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Rail Transportation News Summer 2010

Rail Transportation Program

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The Michigan Tech Rail Transportation Program Newsletter

Summer, 2010

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Transportation Institute

Michigan Tech Hosts Two Summer Youth Programs in Transportation

Summer Youth Program participants visiting the Lake Superior and Ishpeming Railroad

The year 2010 marked the first Summer Youth Program in "Rail and Intermodal Transportation." Michigan Technological University's (Michigan Tech) Rail Transportation Program organized and funded the week-long exploration course in railroad transportation in collaboration with the Transportation Logistics Management Program at the University of Wisconsin-Superior. The program provided partial scholarships to ten high school students who participated in a variety of topics, such as freight and passenger rail transportation, track-train dynamics, equipment and motive power, the role of intermodal transportation in supply chains, and rail operations and track structure. Students visited the Lake Superior and Ishpeming Railroad, Lake Linden Historical Railroad, and the University of Wisconsin Superior, Duluth railroad museum (including a train ride on North Shore Railroad), and the Duluth maritime museum.

Steven Chartier, president of the Railroad Engineering and Activities Club (REAC) and one of the main instructors and coordinators for the program, was quite excited about the program outcomes: "I believe that the first Rail and Intermodal Program was a great success. We had ten great students that had interests in all different parts of rail transportation, ranging from structures to train operations and passenger service, including high speed rail. We were surprised how knowledgeable and interested the group was right from the beginning. It was also great to have the chance to teach these young people about the industry and what it has to offer."

With the success of our first Summer Youth Program, we are looking forward to teaching future railroaders about the industry and what it has to offer in the summer of 2011 and beyond.

National Summer Transportation Institute

For the second consecutive year, the Federal Highways Administration awarded Michigan Tech the National Summer Transportation Institute (NSTI) program, hosted by the University Transportation Center for Materials in Sustainable Transportation Infrastructure (UTC-MiSTI) and the Michigan Tech Summer Youth Programs department.

The competitive scholarship program, held on campus July 19-30, attracted students interested in various forms of transportation. This summer, 27 youth participated in the two-week residential program, which included a visit and behind-the-scenes look at the Mackinac Bridge, a tour of the Soo Locks, and numerous local field visits. In cooperation with the Michigan Department of Transportation (MDOT), students were offered transportation courses through the AASHTO TRAC (Transportation and Civil Engineering) program. In addition, the RTP provided passenger rail transportation and railroad engineering modules, delivered by Dr. Bill Sproule and Steven Chartier, respectively.

Director's Message

Michigan Tech's Rail Transportation Program (RTP) is now three years old, and while the economy over the past year has still been lagging, RTP activities haven't shown any sign of a downturn.

One of this year's big accomplishments was the opening of the CN Rail Transportation Education Center (CN RTEC), a highlight on its own, but the speed with which students took advantage of the resources and social connectivity offered by the CN RTEC was beyond our expectations. We have also been busy with industry partners helping students and graduates attract competitive nationwide scholarships and secure internship and full-time positions that launch their railroad careers. Two more graduate students completed our program, and almost twenty students have been hired for either internship or full time industry positions – quite a testimony to the quality of our students and our program. In addition to our current students, ten exceptional high school students participated in our first Summer Youth Program in Rail and Intermodal Transportation. The upcoming generation demonstrated the necessary talent and enthusiasm to become the future leaders of the railroad industry, and we look forward to these students joining the RTP in the future and new summer programs next year.

We are continuing our international activities, which have always been a high priority to us. Our transatlantic research project in railway education has seen great progress during its first year. We also have a visiting scholar from the Chinese Railway Institute and the first international Ph.D. student has started in the RTP. Read more about all of these achievements and activities in this newsletter and in the upcoming annual report (available soon on our web site http://rail.mtu.edu/).

