

The Bridge

Linking Transportation Research and Practice



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Road-stream crossings and quality stream habitat – Can we have both?

By Chris Freiburger, Supervisor
Michigan DNR Habitat Management Unit
(Adapted from *Massachusetts Stream Crossings Handbook*)

Although public awareness of environmental issues is high in Michigan, few people consider the effects of road-stream crossings (culverts and bridges) and other infrastructure on the quality of stream habitat. Stream conditions may be quite different upstream and downstream of a crossing, and a crossing may look different during low or high water. The design and condition of a crossing determines whether a stream behaves naturally and whether fish and wildlife can migrate along the stream corridor.

Stream continuity has not often been considered in the design and construction of road-stream crossings. Many crossings are barriers to fish and wildlife. Even crossings that were not barriers when originally constructed may now be barriers because of stream erosion, mechanical breakdown of the crossing, or changes in the upstream or downstream channel shape. Fortunately, we have learned how to design crossings that allow wildlife unrestricted access to a watershed, maintain natural stream conditions, and help protect roads and property from some of the damaging effects of floods.

The goal: unimpeded movement

Effective stream protection requires that we consider the needs of all species including invertebrates such as crayfish and insects, fish such as brook trout and darters, amphibians such as spring salamanders, reptiles such as wood turtles, and mammals such as muskrats and otters. For reasons as simple as escaping random disaster or as complex as maintaining genetic diversity, animals living in or along streams need to be able to move unimpeded through the watershed.

Consider the roads you regularly drive to complete your day-to-day tasks. What if the roads you drive on were suddenly permanently blocked so that you could not get to important places? This may sound absurd, but this is analogous to what we have done to species that inhabit streams throughout Michigan. Through the combined effects of dams and poorly designed bridges and culverts, we have partitioned streams and forced wildlife to cope with our restrictions thereby inhibiting:

- Access to cold water habitats
- Access to feeding areas
- Access to breeding and spawning areas
- Natural dispersal

Effective stream protection requires that we consider the needs of all species including invertebrates, fish, amphibians, reptiles, and mammals.

In addition to effects on wildlife movement, many stream crossings degrade nearby habitat, making conditions inhospitable for some native plants and animals, and negatively effect water quality.

Three stream crossing problems — undersized crossings, shallow crossings, and crossings that are perched — can be barriers to

See *Road-Stream Crossings* on Page 7

Building Michigan's Construction Workforce

Full story on Page 4



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Celebrating Construction

My 3-mile commute to work this summer includes detours around two major road construction projects. The most significant is a complete upgrade of Houghton's main street, including new underground utilities, new sidewalks, a brick street surface, and high-efficiency street lights that look like they're from the 1930s. The project is being completed two blocks at a time, which means two blocks of businesses will be in the middle of a construction zone for about six weeks at a time this summer.

The areas that are under construction are completely shut down to vehicular traffic, and foot traffic is restricted to narrow wooden walkways in front of the buildings. All the equipment, material and activity is pretty interesting, but the coolest thing about the project is how businesses are adapting to the disruption. In the four weeks or so since the detour signs appeared, I've seen several examples of business owners making the most of a situation that is inconvenient at best.

Three Houghton bike shops, two of which are located downtown, worked with the City of Houghton to organize and sponsor a "Bike Expo" in May to celebrate national Bike to Work Day. The expo, which included a race track for BMX bikes that was made out of dirt from the construction site, took place in a two block section of the main street that has not yet been replaced.

The only coffee shop downtown opened a drive-thru outlet along the detour route to make sure loyal customers could get their morning (or in some cases any time) fix. The shop owner explained that he opened the second store to make up for an anticipated drop in business because of the construction downtown. So far, business is booming in both locations.

The president of the Houghton Downtown Merchants' Association, Steve Krug, owns a restaurant that is right in the middle of the downtown district. He attended public construction meetings, saw the construction plans and then decided to hire extra help for the summer. "This is an exciting time; I'm expecting to be busier than ever," Krug said.

