it's good for us, but few of us know exactly *how* good it is, *why* it's so good, or *what* we can do to maximize the good-ness. This story, contributed by the chair of Michigan Tech's Department of Exercise Science, is entertaining and interesting. Give it a read.

As always, if you want to contribute stories or pictures to *The Bridge* please call 906-487-2102 or send an email to LTAP@mtu.edu. If you have comments about this newsletter, or anything else in the LTAP program, you're always welcome to call or send an email.

The Bridge

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LTAP Steering Committee

The Local Technical Assistance Program (LTAP) is a nationwide effort financed by the Federal Highway Administration and individual state departments of transportation. It intends to bridge the gap between research and practice by translating the latest state-of-the-art technology in roads, bridges, and public transportation into terms understood by local and county highway or transportation personnel.

The LTAP Steering Committee makes recommendations on, and evaluations of, the activities of the Local Technical Assistance Program based on discussions at the Technology Transfer Interchange and Advisory Committee meeting. This meeting is held annually and is open to all rural and urban agencies, and individuals concerned with the transfer of transportation technology in Michigan.

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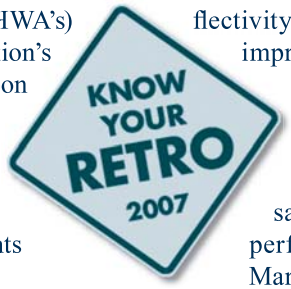
New Sign Retroreflectivity Requirements

Agencies will have until January 2012 to implement a method that meets the requirements



One of the Federal Highway Administration's (FHWA's) primary missions is to improve safety on the nation's roadways. More than 42,000 people have been killed on American roads during each of the past eight years. While only one-quarter of all travel occurs at night, about half of the traffic fatalities occur during night-time hours. To address this disparity, the FHWA has adopted new traffic sign retroreflectivity requirements that are included as Revision 2 of the 2003 MUTCD.

To comply with the new requirements, public agencies will have until January 2012 to implement and then continue to use an assessment or management method that is designed to maintain traffic sign retroreflectivity at or above the minimum levels specified. Public agencies will have until January 2015 to replace any regulatory, warning, or post-mounted guide (except street name) signs and until January 2018 to replace any street name signs and overhead guide signs that are identified by the assessment or management method as failing to meet the minimum retroreflectivity levels.

Provided that an assessment or management method is being used, an agency would be in compliance with the requirements of the new provisions even if there are some individual signs that do not meet the minimum retroreflectivity levels at a particular point in time. Instead of using one or more of the five assessment or management methods described above, agencies are also permitted to develop and use other methods based on engineering studies.

Because of the seven to 10-year compliance period that has been adopted for replacing signs that have insufficient retroreflectivity, highway departments will be able to implement improved sign inspection and management procedures and subsequently replace the signs in a time frame that is consistent with the typical sign replacement cycle. Cost increases from upgrading materials and/or processes might be offset by the long-term savings that result from the longer life of the higher performance sheeting products.

Mark Bott, traffic operations engineer with the Michigan Department of Transportation (MDOT), said MDOT is reviewing and preparing to implement the new retroreflectivity standard here. "Changes to the retroreflectivity requirements in Michigan will be very similar to the new requirements established by FHWA," Bott said. "The key is that each agency must evaluate their signing both day and night to ensure the needs of the motoring public are being met," Bott said.

LTAP will provide the new retroreflectivity standards as part of a series of upcoming workshops on creating a sign management plan. Watch *The Bridge* and your mail for more information.

On the Web:

www.fhwa.dot.gov/retro

For a direct link to the site, go to:
www.MichiganLTAP.org/Bridge/21_4

The Perfect Time to Begin (or Keep Going)

Submitted by Dr. Jason Carter, Ph.D., Department Chair
Exercise Science, Health, and Physical Education Department – Michigan Technological University

Welcome to Spring 2008! If you're like me, by now you're either well into achieving your new year's resolution to "get fit," or you've given up for another year. Before I encourage you to stick with it, did you ever wonder where the origin of the New Year's resolution came from? I wasn't sure, so I did what everyone else does today when questions arise – I "Googled" it. I found many stories about the source of the New Year's resolution. A particularly interesting one dates back to 156 B.C. to a mythical king of early Rome who had a calendar with two faces, one looking ahead to the future and one looking behind at the past. This king became a symbol of ancient resolution, a time to forgive enemies and exchange gifts at the beginning of a new year.

Well, I'm not a historian so I can't confirm or deny the validity of the story. However, I am an exercise scientist, and one of the most popular New Year's resolutions of the modern day is exercise! There's no better time than spring to revisit the commitment you made on January 1. So why exercise and what kind of exercise program should you engage yourself in?

