



MICHIGAN TECHNOLOGICAL UNIVERSITY

RAIL TRANSPORTATION PROGRAM

2008 ANNUAL REPORT



DIRECTOR'S MESSAGE



Welcome to the 21st century rejuvenation of North American rail transportation! I believe that's not an overstatement and I know for certain that it is an exciting time to be involved in the field. I am grateful that Michigan Tech has decided to become one of leaders in academia, when it comes to rail transportation and this First Annual Report of our Rail Transportation Program (RTP) demonstrates that with our enthusiastic students, faculty, staff and administration we're well on our way.

The RTP was established within the Michigan Tech Transportation Institute (MTTI) in October, 2007. MTTI has successfully conducted transportation related research for years and its new mission is to become a central entity for transportation related activities at Michigan Tech. This provides a close alignment with the RTP objective to build one of the first interdisciplinary rail programs in the whole nation that endeavors to advance both education and research. We are pleased that MTTI selected RTP as one of its prime initiatives with an extensive educational component.

We have received great support during the first steps of our program. In addition to the two generous private donations, we are proud to have rail industry partners, who have recognized the merits of our efforts and have stepped up to support program development. CSX Transportation signed as the first Corporate Friend of RTP and Union Pacific Railroad has recently done the same. Several other companies from freight railroads to engineering consultants and manufacturers are currently negotiating partnerships with the program and I expect our list of industry partners in the 2009 Annual Report to be much longer. I hope this is the start of a 21st century style railroad engineering education in the US; one that functions as a true partnership between academia and industry and brings these two entities closer to each other after decades of separation. There is no doubt that this is the right moment to increase cooperation, as the ongoing generation change and the need for alternative solutions to increase the nation's rail capacity are challenging the industry. Many experts recognize the challenge, so it's time to shift gears and get into action.

You can read the summaries of our first year activities and progress in the remainder of the report, but I want to highlight three successes that demonstrate our solid start. On the research side, RTP secured its first two projects which will help us to support three Graduate students in their rail related studies. On the education side, we completed yet another excellent year of our International Summer Program in Railroad Engineering and our students were awarded \$27,500 in railroad scholarships, including almost 50% of all scholarships awarded by AREMA nationwide. Finally, our two major outreach efforts, the 3rd Annual Railroad Night and the Rail History Night, were both huge successes with over 100 participants.

As the remainder of the report demonstrates, the first year of the RTP was a busy and successful one. As we progress to the second year of the initiative, our priorities will be to strengthen and deepen the relationships developed within the university and with our industry partners. We also need to continue to shape the structure of the program, so that it can effectively meet its objectives. I am optimistic that we have taken the right path with our program and I hope to see other universities start similar initiatives. Stay in touch with the Program development as we continue to ride the rails, making Michigan Tech one of the prominent universities in 21st century rail transportation education, research, and outreach.

Pasi

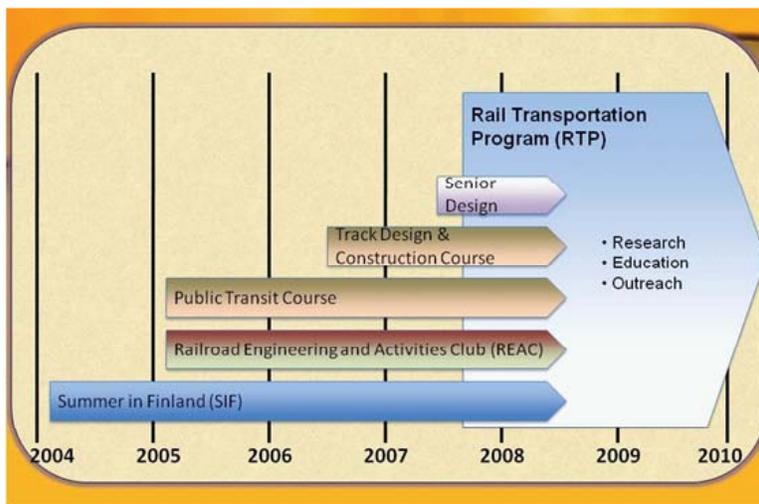
THE RAIL TRANSPORTATION PROGRAM

Vision

Michigan Tech’s vision is to expand its service to the rail industry by offering an interdisciplinary program in railroad engineering and urban rail transit that will provide opportunities for our students and faculty to participate in the development and operation of rail transportation for the 21st Century.

