

MICHIGAN Civil Engineer

Winter 2006

Portland's River Trail re-uses historic steel bridge

The City of Portland's River Trail connects a quiet and scenic linear park to other municipal parks, school facilities and its historic downtown district. Portland, the "City of Two Rivers" is located at the confluence of the Looking Glass River and the Grand River near its downtown. The River Trail is unique in that it utilizes four historic bridges to connect segments of the trails that follow and cross both of the rivers. Two of the bridges were restored in their original locations. The other two bridges were relocated to the Portland, one from 40 miles away in Kent County and the other from just south of town. The bridge restoration and River Trail construction has been ongoing for 15 years.

The first of the four restored historic bridges, the Bridge Street Bridge over the Grand River, is a Pratt through-truss which was restored in 1990 for vehicular use. The restoration was funded with Critical Bridge funds by the Michigan Department of Transportation (MDOT) and Federal Highway Administration (FHWA) — the first time in Michigan that these funds were used for restoration instead of replacement.

Another bridge crossing over the Looking Glass River was moved to Portland. The 1904-vintage Burroughs Bridge from Kent County was no longer suitable for vehicular traffic, however was in great shape for pedestrian traffic. The bridge was removed, renovated and painted off-site and brought to Portland. Funding for this project matched funds from MDOT with grants from the Michigan Natural Resources Trust Fund (MNRTF) and Portland's Downtown Development Authority. As part of the same project, an existing railroad bridge was painted and retrofitted with railings and a new walking surface.

As usage on Portland's trail system continued, City officials looked to extend a trail loop to the south of town toward I-96, necessitating another Grand River crossing. Again, the city matched MDOT with MNRTF funds. With its past success restoring historic bridges Portland again considered using a historic bridge for the new crossing. Engineers

from HH Engineering and Fleis & VandenBrink studied options for the new crossing. This time there were three historic bridges available for relocation and re-use. Two of the bridges had been closed for many years due to deteriorated decks, but the steel trusses were still in good enough condition to be restored.

A third bridge, Portland's Kent Street Bridge, was closed in 2001 due to deterioration of its deck and steel stringers. Kent Street is the downtown Main Street in Portland. The Kent Street Bridge crossed the Grand River, and Portland had secured MDOT Critical Bridge funds to replace it.



Three factors led the engineers to select the Kent Street Bridge: the replacement the cost to remove the bridge would be paid by the Ionia County Road Commission; it could clear-span the river, minimizing floodplain impacts; plus local residents were familiar with the bridge.

Research of the history of the Kent Street Bridge and structural analysis of the truss system indicated that it was designed for a uniform loading of 100 pounds per square foot. This was more than enough capacity to consider it for pedestrian use.

The Kent Street Bridge is a single span, pin-connected, Parker through-truss, originally constructed in 1907. The Parker truss is similar to a Pratt Truss in the arrangement of truss members, but also has a polygonal "arched" upper chord rather than a straight upper chord. The arched chord adds to the aesthetic charm of the bridge. The truss consists of 11 panels of 20 feet for a total length of 220 feet. The structure's upper chords are 35 feet above the deck at the center panel. Due to the size of the bridge, its relocation to another site could not be done without

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PRESIDENT'S Message

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Bryan Jennings, PE

Greetings!

By the time you read this edition of the MCE, the rush of the Holiday Season will be behind you and we will already be into planning for another construction season.

In March 2005, ASCE released its third report card of the nation's infrastructure. With an overall grade of "D", it emphasized that our roads, bridges, water & sewer systems, schools, transit, energy, aviation, dams, solid waste, hazardous waste, navigable

waterways, parks and recreation facilities, and rail systems may soon fail to meet the country's needs. The new grades emphasized that our nation's infrastructure has shown little to no improvement since receiving a collective D+ in 2001. U.S. infrastructure funding needs are estimated to be **\$1.6 trillion** over the next 5 years. In the words of our new ASCE President, Dennis R. Martenson, **"It is our duty** to raise our voices and make our elected officials keenly aware of the crisis. **Sound infrastructure is the basis for a sound economy."**

Using its Report Card, ASCE is elevating public awareness of this crisis. This news reached more than 90 million people through more than 1,600 confirmed news placements. More than 1.5 million web site visits occurred the day they launched the site.