Because it feels good

My area of research focuses on the effects of exercise and stress on human health. Specifically, our research laboratory attempts to unveil neural mechanisms responsible for high blood pressure, clinically referred to as hypertension. Hypertension is the number one cardiovascular disease in the United States; it affects over 72 million Americans. Regular exercise not only helps reduce the risk of hypertension, but it also lowers the risk of other serious health problems, including obesity and diabetes. The National Institutes of Health, our nation's leading health agency, reports that nearly one in three Americans are classified as overweight or obese. Obesity is a primary risk factor for the development of diabetes. So why exercise? How about so you can lower your risk for developing hypertension, obesity, and diabetes! If you already have these conditions, exercise can actually help reverse them.

If that doesn't resonate with you, maybe this will: exercise reduces your stress levels and improves self esteem. It makes you feel good. This is largely due to the release of endorphins during exercise. Endorphins are chemically similar to opiate compounds

See *Keep Going*, on Page 7

Building Michigan's Construction Workforce

Cooperation makes first-ever Michigan Construction Career Days a big hit

by John Ryynanen, Editor and Technical Writer, Michigan's LTAP
Photos courtesy of Michigan Technological University.

When you were in your teens, did you know about careers in Civil Engineering, Construction Management, and Surveying? Did you ever dig with a massive excavator? How about move dirt with a dozer? Ever frame a wall with an air nailer, or use a TIG welder to weld two pipes together? For the rest of their lives, over 1700 middle and high school students from 46 schools across Michigan will remember doing all this and more during the first-ever Michigan Construction Career Days (CCD) event at the Ingham County Fairgrounds. The event, held on April 15 and 16, was coordinated by Michigan's Local Technical Assistance Program (LTAP) and the Capital Area Construction Council (CACC) with a great deal of help and support from MDOT, FHWA's Michigan Division office, and an advisory board of eight other leaders in Michigan's construction industry.

Michigan CCD is part of a national effort to inform young people of the many exciting career opportunities available in the construction industry. The first CCD event was held in Texas in 1999. Since then 27 states have held events and over 230,000 students have participated nationwide.

"The structure of the event – the hardhats, the activities, the interaction with pros – created a real-world experience for these young people. It was like being on a big job site."

Dan DeGraff, Michigan Concrete Paving Association

Like a Big Job Site

As bus after bus pulled into the fairgrounds, students were treated to a great view of cranes, backhoes, dozers, excavators and more. When the students stepped off the buses, each was given a hard hat (theirs to keep), and was sent off to explore careers in construction. For the next four hours, they worked side-by-side with professional equipment operators, carpenters, engineers, electricians and more.

Dan DeGraff, P.E., is the executive director and CEO of the Michigan Concrete Paving Association. He was pleased with the authenticity of the Michigan CCD event. DeGraff knows his way around a construction site; before taking his current position at MCPA, he worked for 23 years in various levels of management for several large construction companies in the U.S. "The structure of the event – the hard hats, the activities, the interaction with pros – created a real-world experience for these young people," he said. "It was like being on a big job site." DeGraff and his staff coordinated a concrete pour as part of an outdoor display at Michigan CCD.

Bill Rough, member of Operating Engineers Local 324, helps a student appreciate the finer points of operating a mini excavator.

Mark Skiles, a technical education instructor at Perry High school brought 36 of his students to Michigan CCD. In an email to organizers a few days after the event, Skiles wrote, "Thanks for the great opportunity. My students said this was the best field trip they have experienced. I hope this can continue." Skiles' sentiment was repeated dozens of times in emails, letters, and comments from students to members of the advisory board after the event.

Plenty of Variety, Lots of Opportunities

All segments of the construction industry were well represented at Michigan CCD. In addition to several activities that showcased apprenticeship and training opportunities in various trades, ten different colleges and universities set up booths and conducted activities to let students know about opportunities in construction-related degree programs. The University Transportation Center for Materials in Sustainable Transportation Infrastructure (UTC-MiSTI) at Michigan Tech was a platinum sponsor and an activity provider. "We were excited to support the event as a sponsor and exhibitor," Dr. Larry Sutter, director of UTC-MiSTI, said. "Addressing state and national transportation workforce needs is at the heart of the UTC program. Engaging these young people in actual construction activities is the ideal way to attract the next generation of workers."

Iron Workers Local 325 used a safety harness, toolbelt and I-beam to show students what it takes to be an Ironworker.