The Keweenaw Peninsula Chamber of Commerce has enlisted several downtown businesses in a "construction cash" campaign. The effort involves randomly placing \$1.00 coupons on vehicle windshields to thank people for shopping downtown during the construction project.

Several other businesses are offering special construction-related promotions to keep people coming in, and the Houghton City Council and Downtown Merchants Association have set dates for several special events in the coming weeks and months. Events include live music every Thursday evening, an art festival, a street hockey tournament, and others. And everything's happening amid the rumble of heavy machinery and the smell of diesel exhaust. "Our basic strategy as a business community is to embrace and celebrate the construction instead of avoiding it," Krug explained.

Isn't that cool?

I have also seen negative and frustrating things that have happened as a result of the construction, but I've run out of room. Wouldn't you rather hear about the good stuff anyway?



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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Michigan seat belt use highest in the nation

News release from Michigan Office of Highway Safety Planning

The National Highway Traffic Safety Administration has officially confirmed that Michigan's 97.2 percent seat belt use rate was highest in the nation for 2008. The figure is also a record high for the state.

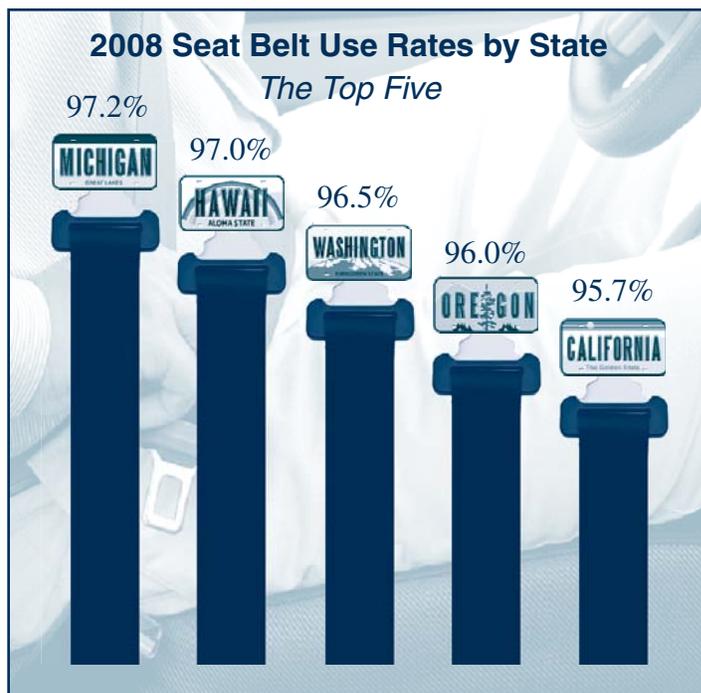
Michigan's seat belt use has been steadily climbing since the state's primary enforcement law took effect on March 10, 2000. Under the secondary enforcement law, belt use peaked at about 70 percent. In 2004, Michigan reached the 90 percent mark, making it the first state east of the Rockies to achieve that milestone.



Further increases came after law enforcement officers began using safety belt enforcement zones during the annual May mobilization. Before zones, most motorists assumed traffic stops were for speeding. Zones are designed to ensure drivers recognize periods of increased safety belt enforcement. Signs alert motorists to the zone area and officers all work a designated roadway.

The state's increasing belt use has contributed to a decline in traffic deaths as well. In 1999 Michigan experienced 1,386 traffic deaths. In 2008, traffic fatalities fell to 980. Direct observation surveys are conducted periodically throughout the year by the Wayne State University Transportation Research Group with grant funding provided by the Office of Highway Safety Planning.

Belt use is only slightly lower in pickup trucks, 96 percent, compared to passenger vehicles, minivans and sport utility vehicles. Men have somewhat lower belt use rates as well, 96.3 percent compared to 98.2 percent for women. Male pick-up truck occupants continue to have the lowest rates of seat belt use (95.5%), followed by male passenger car occupants (96.2%).