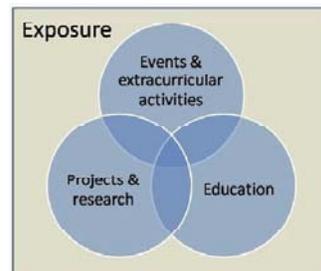
Background

In January 2003, Michigan Tech developed an International Summer in Finland Program, focused on Railway Engineering which was offered for the first time in 2004. The Railroad Engineering and Activities Club (REAC) at Michigan Tech was established in 2005, and became the first official Student Chapter of the American Railway Engineering and Maintenance of Way Association (AREMA) in 2006. Recognizing the growing need and interest to rail transportation, Michigan Tech took a major step to solidify its efforts by establishing the Rail Transportation Program (RTP) under the Michigan Tech Transportation Institute (MTTI) in October, 2007 and by appointing Dr. Pasi Lautala as the Director of the Program. RTP was established to form the foundation for all the activities in the field with an objective to make rail transportation a permanent part of the university curriculum. The evolution of rail activities at Michigan Tech from the initial Summer Program to the establishment of RTP is outlined in the figure below.



In general, RTP supported activities can be divided to three groups designed to increase exposure to rail transportation – Education, Projects & Research, and Events & Extracurricular Activities. The activity groups are not separated entities, but rather integrated with each other.

RTP has close ties and extensive cooperation with rail industry. Our program partners and other industry companies are actively recruiting program participants for internship and full-time positions. They also participate in the program by providing financial support, scholarships, and other sponsorship, such as guest lectures and hosting field visits. Many recent graduates involved in the program from several disciplines have selected railways as their choice for post-graduate career.



PEOPLE

Faculty and Staff



Pasi Lautala is a Research Assistant Professor and Director of the Rail Transportation Program. He has several years of rail industry experience both in Finland and the U.S. He teaches courses in International Railroad Engineering and Railroad Track Engineering and Design. He is the advisor to the Railroad Engineering and Activities Club (REAC) on campus. In his role as director of the RTP, he is responsible for developing the rail education and research programs, as well as other rail related activities at Michigan Tech.



Bill Leder is an Adjunct Professor and Distinguished Practitioner in Residence in the Civil and Environmental Engineering Department at Michigan Technological University. He teaches courses in Public Transit Planning and Engineering, Introduction to Consulting Engineering, and Senior Design. Mr. Leder also possesses a distinguished 34 year career in the planning and design of airports and public transit systems. He concentrated on airport Automated People Mover (APM) systems and urban public transportation projects. Mr. Leder is a recognized practitioner in airport passenger mobility planning and APM conceptual design, engineering, procurement, and implementation.



Charles Mott is the Operations Manager for the Michigan Tech Transportation Institute. He provides professional and administrative support to the rail program. Prior to joining MTTI, he was part of a transportation consulting group that was a major contributor on the state-wide rail plan project for the State of Tennessee.

In addition to the above mentioned individuals, several other faculty are actively involved in rail activities at Michigan Tech including Dr. Devin Harris, Dr. Tess Ahlborn, Dr. Bernie Alkire, Dr. Ralph Hodek and Dr. Bill Sproule.

Special mention needs to be made for the support received from Adam Johnson, Assistant Director of Corporate Development at Michigan Tech. Adam has been very active in finding and securing resources for the program.