Other platinum sponsors included AIS Construction Equipment Corp., Capital Area Construction Council, Lansing Community College, Michigan CAT, Michigan Department of Transportation, Michigan's Local Technical Assistance Program, Oakland Community College, and Operating Engineers Local 324.

The Big Stuff

Heavy equipment was the highlight of Michigan CCD. Lee Graham, training director for the Operating Engineers Local 324 (OE 324), and Pat Brown, director of safety and workforce development

Emerging materials technologies were demonstrated, including a sidewalk using high-tech pourous concrete and decorative concrete that was finished to look like weathered wood.

for the Michigan Infrastructure and Transportation Association (MITA) worked together to coordinate heavy equipment donations. Ingham and Jackson County Road Commissions were among the 24 organizations that donated equipment.

Graham also brought dozens of apprentices and retirees from the OE 324 training center to help the students operate equipment. "We had everyone from third-year apprentices to 84 year-old retirees helping out," Graham said. "They had as much fun as the students. I had a hard time convincing any of them to take a break."

A total of 36 pieces of heavy equipment, 17 of which were set up for the students to operate, filled the infield area of the race track at the north end of the fairgrounds. At the south end, 39 information and activity booths completely filled two large pole buildings. Large outdoor displays and demonstrations filled in vacant areas.

Don O'Connel, Director of Operations for OE 324, commented, "I have been involved with these types of events for over thirty years; this was the best ever. The students got a real good look at our industry, and it will pay dividends down the road."

Beyond Workforce Development

CCD events are always aimed at the goal of attracting workers into the construction industry. But benefits of events often extend far beyond that goal. Habitat for Humanity of Greater Ingham County's participation in Michigan CCD is a great example of unintended benefits. A Habitat team completely framed their first home of 2008 on a huge tarp at the fairgrounds. After the event, they disassembled the walls of the home in large sections, loaded them on a flatbed trailer and hauled them to their main office to await final assembly at the home site later this spring.

In the "back yard" of the Habitat project, a team of instructors and students from Washtenaw Community College's (WCC) Construction Institute built a 10 x 12 storage building. When complete, the WCC team donated the finished building to the Habitat project. Tony Farina, an instructor at WCC, was among the group working on the storage building. "It was great to demonstrate WCC's capabilities at a large event like Michigan CCD," said Farina. "It was especially neat that we ended up benefiting the Habitat project."

Todd Pierce-Ryan, construction liaison for Habitat, was very pleased with his experience at the event. "Our participation at Michigan CCD worked out better than we had planned," Pierce-Ryan said. "The house was framed completely by students at the event, and we got a lot of great exposure to volunteers and others. We're definitely looking forward to doing this again."

A Group Effort

Michigan CCD kicked off a week proclaimed by Governor Granholm as Building Michigan's Construction Workforce week. Brindley Byrd, executive director of the Capital Area Construction Council in Lansing, served as the spokesperson for the event. "Construction work is all about cooperation," Byrd said. "To build a bridge or hospital or home, professionals from all segments of the industry have to work together. Michigan CCD was like a construction project, but instead of building something we can see and touch, we started building Michigan's construction workforce. The cooperation among professionals in the industry to make this event happen was phenomenal."

In all, Michigan CCD involved over 60 different associations, construction companies, government agencies, engineering firms, community colleges, and universities in Michigan. For more photos and a complete list of participating organizations please visit the Michigan CCD web site at www.MichiganCCD.org.

"The cooperation among professionals in the industry to make this event happen was phenomenal."

Brindley Byrd, Capital Area Construction Council

Terry Ream, a Heavy Equipment Operator from Ingham County Road Commission,helps a student use an articulating excavator.

What's Next?

Planning for another event next spring has begun. To learn more about it, or if you would like to get involved, please call LTAP at 906-487-2102, or the Capital Area Construction Council at 517-492-5575.

On the Web:

www.MichiganCCD.org

For a direct link to the site, go to:
www.MichiganLTAP.org/Bridge/21_4

***Prefab Bridge*, Continued from Page 1**

tion, as well as a controlled construction environment – off-site construction of the superstructure ensures greater quality control during the curing process.

The new design called for cast-in-place abutments just outside the existing abutment foundations, and a concrete deck cast compositely on galvanized steel tub girders. The MCRC crew was able to leave the existing abutment foundations in place, which eliminated expensive and time-consuming work in the water, as well as lessened the impact of sedimentation. To support the new abutments, they drove H-piles just behind the existing abutment foundations. They then lengthened the span of the new bridge to 35 feet to reach the new abutments. The demolition of the existing structure, pile driving, and casting of the abutments took county crews about two weeks to complete.