On the Web:

Michigan State Police – Office of Hwy. Safety Planning
www.michigan.gov/ohsp

For a direct link to this resource and more, go to:
www.MichiganLTAP.org/pubs/Bridge

City Engineers Invited to the 2010 County Engineers' Workshop

For the first time in the 43 year history of the County Road Association of Michigan's (CRAM's) County Engineers' Workshop, engineers from cities will be invited to attend. The annual three-day workshop is devoted entirely to addressing the various needs of local road agency engineers.

Bob Peterson, director of engineering for the Ingham County Road Commission and chair of the CRAM engineering committee, is looking forward to welcoming municipal engineers this coming year. "Cooperation and understanding among stakeholders on road and bridge projects is more than just helpful, it's necessary," Peterson said. "Our workshop will be a great way to share information and resources with our partners from cities so we can all serve local road users more effectively."

The event includes presentations on innovative road and bridge construction and maintenance techniques, the latest research results, new products and technologies, updates from state and federal partners, and more. It is coordinated by the CRAM engineering committee and Michigan's LTAP. For more information, please contact Michigan's LTAP at 906-487-2102 or LTAP@mtu.edu.

Save the Date!



County Engineers' Workshop

February 23–25, 2010

Soaring Eagle Inn – Mount Pleasant



Final agenda and other details will be available in November 2009. For more information, contact Michigan's LTAP: 906-487-2102 or LTAP@mtu.edu.

On the Web: www.MichiganLTAP.org/CEW2010

When large loads travel local roads

Wisconsin wind farm construction yields tips for managing big projects

Reprinted with permission from the Spring 2009 issue of *Crossroads*, a quarterly newsletter published by the Wisconsin Transportation Information Center.

Picture a flatbed semi 170 feet long maneuvering along rural roads hauling a 120-foot turbine blade. Imagine a truck loaded with a huge generator and weighing in excess of 170,000 pounds covering the same route, where the maximum weight limit without a permit is 48,000 pounds.

Multiply trips like these hundreds of times over consecutive months and you have a large-scale construction project that puts stress on the transportation infrastructure and strains local resources.

Dodge County [WI] Highway Commissioner Brian Field understands this chal-

"It took awhile to develop a better way to handle permitting on such a scale without sacrificing normal operations."

Brian Field – Dodge County, Wisconsin

lenge firsthand. He explains how officials in the southeastern Wisconsin county handled an onslaught of large projects last year requiring permits to move lots of oversized and overweight loads. Two wind farm developments and a major natural gas pipeline construction project, all happening in close succession, prompted them to develop a better way to process requests.

With the future potential for other energy-related projects on tracts of open land, local officials throughout the state can learn from the proactive approach Dodge County adopted, after a rocky start, for managing the safe transport of large loads along its roads. Towns affected by the project did their own permitting but generally followed the county's lead.