Graduate Students



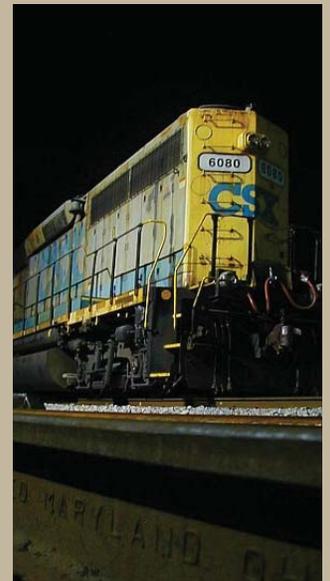
Shane M. Ferrell is pursuing a M.S. degree in civil engineering. He is a Graduate Research Assistant on the “Synthesis of Railroad Engineering Best Practices in Deep Seasonal Frost and Permafrost Areas” project sponsored by the University of Alaska-Fairbanks. He is also the president of the Rail Engineering and Activities Club (REAC). He has a B.S. in Civil Engineering from Michigan Tech and calls Grayling, MI his home. He is a member of the Delta Upsilon Fraternity and enjoys snowshoeing, hiking and camping.



Russel Lutch is pursuing a M.S. degree in civil engineering. He is a Graduate Research Assistant on the “Synthesis of Railroad Engineering Best Practices in Deep Seasonal Frost and Permafrost Areas” project sponsored by the University of Alaska-Fairbanks. He has a B.S. in Civil Engineering from Michigan Tech. His home is Chisago City, MN. where he enjoys hunting and fishing year round, whether it be deer, turkeys, waterfowl, or smelt dipping.



Justin Hicks is pursuing a M.S. degree in civil engineering. He is a Graduate Research Assistant on the upcoming “Multi-Modal Optimization of Timber Shipments in the North Central United States” project. He has a B.S. in Civil Engineering from Michigan Tech. He enjoys outdoor activities like camping, backpacking, kayaking, and biking and his home is in Oconomowoc, WI.



PARTNERS / CONTRIBUTORS



The RTP objective is to develop the program in a close cooperation with rail industry. For the past year, Michigan Tech has worked actively to identify rail industry corporations as potential partners, who recognize the importance of the university participation and want to be involved in the Program development. In January, 2007, CSX Transportation became the first Corporate Friend to the Program. The Union Pacific Railroad provided general program support in 2007-2008 and recently signed on as a Corporate Friend. Several other companies across the rail industry, such as CN (Canadian National), Transystems Corporation, PB Transit and Balfour Beatty are currently negotiating partnerships. The Program has also received interest from individual supporters and has received two generous private donations to assist in the development of the RTP.

The supporters of the program in 2007-2008 are presented below. Michigan Tech looks forward to strengthening the relationship with the rail industry even further, as we continue to develop the program in 2008-2009.



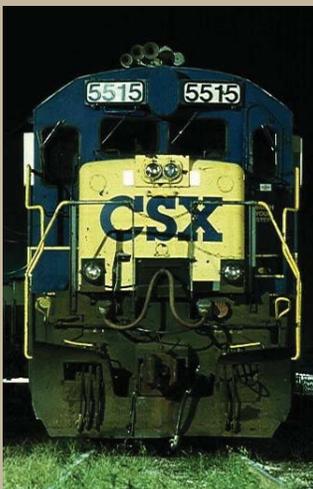
Corporations	
CSX Transportation	Corporate Friend
Union Pacific Railroad	General Program Support
Private Supporters	
Eric and Pat Peterson	Gift for program development
Sandretto / Stackhouse Estate	Gift and endowment for student projects and travel

Scholarships

Support for students interested in rail transportation is a high priority for Michigan Tech. A total of \$27,500 in railroad scholarships were received by Michigan Tech students this year. Six students received \$10,000 of internal scholarships funded by CSX (\$4,000) and Union Pacific (\$6,000). Michigan Tech students also received 11 out of 23 scholarships awarded this year by the Educational Foundation of American Railway Engineering and Maintenance-of-Way Association (AREMA). These scholarships, totaling \$17,500, represented almost 50 percent of all scholarships awarded by AREMA. Tech's winners (in alphabetical order) are:

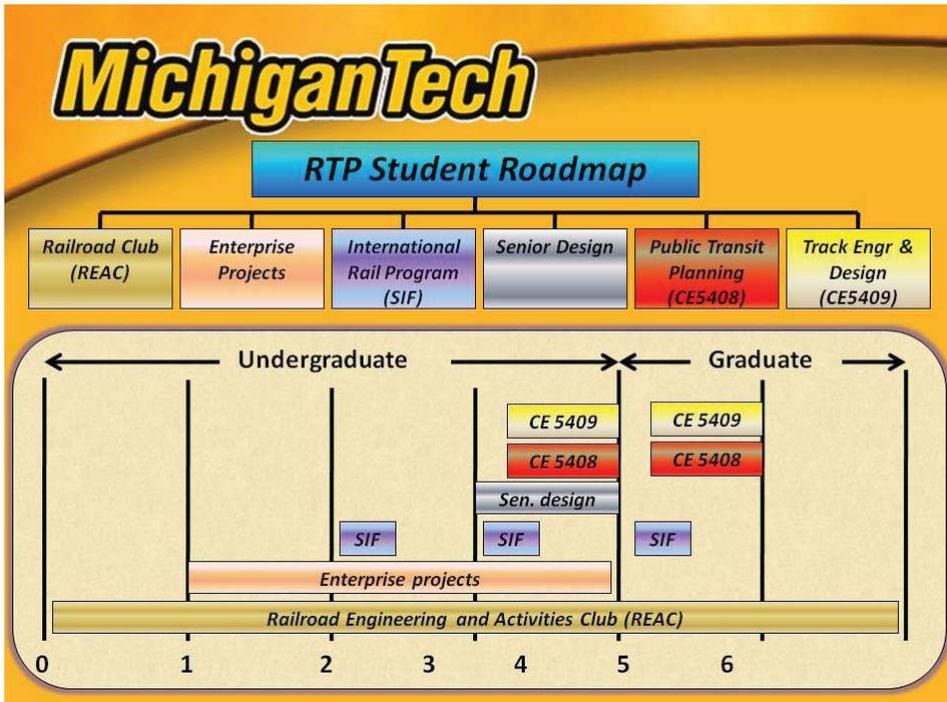
- Daryl Babbitt Jr. (\$3,000 Union Pacific & \$2,000 AREMA)
- Gordon Book (\$1,000 AREMA)
- Shane Ferrell (\$4,000 AREMA)
- Matthew Haapala (\$1,000 CSX & 1,000 AREMA)
- Charles Hoppesch (\$2,000 AREMA)
- David Keleher (\$1,000 CSX & 1,000 AREMA)
- Andrew Manty (\$1,000 CSX & 1,000 AREMA)
- Brent Marsh (\$3,000 Union Pacific & 1,000 AREMA)
- Michael Neuville (1,000 AREMA)
- Steffanie Pepin (\$1,000 CSX & 2,500 AREMA)
- Patrick Scheider (1,000 AREMA)

Congratulations to all of our winners!!



EDUCATION

Michigan Tech offers several alternatives for students to get involved in the Rail Transportation. Figure below provides a “Student Roadmap” that outlines current opportunities for students as they progress through their university studies toward graduation, followed by descriptions of currently offered courses with strong rail transportation content.



CE 4404- Introduction to Railroad Engineering

Overview of basic elements and roles of rail transportation, history, organizations and economics, safety, intercity and urban passenger rail, freight operations, track-train dynamics, signals and communications, motive power and equipment, track components, construction and maintenance. Credits: 3.0

CE 4405- International Railroad Engineering

Overview of basic elements and roles of rail transportation, history, organizations and economics, safety, intercity and urban passenger rail, freight operations, track-train dynamics, signals and communications, motive power and equipment, track components, construction and maintenance. Incorporates technical field visits in the United States and Europe. Offered as part of International Summer in Finland Program. Credits: 3.0

CE 5408- Public Transit Planning and Engineering

An introduction to public transit, user characteristics, management, transit modes, data collection and surveys, planning, operations, scheduling, transit finances, and future trends. Credits: 3.0

CE 5409—Railroad Track Engineering and Design

Railroad location and operation, track structure, curves, grades, subgrade and drainage, ballast and subballast, ties, rail, turnouts and crossings, and rail facility planning and design. Strong emphasis on using computerized design software for developing design plans and cost estimates. Credits: 3.0