Here in Michigan, our infrastructure is critical to our economic health and the quality of life that we all enjoy. We use transportation systems to get to where we are going, water and wastewater systems, watch storm water flow down the drains, set our trash on the curb and send our kids off to schools - seldom thinking about what it takes to keep these systems operating. Consider this:

- 38% of Michigan's major roads are in poor or mediocre condition.
- 29% of Michigan's bridges are structurally deficient or functionally obsolete.
- Michigan has 79 high hazard dams.
- The Detroit metropolitan area loses 96 million gallons of drinking water per day due to leaking pipes.
- Michigan generates 1.68 tons of solid waste per capita.
- Michigan has \$4.09 billion in wastewater infrastructure needs.
- 52% of Michigan's schools have at least one inadequate building feature.

With this in mind, the Michigan Section of ASCE is exploring the possibility of assessing the condition of our region's infrastructure in order to create a Michigan Infrastructure Report Card. Presently, we are just in the discussion stage. We realize that this is a large task, potentially taking many hours and individuals from all aspects of our profession to review and evaluate the different infrastructure categories. However, if we are able to accomplish this goal, we feel that it will provide the means for educating the public and policy makers so that we can sustain our local infrastructure at acceptable levels, and thereby helping to maintain the quality of life that we all enjoy.

Stay tuned! We may be calling you for assistance!

Bryan Jennings, PE

DRIESENGA RANKED 25TH BY CE NEWS

Driesenga & Associates was ranked 25th in CE News' 2005 "Best Civil Engineering Firms to Work For" contest. The editorial judges at CE News took into consideration company programs, practices, benefits and values, with an emphasis on ethics in business to determine the rankings. 135 engineering firms in the United States participated in the fifth annual contest.

CHANGES AT HRC

Hubbell, Roth & Clark, Inc. (HRC) announced the retirement of President Gerald F. Knapp, P.E., after a distinguished 45-year career with the firm. Knapp had been primarily responsible for oversight of planning, design and construction engineering for major municipal wastewater, stormwater and environmental infrastructure projects.

George E. Hubbell II, P.E., DEE, has been named President of the firm effective January 2006. As a fourth-generation successor, Hubbell follows in the footsteps of his great grandfather, Clarence W. Hubbell, founder and firm visionary who provided innovative engineering solutions for the City of Detroit's growing population in the early twentieth century.

OHM ADDS HOGAN

Orchard Hiltz & McCliment, Inc. (OHM), announced that Patrick A. Hogan has joined its Transportation Group. Hogan recently retired from Wayne County's Department of Public Services (WC DPS) as its Director of Roads. At OHM, he will be responsible for community and agency relation, with a focus on transportation-related engineering projects.

LTU RECOGNIZES TORO WITH TEACHING AWARD

Keith D. Toro, PE, a project engineer with Soil and Materials Engineers, received the 2005 "Adjunct of Year Award" by the American Society of Civil Engineers (ASCE) Student Chapter of Lawrence Technological University in Southfield, Michigan. This award recognizes an outstanding adjunct professor in Lawrence Technological University's Civil Engineering program.

TETRA TECH ADDSWATER RESOURCE SPECIALIST

Tetra Tech announced the addition of David L. Moore, P.E. as a Water Resource Specialist.

LEE WEEVER JOINS HOLLAND ENGINEERING

Holland Engineering, Inc. (HEI) announced that Lee Weever, E.I.T. has joined their Holland, Michigan office as Staff Engineer. Weever will be assisting with civil engineering design for residential, commercial and industrial developments.