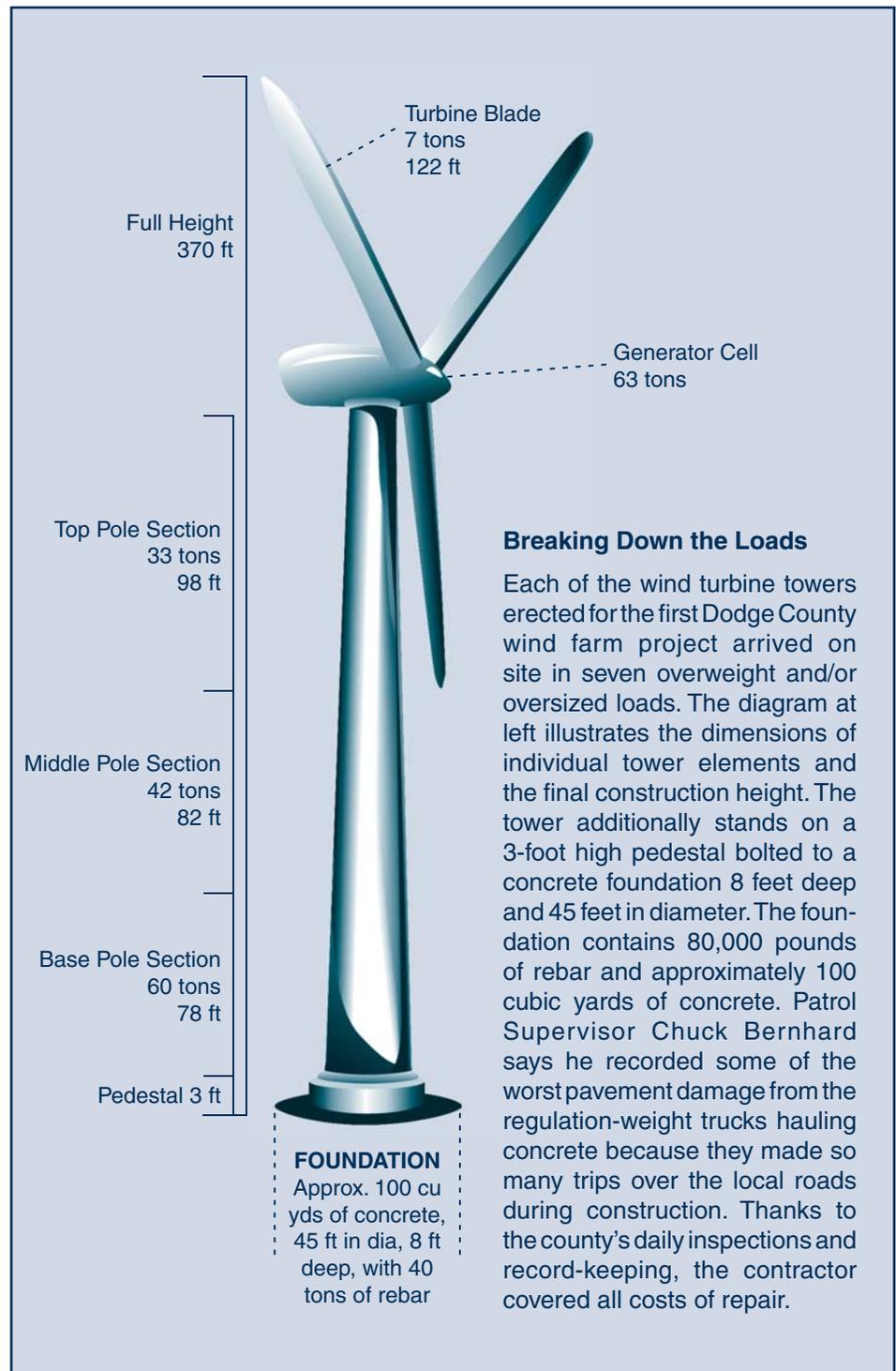
First project overwhelms the system

Once the initial wind farm project began, Field says the county realized the

implications of having so many oversized and heavy loads traveling on its roads. Contractors and trucking firms from all over the country inundated East Side Patrol Superintendent Chuck Bernhard, the

county contact for the project, almost daily with individual requests for what amounted to hundreds of permits.

The project had 48 tower sites in Dodge County (another 18 in neighboring Fond du



Breaking Down the Loads

Each of the wind turbine towers erected for the first Dodge County wind farm project arrived on site in seven overweight and/or oversized loads. The diagram at left illustrates the dimensions of individual tower elements and the final construction height. The tower additionally stands on a 3-foot high pedestal bolted to a concrete foundation 8 feet deep and 45 feet in diameter. The foundation contains 80,000 pounds of rebar and approximately 100 cubic yards of concrete. Patrol Supervisor Chuck Bernhard says he recorded some of the worst pavement damage from the regulation-weight trucks hauling concrete because they made so many trips over the local roads during construction. Thanks to the county's daily inspections and record-keeping, the contractor covered all costs of repair.