It's an optimistic time for rail transportation. The freight industry weathered the economic downturn extremely well, and the U.S. high speed rail (HSR) initiative has made great progress. Although I am excited about rail's future, I will finish with a word of caution. Over the past couple of years, a lot has been said about the benefits of rail to environment, efficiency, and safety, but many recipients of these messages have unrealistic expectations. With rail's efficiency, freight shippers expect continuously lower prices, rail transit passengers don't understand service cuts and rate hikes at a time of increasing demand, and passengers expect to see new HSR running in the very near future. Rail programs at universities can be one of the tools to educate the public and future customers about the intricacies of rail transportation and help dispel misunderstandings and misconceptions. However, the academic infrastructure in railway engineering and transportation is underdeveloped. While the first steps are being taken by Michigan Tech and others to establish this infrastructure, our program and others require much stronger commitment and collaboration between academia, industry, and government. We appreciate the continuing commitment of all our partners, and we look forward to discovering new partners as we grow the RTP and the rail industry as a whole.

Pasi

Railroad Engineering Activities Club Update

Since 2005, the Railroad Engineering and Activities Club (REAC) has served the Michigan Tech community by teaching students, faculty, and community about the rail industry, and providing networking opportunities with industry professionals. REAC is an official student chapter of the American Railway Engineering and Maintenance-of-Way Association (AREMA), and has nearly 40 members from ten different degree programs.

The general monthly meetings assemble REAC officers, members, and the public to discuss club business and plans. An industry speaker also presents current issues from various fields related to rail transportation, reinforcing our vision as a multi-disciplinary organization with opportunities for students from multiple departments. Some examples of last year's speakers include: Tony Hatch, a senior transportation analyst on Wall Street; Steve Meyer of the Utah Transit Authority; John Moore, formerly of Safetran Systems; and David Thomson of S.T.V. Incorporated.

Field visits and conferences are a highlight of REAC's activities and provide students with a firsthand look at the rail industry. This year students observed unloading and loading docks and rotary rail car dumpers at visits to the Lake Superior & Ishpeming Railroad iron ore docks and at CN's Escanaba ore transport and storage facility. In other 2009-2010 highlights, 11 students attended the AREMA Conference in Chicago, IL, and our 5th Annual Railroad Night was again a success with 136 attendees.

This past year was very successful and busy for us. The new CN RTEC will help us continue our mission of informing students of the excellent opportunities and benefits within the rail industry, and we are proud to be leading the way for rail education to students.

Stephen Chartier, REAC President

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CN Rail Transportation Education Center (CN RTEC) a Major Boost for Students

The doors to the new CN Rail Transportation Education Center (CN RTEC) opened in February, 2010 with a generous donation of $250,000 from CN railroad. The donation allowed the Rail Transportation Program (RTP) to renovate Dillman Hall rooms 315 & 316 to accommodate the rail education center, designed by the Railroad Engineering and Activities Club (REAC) members. Since that time, the rooms have been in intensive use by the students and faculty.

Room 316 of Dillman Hall is now dedicated to the students of the rail program and REAC. The center houses a library of rail books, reports, magazines, videos and promotional material, as well as four computer work stations equipped with rail engineering software. The student center has been a huge success for students involved in the RTP, as evidenced by Lars Leemkuil, a civil engineering student currently in internship with CN, "The CN RTEC is a great place to collaborate on projects. It provides unique resources to students that are found nowhere else on campus, in addition to specialized software for railroad related projects. It is a great learning environment." The student center also serves as a "home base" for RTP student employees. It gives them a secure work area with all the necessary resources to conduct typical work on rail related education and research projects.

Dillman Hall 315 houses the media center and general conference room with a large plasma TV and numerous work stations. Webinars and remote conferences will be held there to benefit the RTP and REAC, and the room has quickly become a central meeting location for both faculty and students. It is equipped with a camera for web based video communication, table microphones for computer audio projection and transmission, a tablet for whiteboard use in Adobe Connect Pro, and wired Internet connections. The space is shared with the Center for Technology and Training (CTT), who hosts nationwide Web-based training programs for their RoadSoft software and other training events.

As we get ready for the 2010-11 academic year, we are expecting even more active utilization of the CN RTEC center and will be continuing to add resources for our students and faculty to learn more about railroads and related technologies.