EDUCATION HIGHLIGHTS

Summer in Finland 2008

The 5th annual Summer in Finland Program was conducted In May and June, 2008. Fifteen Michigan Tech students from six disciplines learned more about rail transportation and Finnish language and culture, increasing the total number of student participants to 77 over the life of the program. The program is an intensive multi-discipline summer study conducted over a five week period in three physical locations. Students spend one week on the Michigan Tech campus, approximately three days in Chicago, and three and a half weeks in Tampere, Finland. The program provides a general introduction to two types of rail systems (European and North American) and covers a wide variety of railroad topics from railroad track to locomotives, signal systems and economics of rail transportation. It is a true cooperation between the university and rail industry. This year, guest lectures were delivered by two industry professionals, Mr. Eric Peterson in Houghton, and Mr. Gray Chandler in Finland (both retired CSX engineers). In addition, rail industry hosted numerous field visits throughout the program.

Tours in Chicago vicinity were conducted by the Wisconsin Southern Railroad, CSX Intermodal, Belt Railway Company, Metra, Transystems and the Chicago Transportation Coordination Office (CTCO). Highlights of field visits in Finland included Konecranes, a Finnish high-speed train maintenance facility, and several cultural field visits, such as the traditional visits to a Finnish baseball game and summer cabin. Internships with North American rail industry companies were facilitated for those students who returned immediately after the Program to gain hands on railroading experience.





Senior Design Project

A group of 11 students worked on a semester-long Senior Design Project to develop a conceptual plan, cost estimate, and implementation schedule for an automated Campus Transportation System to link the lower and upper campuses of Michigan Tech. The class divided itself into three teams, each taking on a different aspect of the project: 1) A new parking garage and mid-rise student apartment complex on the upper campus, 2) a rope propelled automated people mover system using a ground-based guideway, 3) an aerial tram. The automated people mover and aerial tram were analyzed as alternative solutions. A highlight of the course was a field trip to the Toronto International Airport to investigate a rope propelled automated people mover in operation. Industry funding for the trip was provided through a gift from Doppelmayr Cable Car, GmbH & Co.



RAILROAD ENGINEERING AND ACTIVITIES CLUB

The Railroad Engineering and Activities Club (REAC) was established to raise awareness and interest in railroad engineering, to educate students about the benefits of rail related careers, and to facilitate networking with representatives from the railroad industry. Currently in its 3rd year of operation, REAC is presently the only student chapter of AREMA and our membership includes nearly 40 members from 8 different degree disciplines. As a student organization, we host and participate in several activities on and off campus, such as our monthly general meetings, field trips and conferences, and social and community events. Participation in our field trips and guest presentations has increased and our special events – 3rd Annual Railroad Night and Rail History Night – were tremendous successes with over 100 attendees.



General meeting is held monthly. It assembles REAC officers and members at large to discuss club business and planned events and includes presentations from industry speakers. These presentations cover current issues from several aspects of rail transportation which reinforces our vision as a multi-disciplinary organization with opportunities for students with different degree paths. The presentations also reinforce the relationship between industry representatives and students. Speakers in the past year included Phil Pasterak (PB Transit), Dave Staplin (Amtrak), Tim Luhm (CN, Communications and Signals), Mike Schell (Rail Power Locomotives) and Tony Hatch (Wall Street Rail Analyst). In addition, presentations were made by both current and former Michigan Tech students who have joined the rail industry.

Field trips and conferences provide an opportunity for students to see actual rail sites, to get a firsthand look for the companies and individuals involved in railroading, to stay informed with current rail issues and topics typically unavailable at Michigan Tech, and finally to develop industry contacts. In 2007, we had ten students participating in the AREMA Annual Conference in Chicago, Illinois. Our field trips included visits to the Lake Superior & Ishpeming Railroad (LS&I) where attendees were able to observe daily operations of iron ore transport, as well as a trip to Duluth/Superior to see a BNSF taconite facility and tour the Duluth Rail Museum. The visit to Duluth was done in cooperation with the Transportation and Logistics Student Club from University of Wisconsin – Superior.