Lac County) that needed access permits and authorization for six or seven oversized/overweight loads coming into each site. They also requested multiple utility permits. Demand soon threatened to overwhelm the system.

"It took awhile to develop a better way to handle permitting on such a scale without sacrificing normal operations," notes Field. It was "learn as you go," but it prepared local officials to rethink how to handle the projects that followed.

Regroup around new approach

After struggling to manage the chaos of permit requests and inspections on that first big project, Dodge County regrouped. Local officials put together a plan that simplified communication and successfully streamlined the process. Field describes their step-by-step approach as one that primarily protects local interests, but also helps project owners meet their objectives. The steps Dodge County follows now on all large permitting projects are outlined to the right.

Public interest meets innovation

A range of large-scale permitting projects—logging operations, industrial agriculture, traditional power plants—regularly place demands on roads and local resources. Now a growing interest in alternative energy sources presents a fresh challenge to local officials. Field says the companies building wind farms in Dodge County work all over the United States on similar projects. He was not surprised to learn that every county they go to manages the permitting/damage assessment process differently. The companies encouraged Dodge County's effort to take a uniform approach.

Finally, Field notes that while the county supports such innovative projects that represent a new approach to producing energy and protecting the environment, he says their commitment to protecting the public interest comes first. Establishing an effective working relationship between local officials and the decision makers on large-load projects was an important step in doing so.



Dodge County's approach on large permitting projects

1 – Schedule early planning session

All groups with a stake in the outcome of the second wind farm project and the pipeline project assembled for early planning sessions. Before the trucks started to roll, Field and Bernhard called a meeting of individuals representing the general contractor, the utility coordinator, a trucking coordinator, the Wisconsin Department of Transportation and law enforcement officials. Together, they reviewed all aspects of the project and came up with strategies for minimizing disruptions and damage, and keeping things on schedule.

2 – Identify local concerns

Dodge County officials outlined their own issues of concern at the meeting, like public safety and establishing the condition of roads before, during and after the project. They explored a workable approach to damage assessments, restoration and cost recovery, and reviewed liability coverage limits and certificates of insurance requirements. The county also distributed its policies covering construction access and utility accommodation.

3 – Establish single point of contact

Insisting the general contractor name a key contact person was the change with the biggest positive impact on the process. Field says that having a single point of contact authorized to manage routes, update schedules and make damage assessments improved communication on the project tenfold. If there were problems, Bernhard knew whom to call to get action.

4 – Designate all staging areas and routes

Representatives on both sides surveyed project needs to designate best transportation routes and staging areas. For example, they reviewed how the contractor planned to prepare the route for huge cranes to cross county or town roads between tower sites. Bernhard says this involved putting down steel plates, a layer of stones and then wooden beams to carry the load and protect the roadbed. The county made a videotape record of the routes to log pre-existing conditions before the project commenced. They inspected every route with the project contact to identify hazards, obstacles or other concerns, and determined who was responsible for addressing each one.

5 – Issue permits for all access points

Part of simplifying the process, the county worked with the project contact to identify permanent and temporary driveway entrances, and issued permits in compliance with access policy.

6 – Issue blanket permit for oversized and overweight loads

Aware of the permitting demands of a project that needs to move hundreds of large loads over many months, the county arranged to issue a blanket oversized and overweight permit to the general contractor and trucking firms. They billed the project monthly for related costs, including inspections, traffic sign removal and replacement, intersection modifications, right-of-way restoration and pavement repairs. They required the project managers to keep a daily log of the oversized/overweight loads, recording the route, the date and time, and the hauler.