"We originally planned to use concrete helical piles for the abutments, but we opted for the H-piles so we could drive them into the bedrock, which gave us a stronger foundation," said Brown. "We saved so much using the precast deck system, we were able to spend more on the piles and still fit within our budget."

Additional Benefits

The superstructure was transported from ADL Systems to the construction site in three individual units, arriving at the job site at noon and set in place by 2:00 p.m. that same day. Each unit weighed 24 tons, and required a single 150-ton crane for erection. The precast concrete deck, only nine inches thick, provides the final driving surface. The galvanized steel tub girders were 12 inches thick. In total, the superstructure thickness is only 22 inches. The shallow depth of the new bridge resulted in a bottom beam elevation that was higher than the bottom of the slab on the old bridge.

MCRC Bridge Engineer, Steve Bouws, said the prefabricated superstructure allowed the road commission to use their county crews throughout the entire project, lowering overall cost of construction.

"A big advantage is that the units came with the wearing surface cast right in with the prefab structure," said Bouws. "We did all the work internally at the road commission –we just had to do the tie pours to finish, and we had a usable bridge."

Galvanized metal decking was placed between the precast units to support the 2-foot-wide, 10-inch-deep cast-in-place concrete closure pour. The decking was placed on support angles that had been installed at ADL Systems as part of the precast concrete deck, and allowed the MCRC maintenance crew to create one continuous concrete deck, 30-feet, 9-inches wide. Over the next three weeks, the project was completed as bituminous approaches were paved, final riprap was placed, and the ditches were re-graded. Finally, guardrail was installed on the bridge deck using anchor bolts that had been precast into the deck.

Monroe County Road Commission maintenance workers place a prefabricated deck slab for the new Suder Ave. Bridge.

Inspection and Maintenance

The MCRC decided not to put hot-mix asphalt over the top of the structure because they wanted to be able to visually inspect the bridge for wear. In the two years since its completion, they haven't seen any cracking or other structural distress on the prefabricated or cast-in-place sections. In fact, maintenance on the prefabricated bridge is no different from any other bridge.

"I anticipate a low-maintenance bridge for many years to come," said Bouws. "Inspection is every two years, per the federal bridge inspection program requirements, just like any other bridge."

Impact is Minimal

The project impacted the stream very little throughout the construction phase, and the resulting structure is completely outside of the waterway. The MCRC's original permit application to the Michigan Department of Environmental Quality (DEQ) called for a 16-foot span, which meant working in the waterway and potentially increasing negative environmental impact such as sedimentation and disrupted stream flow. When MCRC decided to use the Con-Struct system, they submitted a revised application that addressed environmental concerns.

"The MCRC revised their application to a 35-foot span, which allowed them to work outside of the stream bed," said Jerry Fulcher, DEQ. "We prefer this because it minimizes sedimentation and erosion."

Culverts can also pose an environmental concern, requiring more maintenance work as they become plugged with sediment, potentially limiting stream flow and disrupting fish passage through the channel. The MCRC's design change meant raising the bridge elevation by almost a foot, which increased hydraulic capacity under it.

The new Suder Ave. Bridge in Monroe County.

"The design change is better for fisheries because it's more of a natural channel setting," said Fulcher. "Restricting the channel can limit fish passage, which is something we want to avoid."

Encouraging Innovation

Such innovative bridge projects present financial opportunities to local road agencies as well. According to Dave Juntunen, MDOT Engineer of Bridge Operations, MDOT has $3 million in funds set aside through the Bridge Preservation Program, specifically for MDOT projects using emerging technologies, like the construction method represented by the Con-Struct and other prefabricated bridge systems. The Federal Highway Administration also has potential funding available through the Innovative Bridge Research and Deployment (IBRD) program, which includes funding for research, deployment and education in support of innovative bridge construction approaches and technologies. While the MDOT Bridge Preservation Program is specifically for MDOT projects, IBRD funds can be used for MDOT or local agency projects.

Prefabricated bridge systems demonstrate much potential, whether prefabrication includes substructure elements, superstructure elements like the decking used at the Suder Avenue Bridge, or a total prefabricated bridge system. MCRC has seen increased quality of the superstructure through the controlled fabrication conditions, as well as minimal environmental impact and improved constructability.

"Prefabricated bridge construction shows a great deal of promise," Juntunen said. "MDOT is very supportive of these types of rapid bridge construction technologies."