The CN RTEC is a great place for RTP participants to meet, study, and work

The CN RTEC has a complete virtual meeting and presentation room for RTP and CTT faculty, staff, and students

Lake Superior & Ishpeming Track Improvement Project

In the fall of 2009, a multidisciplinary group of 13 students participated in a track improvement project for the Lake Superior & Ishpeming Railroad (LS&I). The project consisted of designing a bypass track around a weigh-in-motion scale and an intermediate siding to allow passing of two iron ore trains. The project also included evaluation of construction costs and operational savings between alternative improvements. A civil engineering senior design group, along with the Efficiency through Engineering Enterprise (ETEC) team and students from the surveying program performed surveys and soil sample collection on site and worked together to develop the final design products. The groups were led by Dr. Pasi Lautala, Lynn Artman, and industry advisors from AECOM (Lance Pepper) and LS&I (Darryl Babbitt).

After the 15-week extensive study, the students made several recommendations to LS&I. For the Pine Hill location, students suggested constructing the project in several phases, beginning with building a bypass track around the existing scale (at a cost of approximately $850,000) so empty trains could pass the scale with regular track speeds. The second phase was to build a new scale on the bypass track (at a cost of approximately $250,000). This would allow LS&I to operate at a larger capacity and lower travel times to the dock. Although the senior design group also designed an intermediate siding for the track (with a cost of $1,200,000), the operational benefits indicated that the Pine Hill bypass track would provide a better solution than intermediate siding.

Philemon Lewis, Michigan Tech Alumnus and REAC guest speaker

Alumni Highlight
Philemon Lewis
(ME-EM, 1949)

In April, 2010, the RTP and REAC were privileged to host Michigan Tech Alumnus of Mechanical Engineering – Engineering Mechanics (-49) and long-time industry veteran, Philemon Lewis. Mr. Lewis spent most of his career working in many areas of the railway industry and was the founder of Lewis Rail Services (now part of Harsco Corporation). Mr. Lewis participated in the lectures of Railroad Track Design and Engineering and gave a presentation titled "50 Years of Railroading, Perspective of a Tech Graduate" for the REAC members. In addition, several discussions were conducted between Mr. Lewis and students involved in the RTP on the current state of railway industry and on the opportunities available for young graduates.

Rail Transportation Program Hosts Visiting Scholar from China

In January 2010, the Rail Transportation Program welcomed Chao Ma as a visiting scholar to the program. Chao is on a one-year sabbatical from the Shijiazhuang Railway institute in China where she is a faculty member of the Civil Engineering School in the Road and Railway Engineering Department. Chao arrived in Houghton with her seven year old daughter Shiqi Yuan, who attends a local elementary school.

Chao during the Rail Transportation Program's visit to Pingyao, China

Chao worked with the RTP team during their visit to China as part of the Alaska & Canada Rail Line project. While in China, Chao and RTP members explored the national railway system and assisted in organizing visits with local experts on cold climate railroad research.

During her stay at Michigan Tech, Chao's objective is to learn more about railway engineering and higher education in the United States and compare railway education and teaching between China and the United States. She is providing RTP members with insight into the Chinese railway systems. To date, Chao has provided guest lectures in the railway engineering classes, assisted in the development of a concrete tie sustainability project, and led material preparations for the Rail and Intermodal Transportation Summer Youth Program. She has been a tremendous asset to the RTP, and we look forward to developing even stronger relationships with Chinese railway academia and industry.

Rail Program Welcomes First Ph.D. Student, Hamed Puryousef

In May, 2010, Hamed Pouryousef joined the Civil and Environmental Engineering Department at Michigan Tech, becoming the first Ph.D. student to be funded under the Rail Transportation Program (RTP). Hamed is originally from Tehran, Iran, where he graduated with a Bachelor of Science in Railroad Engineering and Operation from the Iran University of Science and Technology in 2000. He worked with Metra Consultant Engineers, affiliated with the Iran Ministry of Transportation, from 2000-2008. In 2008, Hamed moved to Portugal with his wife, Hosna, to continue his studies in the MIT-Portugal Program, which is a collaboration between the Massachusetts Institute of Technology (MIT) and the Technical University of Lisbon (IST) in Portugal. He received a Masters Degree in Civil Engineering-Transportation, with his thesis *Strategic Maintenance Planning and Interaction with Operational Issues with Focus on Tehran-Istafan (Iran High Speed Railway) Case Study*. His main focus while at Michigan Tech is largely in track maintenance and planning, especially in relation to high speed rail. He will also be supporting research on projects related to woody biomass transportation in the State of Michigan.