7 – Conduct daily inspections

Bernhard, or someone he designated, inspected all routes used for the project every day to assess any new damage and determine responsibility. Gathering this information in a timely manner meant less confusion later over who pays for damages.

8 – Inspect all routes after project completion

The county's orderly approach to managing large-scale projects was in place by completion of the first wind farm. Bernhard retraced the construction truck routes to record the post-project condition of pavements, shoulders, ditches and access points. He used a previously shot video log for comparison. The process worked. Field says the contractor met with the county to review findings from this final inspection and paid off minor damages right away. Where it appeared stress from the loads and the volume of truck traffic shortened the expected life cycle of a pavement, the county developed a formula for compensation to offset future costs of resurfacing and billed the contractor.

For more information:

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Young people get a close look at careers in construction

By John Rynanan, Editor, Michigan's LTAP

On April 21 and 22, Ingham, Jackson, and Livingston County Road Commissions brought several pieces of heavy equipment to the Ingham County Fairgrounds. Tuscola County Road Commission brought volunteers. They joined 25 other heavy equipment providers, 40 exhibitors and hundreds of volunteers at the Operating Engineers' Michigan Construction Career Days (CCD) event. Over 2000 students from 53 schools attended.

"Our entire organization, including our board and our union, appreciates the opportunity show these kids careers in the field of road construction," said Ken Straub, managing director of the Jackson County Road Commission. "We participated last year as well, and we will definitely be there in the future."

Classroom to real life

Jill Campbell, a counselor at C.W. Otto Middle School in Lansing, brought 70 eighth-graders. Through over 30 years of counseling middle school students, Campbell has learned to recognize and appreciate activities that help students connect with life outside of the classroom. She was thrilled with what she saw at CCD. "Finding ways to help kids know themselves so they can interact with people and engage in the real world is what my job is all about," she said. "This event was terrific. The equipment operation and hands-on activities really engaged the kids, and the interaction between the young people and the professionals provided a solid personal

connection. My students not only learned a lot about the construction industry, they also learned a lot about themselves."

Lee Graham, training director for the Operating Engineers' Local 324 Training Center in Howell, knows exactly what Ms. Campbell is talking about. "Hands-on work, side-by-side with experienced professionals is exactly how the Operating Engineers approach training and professional development." Graham said. "With this approach, experts not only impart their knowledge to the less experienced, they also work with them over a period of time to refine their skills and develop a deeper understanding of and greater appreciation for the work. It's what makes mentoring so effective."

Graham was instrumental in securing funding to make the Operating Engineers the title sponsor of the event, and he was also a key planner and organizer on the advisory board, which includes the Michigan Department of Transportation (MDOT), Michigan's LTAP, the County Road Association of Michigan (CRAM) and eight other organizations.

It started 10 years ago

The model for CCD events was established ten years ago in Texas. Humberto Martinez, who is now retired from the Federal Highway Administration (FHWA), worked with three others to plan an event that would encourage young people to consider careers in the field of construction. Based on the success of the first event, held in



The Michigan Concrete Association's display included a working sample of pervious concrete.

Texas in 1999, construction leaders in other states began to organize and hold similar events. In 2005, the FHWA established the National Construction Career Days Center on the campus of the University of Rhode Island. Today, the CCD effort has grown to include over 250 events in 32 states.

Mr. Martinez now serves as a technical advisor for planning CCD events. He attended the Michigan CCD event in April, and was very impressed with every aspect of it. "The Michigan CCD event reflects the five-star recipe for capturing the attention of the target audience: our young people," he said. "There were plenty hands-on activities for the students, lots of engaging exhibits, and a perfect operations plan and site layout."



Students experimented with a Laser Screed®, a high-tech material placement machine which was provided by Barton Mallow.



Experienced dozer operators walked alongside of the machines, instructing students as they maneuvered within a 25,000 square foot fenced area.

