



MICHIGAN TECHNOLOGICAL UNIVERSITY

RAIL TRANSPORTATION PROGRAM

2009 ANNUAL REPORT



DIRECTOR'S MESSAGE



The Rail Transportation Program (RTP) at Michigan Technological University (Michigan Tech) is two years old and both years have certainly been busy. Our second year included the graduation of our first Master's of Science student, new research grants, and a generous donation by CN to establish the CN Rail Transportation Education Center (CN RTEC). You can read the highlights of our second year in this report.

I want to devote the rest of this message to discussing topics that are outside Michigan Tech and the RTP, but at the same time are extremely relevant to the success of our program. Despite the severe economic downturn, 2008-2009 will be remembered for the great promises and expectations that were laid for US rail transportation - passenger and freight alike. It will be remembered for the historical investments pledged by the government to develop a new high-speed passenger rail network. It will also be remembered for some lingering rate disputes between the freight and their customers. While the overall message for the future of rail is positive and the expectations for the industry are high, a certain dose of reality, or expansion of the horizons to consider the global perspective, are not bad ideas. The \$8 billion reserved in the American Recovery and Reinvestment Act of 2009 (ARRA) for high-speed rail is a nice egg in the basket, but based on recent press, there seems to be unrealistic expectations on what these funds can accomplish. Developing a rail system that transports both passengers and freight throughout the US will require significant and consistent funding levels over an extended period of time, and the reality is that the US investment is still a long way behind other nations.

You may ask how all of this is related to our Rail Transportation Program. There are connections on multiple fronts. The RTP is a young program and it will take time and resources as we strive to become a main contributor in the rail education, research, and development in the US. Opportunities to learn and work with experts and open communication and knowledge streams with other stakeholders are also a necessity. The generous donations by CN, CSX, and Union Pacific Railroad have provided the foundation to the development of the RTP. However, their contribution addresses only one piece of the puzzle. For an academic program to mature, there also has to be opportunities for meaningful research, projects, and access to information, so that we can learn about key challenges that are waiting to be resolved. In addition, there needs to be open and constructive collaboration between universities, industry, and government, so that each party can use their strengths toward common goals. While noticeable "baby steps" have been taken in each critical area, the long absence of aca-

ademic programs from rail transportation has left universities (including us) with little institutional knowledge to lean on.

The key term often used to describe the state of rail industry has been "rejuvenation," which truly has been taking place over the past few years. I would like to place a challenge for the whole railroad community to follow on that path and "rejuvenate" the once tight relationship between academia and industry. A good start would be to have government, industry, and academia together develop a common strategy, or a roadmap, that outlines how we can better utilize the resources that universities can offer and how to re-ignite their interest for rail transportation. It is hard to believe that increased university involvement wouldn't be beneficial at a time when demand for several new technologies, such as positive train control, high-speed rail, more energy-efficient locomotives, and increased security are just around the corner (or have already passed the corner).

I would like to set another challenge as well - namely increasing international collaboration. There are areas of rail transportation where the US is the leader, but there are other areas where other regions have been holding the reigns. Since rail transportation rarely competes across national borders, it provides a fertile ground for international collaboration. The International Heavy Haul Association (IHHA) and the establishment of the Global Rail Innovation Center (GRIC) by IBM in Beijing, China, are good examples of collaboration, but much more can be done. There is no doubt that we can learn more from the extensive educational railroad programs in Russia, China, and Europe. Likewise, there is no doubt that the US can benefit from other countries' past experiences, as we modernize the current rail system, or introduce the new high-speed passenger rail component. With our Transatlantic TUNRail project and a visiting scholar from China in 2010, Michigan Tech hopes to move along a path that brings the various stakeholders around the world closer to continuous collaboration.

In closing, when the stakes are high, it's certain that some objectives aren't able to be achieved over only one or two years. We have made amazing strides and reached several milestones in the first two years of the RTP, but we are nowhere close to where we want to be. I have no doubt that if we continue our hard work and get the railroad community to recognize the importance of academic involvement in their future strategy, the speed of development will be greatly accelerated over the coming years. I'm looking forward to report on the progress of the RTP after year three.

Pasi

RAIL INDUSTRY PARTNERS

Since its inception, the Rail Transportation Program (RTP) has emphasized developing collaborative relationships and official partnerships with rail industry stakeholders. Over the past year, the RTP has continued its strong partnerships with the North American large freight railroads. CSX Transportation and Union Pacific Railroad renewed their pledges as Corporate Friends, and in April CN announced a donation of \$250,000 to create the CN Rail Transportation Education Center (CN RTEC). The CN RTEC is expected to be completed in the fall of 2009 and it will function as a central location for student, faculty and industry collaboration. It will also provide education and research facilities for the Rail Transportation Program, including computer workstations with rail applications, a reference library, and on-line learning technologies.