Ph.D. Student Hamed Pouryousef visits a rail yard in Europe before coming to the RTP

RTP Research Projects

The Rail Transportation Program has completed its first externally funded research project and is actively conducting several other rail related research projects. The RTP continues to identify potential research partners and projects that contribute to the development of rail transportation in the 21st century.

Completed Project:

Study of Greenhouse Gas Savings Associated with Congestion Reduction Using Multi-Modal Optimization of Timber Shipments in the North Central United States

The RTP participated in a study led by the Transportation Logistics Management Program at the University of Wisconsin, Superior, to investigate a multi-modal rail/truck surface transportation solution for improving timber shipments in the north-central United States. The final report was released in June, 2010. As part of the project, RTP graduate Justin Hicks and a Michigan Tech research team developed a comprehensive map of all rail facilities capable of handling logs in the study area and a computer model capable of comparing the transportation costs between truck and "bimodal" (truck and rail) transportation. The model evaluated costs based on the distance traveled and fuel prices. Actual data from over 100,000 truckload shipments of logs in northern Wisconsin, northern Minnesota, and the Upper Peninsula of Michigan were utilized to test the model. The outcomes are presented in the MS report *Modeling the Multi-Modal Transport of Logs and the Effects of Changing Fuel Prices* by Hicks, and it suggests that over 20% of the analyzed ton-miles would have been moved more cost-effectively through combined truck and rail (bimodal) transportation, leading to a roughly 3.75% reduction in transportation costs (using fuel rates at the time of transportation). In addition, researchers conducted a sensitivity analysis to analyze the effects of changing fuel prices for the optimal modal split. This analysis showed that every one dollar increase in fuel price would warrant an additional seven percent shift of ton-miles to bimodal transportation, with a linear relationship between savings and fuel prices (Figure 1).

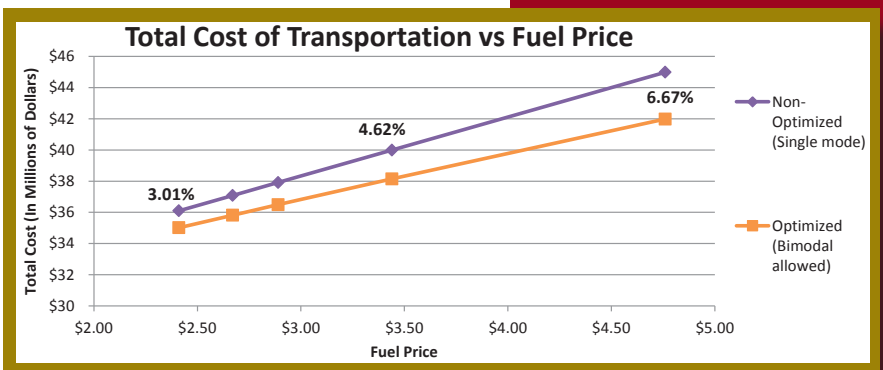


Figure 1. Total cost of transportation vs. fuel price

On-Going Projects:

Synthesis of Railroad Engineering Best Practices in Deep Seasonal Frost and Permafrost Areas

The RTP is finalizing the project funded through University of Alaska, Fairbanks to investigate the literature and experiences of the existing and planned rail systems to develop recommendations for future projects of the proposed Alaska-Canada Rail Link (ACRL).

Tuning Transatlantic Cooperation in Rail Higher Education (TUNRail)

TUNRail is a policy-oriented research grant entering its second year that aims to "tune" and intensify the railway higher education knowledge exchange and collaboration between the European Union and the United States.

Project 3 of Frontier Renewable Resources Center of Energy Excellence: Improving Forest Feedstock Harvesting, Processing and Hauling Efficiencies

Project 3 of Michigan Economic Development Corporation Forestry Biofuel Statewide Collaboration Center (MI)

Michigan Tech, in collaboration with Michigan State University (MSU) has two ongoing projects related to the production, harvesting, processing and hauling of biomass in the State of Michigan.