WILLIAMS & WORKS ADDS STAFF

Williams & Works welcomed new staff members Dan VanderHeide, EIT, and Joshua Dudicz, EIT, as engineers for the company's civil and site development group.



Moore



Toro

CHEN TO PLANTE & MORAN AS PARTNER

Plante & Moran CRESA announced that Tom Chen, PE, has joined its practice as a partner, where he'll provide leadership in strategic planning, operations, risk management, and market research consulting services to clients in both the public and private sectors. Prior to joining Plante & Moran, Chen served as senior vice president at Skanska USA Building Inc., in Southfield, Michigan. Chen held associate, vice president of sales and marketing, and senior vice president of corporate development positions for Greiner Engineering Inc. and URS Corp.

DEHONDT JOINS HUBBELL, ROTH & CLARK

Hubbell, Roth & Clark, Inc. (HRC) announced that Thomas DeHondt, PE, has joined HRC as Senior Project Engineer after a career spanning 30 years with the City of Sterling Heights.

BELIAN SET TO LEAD IRISH IN DETROIT

The Notre Dame Alumni Club of Detroit has elected its 2005-06 Board of Directors. Gerald M. Belian, PE, Vice President/Principal in the Plymouth, Michigan office of Soil and Materials Engineers, Inc. (SME), was elected President-Elect.

ASCE MICHIGAN ACCEPTS HARDWARE IN L.A.

Past Michigan Section President Jim Hegarty, PE accepted a Merit Award in Governmental Relations from ASCE Past President Bill Henry at the recent National Convention in Los Angeles. The Section was honored for its work to restore funding for the Dam Safety Unit of the MDEQ.



2005 ASCE HISTORIC CIVIL ENGINEERING LANDMARK: STEGMAN CREEK CULVERT

The 1885-vintage stone culvert over Stegman Creek in Kent County's Algoma Township is the ASCE Michigan Section's Historic Civil Engineering Landmark for 2005. Under the former Grand Rapids & Indiana Railroad (now the White Pine Trail, a non-motorized facility that stretches between Comstock Park and Cadillac), the stone culvert was restored in 2005. ASCE's recognition follows its listing on the National Register of Historic Places in 2001.

The Grand Rapids & Indiana Railroad extended from Fort Wayne, Indiana to Petoskey, Michigan. The stone culvert over Stegman creek was actually the second structure at the site. The first, a wooden trestle built in the 1860s, needed replacement because of arson & flooding problems. The railroad hired an Algoma Township settler, James House, to gather rocks from his 147 acre farm and to cut and shape them by hand and haul them by wagon to the site for workmen to assemble between 1883 and 1885. It is the oldest existing structure in the township. This railroad formed a connection from the trans-continental railroads and extended through the western portion of Michigan to Petoskey, and later served the Mackinac Straits. This was a factor in the development of the area. The development of resorts, such as the Grand Hotel on Mackinac Island, off Mackinaw City, and Bayview Resort in Petoskey were financed or enhanced by this railroad. The white pine logged off the northern

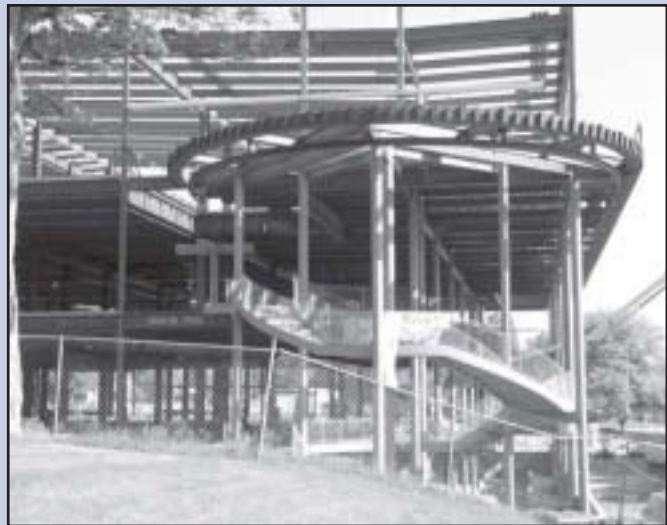


Michigan area were transported throughout the United States. There were three passenger trains per day with sleeping car service direct from Chicago, Cincinnati, Indianapolis, Louisville and St. Louis.