Martinez also pointed out a few of the behind-the-scenes elements that contributed to the success of the Michigan CCD event. "A core value of the CCD program is that each event should represent the wide diversity of sectors and the wide array of careers that the

Mr. Byrd was pleased with the broad participation and support from the construction industry, but he pointed out three areas where the event could be made even better. "Next year we're going to concentrate on getting more big contractors

The Michigan CCD event reflects the five-star recipe for capturing the attention of the target audience: our young people

Humberto Martinez, National Construction Career Days Center

industry has to offer. The event in Michigan was spearheaded by a highly motivated and cohesive team of planners and organizers who generated support from several sources. Top to bottom, I was very impressed. The future for Michigan's construction workforce is bright," he said.

Bigger and better next year

That's great news for Brindley Byrd, executive director of the Capital Area Construction Council in Lansing. Byrd serves as the chair of the Michigan CCD advisory board, the spokesperson for the event, and the top advocate for all things construction in Michigan. He served in the same capacity last year to organize the first Construction Career Days event in Michigan.

"This was awesome; even better than last year," Byrd said. "The weather was cold, wet and windy, but it takes more than a little bit of weather to dampen the enthusiasm of Michigan's construction industry."

involved so we can have even more activities," he said. "We also want our county road commissions and city departments of public works to be there in a bigger way, and we want more participation from colleges and universities."

Planning has begun

Byrd and the advisory board have begun to plan the CCD event for 2010. It will be held again at the Ingham County Fairgrounds next spring. If you would like to get involved, please contact Michigan's LTAP at 906-487-2102 or the Capital Area Construction Council at 517-492-5575.

On the Web:

Michigan CCD
www.MichiganCCD.org
National CCD Center
www.uritc.org/nccdc

Road-Stream Crossings from Page 1

fish and wildlife. Safe and stable crossings accommodate wildlife and protect stream health while reducing expensive erosion and structural damage.

Structural analyses are necessary to ensure that crossings are safe, particularly for new bridges. For replacement crossings, the slope of the streambed upstream and downstream of the crossing should be compared to ensure that the slope and elevation of the bed connects through the crossing. If it does not connect, excessive streambed erosion can result upstream of the culvert, or other problems can arise. Qualified consultants can provide technical assistance on all of these issues.

Local highway departments and construction professionals have considerable creativity, expertise, and local knowledge that will enable them to design effective crossings. Resource agencies have a good understanding of the natural resources in their area and the level of protection that may be required in certain areas.

Yes! Crossings can and should be essentially "invisible" to fish and wildlife. They should simulate the stream by maintaining appropriate flow and substrate through the crossing and by not constricting the stream. At the same time, designs should be efficient and cost effective. A structure that is properly designed for fish and wildlife movement will also be less prone to maintenance issues and failure due to flooding. Site-specific information and good professional judgment should always be used to develop practical and effective crossing designs.

For more information:

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On the Web:

Massachusetts Stream Crossings Handbook
www.mass.gov/dfwele/river/programs/rivercontinuity/guidancedoc.htm

U.S. Forest Service
www.fs.fed.us/eng/pubs/pdf/StreamSimulation/

U.S. Fish and Wildlife Service
www.fws.gov/midwest/Fisheries/streamcrossings/index.htm



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Upcoming Events

July

20-22 **HEC-RAS**
(Lansing)

23-24 **Scour Analysis (requires HEC RAS)**
(Lansing)

October

7, 14, 21, 28 **Local Roads Seminar**
(7-Nov, 14-Grand Rapids, 21-Okemos, 28-Troy)

27 **Transportation Asset Management Conference**
(Marquette)

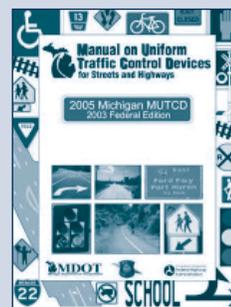
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Jack Welch,
former Chairman and CEO of General Electric Corporation

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