We participate in or host several campus events throughout the year to increase the visibility and to promote rail transportation. In addition to the special events already mentioned, past year's events include Make A Difference Day, Boy Scout merit badges, go-kart and bowling socials, and attendance in university events such as K-Day, the MTU Transportation Expo, MTU Preview Day and departmental open houses.



As you can see, we were really riding the rails last year and we expect to be even busier this year. We will continue our mission to introduce even more students to the benefits of rail transportation. Our plans for the year are well on their way and financial support from the Michigan Tech rail industry partners allows us to concentrate in the activities that have the greatest effect. It is exciting time for railroading and we are pleased to be the leading student organization to spread the word on the opportunities for upcoming generation.

Shane

RESEARCH

Michigan Tech University has a history of rail related research projects. RTP is working actively to identify potential research partners and projects, where Michigan Tech can contribute to the development of rail transportation in 21st century. During its short existence, RTP has already started working on one research project and another one is expected to start in late fall, 2008.

Awarded project: “Synthesis of Railroad Engineering Best Practices in Deep Seasonal Frost and Permafrost Areas”

Dr. Pasi Lautala, P.E., Principal Investigator

Dr. Theresa Ahlborn, P.E., Dr. Devin Harris

Renewed interest in resource deposits in Alaska, Yukon, and British Columbia, as well as changing world markets, global trade dynamics and supply chains, has sparked interest in a rail link from Alaska to the rest of the North American rail system through northern Canada. However, deep seasonal frost and permafrost in the arctic environment create conditions that require special considerations for the design, construction, maintenance, and operation of rail infrastructure. This project will investigate the literature and experiences of the existing and planned rail systems at deep seasonal and permafrost areas around the world and use findings to develop recommendations for future investigations and project development of the proposed Alaska Canada Rail Link. *Award amount \$301,156. Project Schedule May 2008-February 2010.*



Upcoming Project: “Multi-Modal Optimization of Timber Shipments in the North Central United States”

Dr. Pasi Lautala, P.E., Principal Investigator

Dr. Kurt Paterson, Dr. Gregory Graman

Rising fuel costs are expected to increase truck rates by 10 to 30 percent over the next two years. Simultaneously, estimates suggest that truck log delivery systems in the region may be operating at less than 50% loaded capacity. The optimization of truck and rail modes with an efficient intermodal linkage could result in the reduction of transportation costs, congestion, pavement and roadway degradation, and harmful air emissions. This project shall analyze optimization of the delivery of logs to the wood products industry in the region. It will investigate a multi-modal (rail/truck) surface transportation solution set and evaluate the effects on traffic congestion and air emissions before and after optimization. *Award amount \$230,000 (Michigan Tech \$80,000). Expected Schedule: October, 2008 – September, 2009.*

OUTREACH AND EVENT HIGHLIGHTS

A high priority for RTP and REAC is to expand awareness of rail transportation. RTP is reaching this objective thru newspaper articles, presentations in conferences and professional events, and by organizing and participating in events to promote rail transportation to current and prospective students, administration, faculty, staff and community.



AREMA Conference

Dr. Pasi Lautala presented his paper “From Classroom to Industry – An Engineer in the Making” at the 2007 AREMA Annual Conference. Michigan Tech’s ten student participants represented one of the largest student groups in the conference and our efforts to advance the university rail education were recognized by industry representatives throughout the industry.

Newspaper and Magazine Articles

A Press Release written by the University Communications and a local Newspaper article to announce the establishment of the Rail Transportation Program and its first partnership with CSX Transportation led to a series of appearances in nationwide newspaper and magazine articles, such as Detroit Free Press, Railway Age, and Metro Magazine.



3rd Annual Railroad Night

The Third Annual Railroad Night was held on February 19th in conjunction with Michigan Technological University’s 2008 Winter Job Fair. Michigan Tech has become a university of choice for recruitment by many rail industry companies, and the annual Railroad Night is an opportunity for students, faculty and administration to meet and socialize with the representatives of those companies participating in the Winter Job Fair. The event also offers Michigan Tech an opportunity to present and explore rail-related educational and research initiatives with visiting representatives. The event was hosted by the Rail Transportation Program (RTP) and the Railroad Engineering and Activities Club (REAC). The event broke its attendance record with over 100 participants and with eleven rail industry companies sponsoring the event.