On the Web:

FHWA
Prefabricated Bridge Elements and Systems
Bridge Research and Deployment Program
FY 2008 Budget Request for RDT&E

Michigan DEQ
Bridge & Culvert Guidelines
Transportation & Hydraulic Review

For direct links to the sites, go to:
www.MichiganLTAP.org/Bridge/21_4

***Keep Going*, from Page 3**

such as morphine, thus they have analgesic (pain relieving) and euphoric (happiness enhancing) effects. In fact, the improved mood states of people who exercise regularly are so significant that it has prompted physicians and psychologists to prescribe "exercise" for clinical depression (some even argue it is more effective than antidepressive drugs). In short, exercise helps your body and mind!

What type and how much?

Alright… are you motivated? If so, you may be asking, "What kind of exercise should I do and how much?" Both are good questions. There are many types of exercise and many frequency and duration recommendations. In general, research shows that 30 minutes of exercise for three days of the week is both feasible and beneficial. We live in a culture where time is limited, but we can carve out at least 90 minutes a week, can't we?

The most popular exercise routine is aerobic training – running, biking, stair-stepping, swimming, or some other activity at an intensity that keeps your heart rate somewhere between 55 to 75 percent of your maximum. Resistance training (weight lifting) is also popular. It's much more common with men, and the primary gains are in muscular strength. However, it does have positive implications for the heart as well. In fact, our research laboratory recently demonstrated that eight weeks of whole body resistance training can significantly reduce blood pressure. Furthermore, studies show that resistance exercise is great for increasing bone mineral density and helping to prevent osteoporosis.

The best scenario is to have an exercise routine that includes both resistance and aerobic components. Circuit training is the most time-efficient way to fit both into a busy schedule. The best way to describe circuit training is as a "frantic" resistance workout. Most traditional resistance training programs provide about two minutes of rest between sets. Circuit training provides less than 30 seconds rest to ensure your heart rate remains elevated. This method is becoming more popular because it combines the benefits of resistance and aerobic training, plus it allows for a short, intense workout – perfect for our time-crunched culture.

Take your pick

Bottom line: there are multiple exercise routines available to help you get into shape. It's been my experience that variety is important in any exercise routine, so I recommend circuit or concurrent training. In addition, both routines maximize the benefits of aerobic and resistance training.

Before you begin any new exercise routine, I strongly advise that you consult your physician. You should also consult with a qualified personal trainer to learn proper technique for the different exercise regimens. Most fitness centers have personal trainers endorsed by agencies such as the American College of Sports Medicine or the National Strength and Conditioning Association. Good luck! I hope you have a great (and active) summer of 2008!

On the Web:

www.exsci.mtu.edu

For a direct link to the site, go to:
www.MichiganLTAP.org/Bridge/21_4

"To me, there are three things we all should do every day. Number one is laugh; you should laugh every day. Number two is think; spend some time in thought. And number three is, you should let your emotions move you to tears. Think about it – if you laugh, think, and cry, that's a full day. That's a heck of a day. You do that seven days a week, you're going to have **something special**.

Jim Valvano, accepting the *Arthur Ashe Courage Award* at the 1993 ESPY Awards.

Want to Help Your Elected and Appointed Officials Make Smart Roadway Management Decisions?

Innovative new workshop teaches local decision makers to use principles of transportation asset management

In any organization, significant accomplishments or improvements are preceded by a series of good decisions. And good decisions are almost always the result of a diligent effort to learn as many facts about a given situation as possible. Effective organizations exist within cultures where facts are easily accumulated and analyzed, good decisions are naturally executed one after another, and significant improvements and accomplishments are realized consistently and continually.

An innovative three-hour workshop, *Introduction to Transportation Asset Management – A Workshop for Elected Officials*, is helping road commissioners, township board members, city council members, and other decision makers understand facts about transportation asset management so they can work together to make good roadway management decisions.

Baldwin Township Supervisor Greg Stevenson attended a session in Escanaba in March; he appreciated the new level of communication the workshop created among the decision-makers in his area. "Board members are starting to look at road maintenance in a different way," Stevenson said. "The principles we learned are helping us apply the right fix in the right place at the right time."

The workshops are sponsored by the Michigan Transportation Asset Management Council, conducted by LTAP staff, and hosted by local agencies. They are free of charge, but there are only a limited number available. Invitations to participate are sent out by local agency hosts. If you want to learn more about the workshops, or if you want to host one in your area, please call Michigan's LTAP at 906-487-2102 or email ltap@mtu.edu.

"Board members are starting to look at road maintenance in a different way. The principles we learned are helping us apply the right fix in the right place at the right time."

Greg Stevenson, Baldwin Township Supervisor

To learn more, contact Michigan's LTAP at 906-487-2102 or ltap@mtu.edu

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