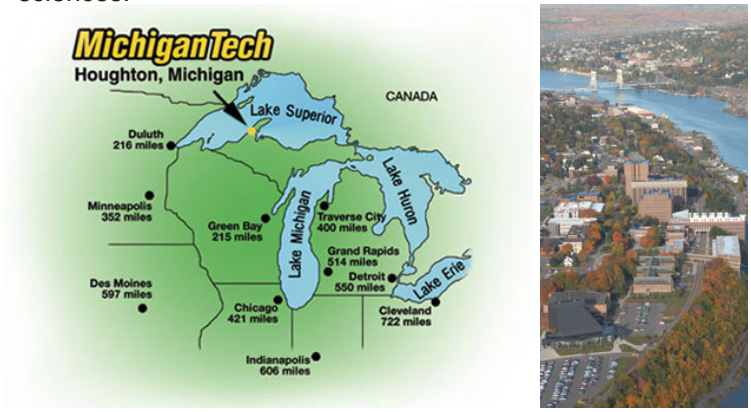
Tech Students Win Scholarships

The students of the Rail Transportation Program continue on their successful path in education. This year, seven of 33 available scholarships by the AREMA Educational Foundation were awarded to Michigan Tech Rail Transportation Program students. Additionally, five students received internal scholarships sponsored by Union Pacific Railroad and CSX Transportation. The RTP wants to congratulate the following students on their accomplishments:

- AREMA Committee 27 – Maintenance-of-Way Work Equipment Scholarship: Stephen Chartier, Jr., Construction Management
- AREMA Committee 33 - Electrical Energy Utilization Scholarship: Luke J. Gublo, Civil Engineering
- Michigan Tech Alumni Scholarship: John Hatch, Mechanical Engineering
- AREMA Presidential Spouse Scholarship: Laura Hess, Civil Engineering
- Michigan Technological University REMSA Scholarship: Gregory L. Hunter, Civil Engineering
- AREMA Committee 24 – Education & Training Scholarship: Lars Leemkuil, Civil Engineering
- Robert & Sue Boileau Rail Engineering Scholarship: Damian Wallner, Civil Engineering
- Union Pacific Railroad Scholarships: Stephen Chartier Jr., Lars Leemkuil, Damian Wallner
- CSX Transportation Scholarships: Laura Hess, Greg Hunter

About Michigan Technological University

Michigan Technological University is a leading public research university, conducting research, developing new technologies, and preparing students to create the future for a prosperous and sustainable world. Michigan Tech offers more than 120 undergraduate and graduate degree programs in engineering, forestry and environmental sciences, computer sciences, technology, business and economics, natural and physical sciences, arts, humanities and social sciences.



Michigan Tech
Create the Future

About the Michigan Tech Transportation Institute

Transportation related activities at Michigan Technological University (Michigan Tech) including research, education and training, outreach, product development or technology transfer, are organized under the umbrella of the Michigan Tech Transportation Institute (MTTI). MTTI brings together principle investigators across all disciplines at Michigan Tech for collaborative research in six areas of transportation to address national and global needs:

- **Structures** research focuses on the built environment including bridges, pavements, geotechnical applications, construction and nanotechnology related to sensors. Research is also conducted on monitoring strategies to extend the service life of aging transportation infrastructure.
- **Materials** used in transportation infrastructure including concrete, asphalt, steel, wood and aggregates are being investigated as well as the use of industrial byproducts and recycled materials including fly ash, slag and cement kiln dust.
- **Systems** groups focus on the planning, design, construction, operations and management of transportation infrastructure and systems including highway networks, railroads, airports, public transit, and waterways.
- **Environmental** studies include the transportation issues of energy, carbon dioxide and other pollutants, flora, fauna and wildlife, and the impact of the environment.
- **Societal** research explores historical developments in transportation, archeological studies of transportation features, human factors, and the interaction of transportation and society through policy, planning, and regulation.
- **Technology transfer** "bridges the gap between research and practice" by providing outreach, management systems, and workforce development programs as well as develops management tools for the transportation industry including GIS, asset management, and project estimating software.