Rail History Night.

On March 27, 2008, REAC and RTP hosted a Rail History Night, featuring Dr. Bruce Seely, dean of the College of Sciences and Arts, and Dr. Bill Sproule, professor in the Department of Civil and Environmental Engineering. Their presentations “The Rise and Fall of Railroads in North America” and “Railroads in the Copper Country” attracted over 100 students, faculty, and community members to the event.



Construction Career Days (CCD)

The RTP and REAC participated in Michigan's Construction Career Days (CCD), providing students with information about rail opportunities at Michigan Tech and within the rail industry. CCD is part of a national effort to inform young people of the many exciting career opportunities available in the construction industry. Over 230,000 students have participated nationwide in the CCD events since 1999. The event was coordinated by Michigan's Local Technical Assistance Program (LTAP) and the Capital Area Construction Council (CACC). The University Transportation Center for Materials in Sustainable Transportation Infrastructure (UTC-MiSTI) at Michigan Tech was a platinum sponsor and an activity provider for the event, which was also supported by MDOT and FHWA's Michigan Division office.

RTP assisted Michigan Tech in setting up a booth and in conducting activities that introduced students to opportunities in construction-related degree programs. RTP representatives also met personally with a student, who at the age of 12 has already decided that he wants to study rail transportation at Michigan Tech after finishing his high school.



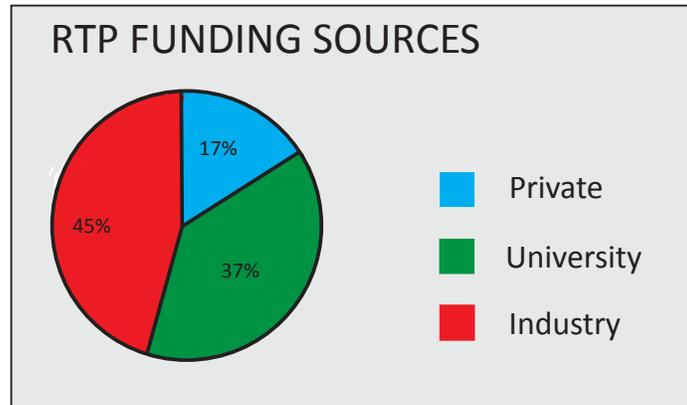
Railroad Engineering Education Symposium (REES):

Michigan Technological University's Rail Transportation Program was part of the organizing committee for the First Railroad Engineering Education Symposium (REES) that was held June 9-11, 2008 on the University of Illinois campus in Champaign-Urbana. The symposium attracted over 30 faculty members from 25 Canadian and U.S. colleges and universities and 30 representatives from the rail industry. The program included discussion on the career opportunities in the rail industry, current and future rail research, and introductory lectures by senior faculty on a variety of rail topics where each lecturer provided attendees with presentation materials and a wealth of information to take back to their classrooms. Dr. Bill Sproule presented a lecture on Intercity Passenger Service and Urban Rail Transit, and made a presentation on Michigan Tech's Summer in Finland program. A visit to the Norfolk Southern's Decatur Yard was also part on the program. Plans are underway for the next Symposium to be held in 2010.



RTP Funding

The Rail Transportation Program receives financial support from various internal and external sources. These include Michigan Tech's Vice President for Research, The Michigan Tech Transportation Institute, The Department of Civil and Environmental Engineering, corporate supporters, and private gifts. Research funding and expenditures were omitted from this report due to the short time difference between the project start date and the end of the fiscal year. Research funding will be included in the next annual report.