Funding and support for the 2005 stone culvert restoration was provided by the Michigan Department of Transportation, Michigan Natural Resources Trust Fund, the Forest Management and Park & Recreation Divisions of the MDNR, Kent County Parks and Algoma Township.

RUBY & ASSOCIATES PROJECT WINS AWARD

Ruby+Associates received the 2005 Outstanding Project for the Lansing Community College, Health & Human Service Career Building in the National Council of Structural Engineering Association (NCSEA) Excellence



in Structural Engineering Awards competition. Originally designed as a 3-story building, with a future fourth floor expansion, this modern structure had a price tag of \$2.7 million. Partnering with Douglas Steel to deliver the steel structure of the building, Ruby applied constructability principles and completely redesigned the structural steel component of the building. This redesign saved enough money to enable LCC to construct the fourth floor and still bring the project in several hundred thousand dollars under budget.

Observations of an eccentric mind:

"Winnie would spend all of his time practicing limbo... He got pretty good... He could go under a rug..."

"All of the people in my building are insane. The guy above me designs synthetic hairballs for ceramic cats. The lady across the hall tried to rob a department store... with a pricing gun... She said, "Give me all of the money in the vault, or I'm marking down everything in the store..."

"He was a multi-millionaire... Wanna know how he made all of his money? ... He designed the little diagrams that tell which way to put batteries in..."

"If you can't hear me, it's because I'm in parentheses..."

Steven Wright

Railroad Engineering is back at Michigan Tech

Replacing its aging workforce is one of the most significant challenges for the American rail industry. Almost half of the current railroad engineers are within five to ten years of retirement. The task of finding graduate engineers for an expanding industry is not an easy one. At one time, railroad engineering was a common course in civil engineering programs and many graduates moved into the rail industry, but these courses have virtually disappeared and today few universities have a separate course and many do not even mention rail in their introduction to transportation engineering course.



Michigan Tech responded to the challenge and now offers an introductory course in railroad engineering with a study abroad component. It is an intensive five-week program in which students spend one week on the Michigan Tech campus, one-half week in Chicago, and three and a half weeks in Tampere, Finland studying railroad engineering along with Finnish language and culture. The program has been offered the past two summers and planning has started for summer 2006. Finland was chosen as the study abroad partner because of the Finnish heritage in the Houghton-Hancock area and an existing partnership with Tampere University of Technology. Pasi Laulata, a Ph.D. student in civil and environmental engineering at Tech, is the coordinator of the program and primary instructor in the railroad engineering course. He has several years of railroad and rail consulting experience and was born and raised in Tampere, Finland.

The railroad engineering course is a technical elective and the Finnish course can be used as a general education elective. The railroad engineering course covers a wide range of topics including history, rail organizations, freight and passenger rail transportation, urban rail transit, operations and train characteristics, safety, track layout and design, signals and communications, and construction and maintenance.

In its first year 16 students enrolled and last year 13 students enrolled. Five of the six largest railroads in the United States (CSX, BNSF, Union Pacific, Canadian Na-

tional, and Canadian Pacific) interviewed on campus and of the 16 students that participated in the 2004 program, 14 graduated in 2004-05, and 7 accepted permanent employment with a railroad. A summer internship program was developed for this year's students and of the 13 students

that participated in the 2005 program, 6 accepted positions with a railroad when they returned from Finland. One student actually accepted a position with the VR Track, Limited (the Finnish national railroad). The program is providing a special niche for Michigan Tech and a good

source of employees for the rail industry at a time when they need them most. Railroad engineering is back at Michigan Tech.