The collaboration with industry partners extends beyond large freight railroads and monetary gifts. The RTP is in collaboration with IBM through its Global Rail Innovation Center and with the Lake Superior & Ishpeming (LS&I) Railroad, owned by Cleveland Cliffs. IBM has donated two IBM Notepads for the RTP. In the fall

2009 semester, Michigan Tech's civil engineering, construction management, and surveying students are working on a track design project for LS&I Railroad. The partnering companies also aggressively recruit Michigan Tech students and have provided numerous internships and co-op positions.

Over the next year, Michigan Tech and the RTP will continue to work to expand opportunities for student and faculty participation in real-world rail development through sponsored projects and research. With the CN RTEC and support from the other program partners, the RTP is yet another step closer in becoming a true university-industry partnership in railroad higher education. The dedicated physical space provided by CN RTEC allows the RTP to build its own identity on campus, and participating students who come from a wide range of degree programs will have their own place to discuss and understand rail related issues. But foremost, it will finally bring all the resources that have been collected over the years to one central location, easily accessible by all involved stakeholders.



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Michigan Tech students visiting the CN locomotive shop in Homewood, Illinois.

STUDENT HIGHLIGHT - SHANE FERRELL



Shane Ferrell presents his paper at the 9th International Heavy Haul Conference in Shanghai, China

Shane Ferrell became the first graduate of the Rail Transportation Program (RTP) at Michigan Technological University (Michigan Tech). He received his BS in Civil Engineering from Michigan Tech in 2008 and was awarded a MS in Civil Engineering with the completion of his thesis "Maintaining Stability Beneath Cold Climate Transportation Infrastructure with Special Emphasis on Railroads" in August 2009.

During his years at Michigan Tech, Shane was involved in numerous RTP activities. As a student, he participated in rail-related classes including the Summer In Finland program, Public Transit, and Track Design and Construction. He was also the Railroad Engineering and Activities Club (REAC) president and recently presented at the 9th International Heavy Haul Conference in Shanghai, China. Shane coauthored a paper with Dr. Pasi Lautala, RTP Director, titled "Cold Climate Freight Railroads" and was invited to travel to China to attend the conference and present his paper.

Internships and co-ops were also an important part of Shane's involvement at Michigan Tech. He gained work experience while participating in two summer internships with the Michigan Department of Transportation as well as a summer internship and seven month co-op with Union Pacific Railroad. During his extended co-op, Shane worked in southern New Mexico and Arizona on the Sunset Route assisting with the double mainline track construction. His main tasks on the project included material coordination of precast concrete bridges and pilings as well as construction inspection.

While working on his master's degree, Shane focused his research on cold climate railroads. Collaborating on a project sponsored by the Alaska Department of Transportation and the University of Alaska-Fairbanks, Shane's research involved gathering and analyzing data relevant to construction of cold climate railroads. Through his report, geotechnical issues and engineered solutions related to embankment stabilization above permafrost soils were investigated.

"Involvement with the Rail Transportation Program and REAC really helped to expose me to industry representatives and resources. With the contacts and experience gained over the last two years at Michigan Tech, I'm far ahead of my peers with regards to professional networking and development. The RTP at Michigan Tech offered me a way to develop my experience based on my own level of interest. With different options such as the Summer in Finland program and REAC, you can get involved as much, or as little, as you want. It's a great way to get involved on your own terms and to learn a lot in the process."

Shane Ferrell
MS in Civil Engineering, Michigan Tech '09

Following his graduation from Michigan Tech, Shane has relocated to Anchorage, Alaska to work for Hanson Professional Services as a design engineer. Shane will be involved on several projects for Hanson for the Alaska Railroad including the Northern Rail Extension originating near Fairbanks, and the Port Mackenzie extension to access the new port facilities south of Wasilla.

SCHOLARSHIP WINNERS

The American Railroad Engineering and Maintenance of Way Association (AREMA) Educational Foundation sponsors a yearly scholarship competition for students showing interest in the rail industry. In addition, RTP partners with Union Pacific Railroad and CSX to fund internal scholarships for Michigan Tech students. This year eight Michigan Tech students were awarded over \$15,000 in scholarship money from AREMA, Union Pacific, and CSX combined.