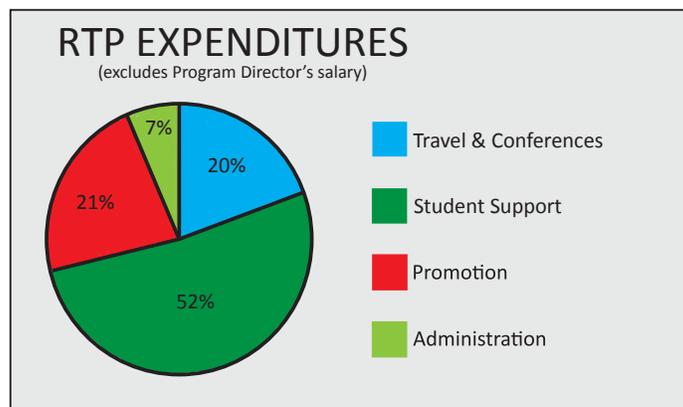


RTP Expenditures

The funds are used to support the Program Director position and various program activities which are divided into several categories.

- Student support includes expenditures that benefit students directly, such as scholarship, rail material resources and sponsorship for events, tours and conference visits.
- Travel and conferences include presentations and participation in the rail and educational conferences and meetings as they are deemed beneficial to the program development.
- Promotion includes development of materials, such as program web site, and participation in different events to promote rail transportation and RTP.
- Administration includes operational program expenses and activities by the supporting staff in the program development.

A general breakdown of fiscal year 2008 expenditures is provided in the chart below.



About the Michigan Tech Transportation Institute

The Michigan Tech Transportation Institute (MTTI) is an umbrella organization bringing together the cross-disciplinary centers and principle investigators conducting transportation related research and education initiatives that address national and global needs. Sustainability is central to all MTTI efforts regarding transportation, and Michigan Tech researchers are leaders at applying sustainability concepts to transportation problems. Currently, researchers from multiple departments are collaborating through MTTI within six focused theme areas:

- Transportation Structures including bridges and pavements. Other related areas include geotechnical, construction, and nanotechnology related to sensors. This group includes the Center for Structural Durability (CSD).
- Transportation Materials including concrete, asphalt, steel, wood, and aggregates. Other related areas include construction, geotechnical, and nanotechnology related to sensors and materials. This group includes the University Transportation Center (UTC) for Materials in Sustainable Transportation Infrastructure (MISTI), the Transportation Materials Research Center (TMRC), and the Center for Aggregate Research (CAR).
- Transportation Systems including waterways, traffic/safety, construction, rail, air, public transportation, freight, intelligent transportation systems, vehicle infrastructure integration, nanotechnology related to sensors, and radio frequency identification devices. This group includes the Rail Transportation Program (RTP).
- Transportation and the Environment includes environmental impacts, energy, carbon dioxide and other pollutants, fugitive dust, wildlife, flora and fauna, and carbon credits.
- Transportation and Society includes policy, planning, human factors, history, economics, and archeology.
- Transportation Technology Transfer includes all outreach, management systems, and workforce development programs. This group includes Michigan's Local Technical Assistance Program (LTAP), the Technology Development Group (TDG), and the Tribal Technical Assistance Program (TTAP).

The photos below were used with permission of the photographer, David Stewart of Union City, Ga. They are available on the web at <http://www.rpicturearchives.net>.



Cover



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About the Michigan Tech Rail Transportation Program



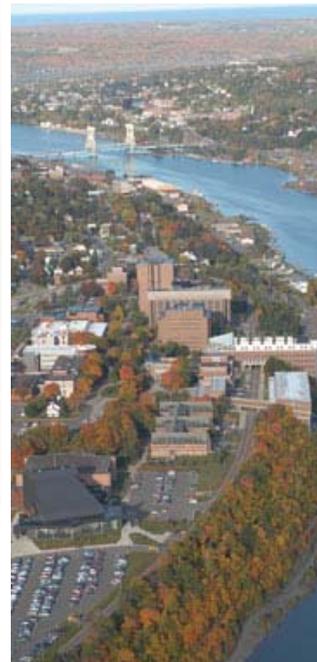
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The vision of Rail Transportation Program is to expand its service to the rail industry by offering an interdisciplinary program in railroad engineering and urban rail transit that will provide opportunities for our students and faculty to participate in the development and operation of rail transportation for the 21st Century.



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