LEE ROAD ROTARY OPENS IN LIVINGSTON COUNTY

A recent ribbon-cutting ceremony celebrated the opening of an innovative traffic rotary serving traffic exiting US-23 at Lee Road in Green Oak Township. Constructed in just 42 days, the rotary will provide traffic solutions for the new \$100 million Green Oak Village Lifestyle Center slated to open in October 2006. In 2006, another rotary will be constructed on the opposite side of the highway. Orchard, Hiltz and McCliment, Soil and Materials Engineers, Parsons Transportation Group, the Michigan Department of Transportation, Livingston County Road Commission, Green Oak Township, Quadrants, Inc., Redico and Lormax Stern worked together to make this project a reality. When both traffic rotaries are completed, this will be the only dual-rotary in North America.



(from page 1)

dismantling the bridge, creating significant construction and engineering challenges.

The project to remove the bridge from its original site and replace it with a new bridge was undertaken by the Ionia County Road Commission in 2002. The contractor hired to build a new bridge at Kent Street, Davis Construction, removed the old steel bridge by lifting it from each end with cranes and setting one end on a barge. The other end rested on a dolly that was pulled by a bulldozer to move the bridge to the south side of the river. After it was moved, temporary piling was installed to brace the truss and then truss members were dismantled panel by panel. Timber deck boards, steel beam stringers, pins, eye-bars, cross-bracing, bearing plates and all other miscellaneous parts of the bridge were transported to the Portland DPW's yard. All steel parts were tagged so that they could be re-installed in their original position.

With the bridge removed and more easily accessible, it was easier to assess the needed repairs prior to completing the design and construction plans for its re-use as a pedestrian bridge. During removal of the bridge the contractor had to cut the longitudinal steel stringer beams to remove them from the floor beam support brackets. Rather than replace these stringers with new steel beams of the required length it was determined that it would be more economical to replace them with treated timber deck panels. The timber deck panels would also serve as the deck surface. Pins for the lower chords were also cut during removal, but it was already decided to replace the pins with new stainless steel pins. The lower level horizontal steel cross bracing rods were significantly deteriorated and would be replaced with steel new rods. The transverse steel floor beams had deteriorated, however, the capacity of the beams was higher than required so that modifications could be made to salvage them.

The new site required a 300-foot-long bridge to span the floodplain. Approach spans were required to reach this length. The approach spans were designed to utilize the steel stringer beams that had to be removed. The timber deck that was removed from the bridge was also salvaged and utilized on the approach spans. New timber deck boards were specified to overlay the older boards.

The restoration design, including new abutments, piers, bearings and railings was completed and bid in 2003. Davis Construction, the contractor for the bridge removal,

PORTLAND HISTORIC BRIDGE RESTORATION

PROJECT TEAM

OWNER
City of Portland

ENGINEERS
HH Engineering
Fleis & VandenBrink

CONTRACTOR
Davis Construction

COST
\$680,000

was again hired for the \$680,000 restoration project. Work started in the City DPW yard in the summer of 2003.

All of the steel parts to be re-used were sandblasted and coated with a three-coat paint system. Repairs of damaged verticals, including pin connection plates, and floor beam repairs were also done in the yard. To protect the environment from dust, potential lead contamination, and paint spray a full containment system with negative pressure was used for blasting. Soil samples at the site were analyzed before and after the operation to assure there were no negative impacts. There were vertical members that had been damaged by vehicle collisions and replaced with members that did not match the original. These members were replaced to restore them to their original member sizes. Lacing bars on

the members were riveted to match the original rivet construction. Painting, steel repairs and riveting were accomplished by subcontractors.

While the steel repairs and painting were proceeding, the new pile-supported foundations were built. The contractor decided that re-installation of the bridge would require a temporary support system to be built across the river, parallel to the bridge foundations, rather than erecting the bridge and lifting it into place from the river banks. The temporary support system included an erection frame, rollers and a winch system to pull the truss across the river in stages as each panel of the bridge was erected.