Luke Gublo — MTU Alumni Scholarship and CSX Diversity Scholarship

Luke Gublo is a third year Civil Engineering student at Michigan Tech. He became interested in railroad engineering, primarily due to the Railroad Engineering and Activities Club (REAC) at Michigan Tech. Luke is the current REAC president and looks forward to using his college experience to advance himself in his future career.

John Hatch — AREMA Committee 27: Maintenance of Way Work Equipment Scholarship and CSX Diversity Scholarship

John is a third year Mechanical Engineering student at Michigan Tech, and has been involved in everything from railroads, to race cars, to photography, as well as research. John aspires to find a career with a railroad or in high-performance automotive research and development.

Lars Leemkuil — AREMA Committee 37: Signal Systems Scholarship and CSX Diversity Scholarship

Lars is a fourth year Civil Engineering student from Somerset, Wisconsin. Lars has been involved with the Concrete Canoe competition, REAC, and the American Society of Civil Engineers (ASCE). This past summer he attended the Summer in Finland (SIF) study abroad program and is currently working as an undergraduate research assistant for the Synthesis of Cold Climate Railroad Engineering project. The SIF program furthered Lars' interest in railroad engineering and he is excited to pursue a career in this rewarding field.

Andrew Manty — HNTB Founder's Scholarship and Union Pacific Railroad Scholarship

Andy is a fifth year Civil Engineering student from Ishpeming, Michigan. He has been involved with REAC, Engineers Without Borders, and Habitat for Humanity. In 2007, he worked on a research project in Bolivia and attended the SIF program in 2008. Andy has worked for Toyota Motor Corporation and Union Pacific Railroad and assisted in the development of the RTP over the past summer. He will graduate with a Bachelor of Science in May 2010.

Steffanie Pepin — MTU Alumni Scholarship

Steffanie is a Civil Engineering student at Michigan Technological University from Ishpeming, Michigan. She is a fourth-year student with a 4.0 GPA and plans to graduate with a Bachelor of Science in May 2010.

Ryan Rintamaki — CSX Diversity Scholarship

Ryan is third year Civil Engineering student at Michigan Tech. He participated in the SIF program this past summer and remained in Finland to work on a railroad-related research project at Tampere Technological University. Ryan will graduate in May of 2011.

Ben Sheff — AREMA Educational Foundation Scholarship

Ben is a third year student at Michigan Tech. He is pursuing a BS in Civil Engineering with a minor in Jazz Idiom. He spent this past summer working with CN's Mechanical Department in Flat Rock, Michigan and spent the summer of 2008 as an intern for Norfolk Southern Railway.

Matt Tronnes — John J. Cunningham Memorial Scholarship and Union Pacific Railroad Scholarship

Matt graduated from Michigan Tech in December of 2008 and is currently working on his master's degree in Civil Engineering with an emphasis in Transportation. Matt participated in the SIF program this past summer. Before participating in the SIF program he had no idea that the railroad industry had so much to offer. Now a career in rail may be in his future.

RTP FACULTY AND STAFF



Dr. Pasi Lautala

Dr. Pasi Lautala, P.E.

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. Dr. Lautala is also 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 program and is currently the Principal Investigator on several rail related research projects.



Bill Leder

William (Bill) Leder, P.E.

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.



Dr. Bill Sproule

Dr. William (Bill) Sproule, P.E.

Bill Sproule has over 35 years experience in government, consulting, and university teaching and research in Canada and the United States. He is a Professor in the Department of Civil and Environmental Engineering. Over the years, he has taught a variety of courses in traffic engineering, transportation planning, airport planning, highway design, public transit, and consulting engineering. In addition, he assisted in the development of the Rail Transportation Program at Michigan Tech. His current research areas include airport ground access, traffic safety, automated people mover systems, vintage trolleys, and hockey history. Bill has been active in several professional associations and has received several awards including a Michigan Tech Distinguished Teaching Award and the ASCE Horonjeff Award.



Pam Hannon

Pam Hannon

Pam Hannon is the Coordinator of the Michigan Tech Transportation Institute and provides various types of support in the development of the Rail Transportation Program.

In addition, several other faculty and individuals are actively involved in rail related research activities at Michigan Tech including Adam Johnson, Dr. Devin Harris, Dr. Tess Ahlborn, Dr. Bernie Alkire, Dr. Ralph Hodek, Dr. Kurt Paterson and Dr. Greg Graman.