After the entire truss was put back together it was pulled even with the new foundations and then lifted into place with cranes on each side of the river. With the truss in place the crossing was completed with installation of the approach spans, the timber deck panels, touch-up painting and railing installation. The project was completed in the fall of 2003.

Cooperation and coordination with MDOT and the Kent County and Ionia County Road Commissions has been an integral part of the success of each of these projects. With the completion of the bridge and trail construction the City has over 8 miles of paved trails and numerous trail heads, which include large parking areas. The trail has met the community goal of providing a network of safe routes between parks and schools, as well as added recreational, community and business opportunities. The total cost for the bridge restoration portions of the River Trail projects was approximately \$1,000,000. Through innovative use of grant funds and historic structures the City has a unique trail system that has enhanced the character of the City and preserved elements of the area's history.

SPOTLIGHT

Dennis Martenson, PE



Dennis Martenson, PE

mce How has your role or involvement in ASCE helped you?

dm It has helped me develop better skills, both technically and professionally. In addition, I have been able to meet many wonderful civil engineers.

mce What was the last good book you read, and why did you like it?

dm "Authentic Leadership – Rediscovering the Secrets to Creating Lasting Value" by Bill George, former Chairman and CEO, Medtronic. I like it since it tells how we need to have ethics and be "real" people and lead with honesty and integrity.

mce What is the most enjoyable part of your job?

dm As ASCE President-elect it is meeting other civil engineers and students; in my real job at CDM, it is knowing that what I am doing daily does make a difference in the peoples' lives via improvements in potable water supply and wastewater treatment.

mce What do you do to relax?

dm I find many things help me relax, e.g. reading, woodworking, playing with grandchildren, watching movies going to sporting events.

mce If you could give a young civil engineer one piece of career-enhancing advice, what

would it be?

dm Develop a good attitude about the field of civil engineering and you will be successful because you will have an interest and commitment to your everyday work that will reap rewards as you progress in your career.

mce What do you think is the biggest challenge facing ASCE?

dm While there are certainly many, the great diversity of our membership is a strength but also a challenge in that it is difficult to represent the interests of every practice area for our 137,000-plus members.

mce Who is your favorite comedian?

dm Although he has passed away, Bob Hope.

mce If you could not be a Civil Engineer, what would you like to do?

dm I would like to have been a medical doctor but my interest in construction led me to study civil engineering.

mce What is the most frustrating aspect of your work?

dm As an ASCE presidential officer it is the inability to change the actions of our elected officials relative to the need for infrastructure funding.

mce If you knew at age 25 what you know now, what would you have done differently?

dm Probably started saving money earlier since I did not realize the time value of money until I was in my 40s.

mce Of what are you most proud regarding your involvement with our profession?

dm Serving as a role model and mentoring young civil engineers including those who were studying civil engineering in college.

mce Who or what inspired you to choose Civil Engineering?

dm My interest in construction and my parents wanting me to obtain a college education. If it were not for their insistence on a college education, I may have been a tradesman.

mce What do you think is the biggest challenge facing our profession?

dm While there are many, it is my opinion that getting our elected officials and citizens to realize how vital good infrastructure is to the economy and the health and welfare of the public. I think the tragic events in southeast Asia and recently in the US Gulf Coast should show how important that is; however, I am not certain that they make the connection.

mce What is your favorite movie of all time?

dm That's a tough one, but I'll say Miracle on 34th Street.

mce Is there anything else you'd like our readers to know about you?

dm Anything worthwhile in life takes effort and dedication to achieve.

mce What was your first job?

dm My first job that paid was being a paperboy. I was able to deliver 110 papers on a paper route for some 5-plus years and saved enough money to buy my first automobile.

THE MARTENSON FILE ASCE's 2005-2006 President


EMPLOYER
Camp, Dresser and McKee

EDUCATION
BSCE & MSCE
University of Minnesota

QUOTE
*"Develop a good attitude
about the field of civil
engineering and you will
be successful."*

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