GRADUATE STUDENTS

Justin Hicks

Justin Hicks is pursuing a MS degree in civil engineering. He is a graduate research assistant on the “Multi-Modal Optimization of Timber Shipments in the North Central United States” project and is working to complete his MS research project, titled “Benchmarking Modal Choice for Log Transportation in the Upper Midwest.” Justin received a BS in civil engineering from Michigan Tech. He enjoys the outdoors and is active in camping, backpacking, kayaking and biking. Justin’s hometown is Oconomowoc, Wisconsin.



Justin Hicks

Russell Lutch

Russell Lutch is pursuing a MS 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. His thesis is titled "Ultimate Capacity Optimization of Prestressed Concrete Railroad Ties". Upon graduation in December 2009 he will move to Omaha, Nebraska and begin working at Kiewit Engineering Company (KECo) as a structural engineer. He has a BS in civil engineering from Michigan Tech. He is originally from Naperville, Illinois but considers Houghton to be his home as he enters his sixth year at Michigan Tech. In his spare time, he enjoys hunting, fishing, and snowmobiling.



Russell Lutch

Andrew Langsner

Andrew Langsner graduated with a BS degree in civil engineering from the University of New Hampshire before moving to Houghton from his hometown of Lebanon, New Hampshire. At Michigan Tech, he is pursuing a MS degree in civil engineering while assisting in the development and research activities of the Rail Transportation Program. Andrew is currently assisting in the project “Tuning Rail Higher Education in the US and EU (TUNRail).



Andrew Langsner



REAC Students visiting North Star Commuter Rail facility in Big Lake, Minnesota.

RAIL TRANSPORTATION PROGRAM AROUND THE WORLD

In June and July, 2009, members of the Rail Transportation Program (RTP) participated in several rail related events in China and Russia. These events included the opening ceremonies of IBM's Global Rail Innovation Center (GRIC), visits to Chinese and Russian universities and research centers, and presentations at the 9th International Heavy Haul Association (IHHA) Conference. The visits concentrated on activities related to rail research and education and allowed the RTP to initiate collaboration with academic and industry representatives from several countries.



Shane Ferrell and Dr. Pasi Lautala at IBM's Global Rail Innovation Center Opening in Beijing, China.

China

Global Rail Innovation Center

In June, RTP Director Dr. Pasi Lautala and graduate student Shane Ferrell participated in the opening ceremonies of the Global Rail Innovation Center (GRIC) at IBM's China Business Innovation Center in Beijing, China. GRIC will focus on developing technologies that can increase railroad capacity, efficiency, speed, and safety while also improving customer service. Michigan Tech joins several US and foreign partners as initial members of the center's advisory board. Other board members include Massachusetts Institute of Technology Professor Joseph M. Sussman; Judge Quentin L. Kopp (chairman of the California High Speed Rail Authority); the German railroad Deutsche Bahn; Motorola; Railinc Corporation (a subsidiary of the American Association of Railroads) and Sabre (a travel network). In addition to the GRIC partnership, IBM has also supported the RTP by donating two laptop computers for the upcoming CN Rail Transportation Education Center (CN RTEC).

Shijiazhuang Railway Institute and Tsinghua University

As part of their visits, RTP representatives provided an invited lecture at the Shijiazhuang Railway Institute. The lecture, attended by almost one hundred students and faculty, covered educational topics in civil and railway engineering along with a summary of findings from the Synthesis of Railroad Engineering Best Practices in Deep Seasonal Frost and Permafrost Areas research project. Shijiazhuang Railway Institute is one of the several universities in China that place high emphasis on rail-related research and education. It is one of the key universities in Hebei province. The objective of the visit was to discuss research activities performed by the university along the recently completed Qinghai-Tibet rail line and to initiate knowledge transfer and collaboration between the two institutions. As the first step of the collaborative effort, the RTP will be hosting a visiting scholar from the Institute at Michigan Tech during the calendar year of 2010. The RTP also visited Tsinghua University in Beijing where an increasing number of faculty and students are concentrating on research activities related to rail transportation.



Students and faculty listening to a presentation by Dr. Lautala at Shijiazhuang Railway Institute, China.

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Cold and Arid Regions Environmental and Engineering Research Institute (CAREERI)

The RTP conducted a one-day visit to meet with the researchers of the Cold and Arid Regions Environmental and Engineering Research Institute (CAREERI) in Langzhou, China. CAREERI was established in 1989 and currently has 40 researchers and 14 faculty who conduct research on various topics related to cold regions. Their researchers played a major part in the preparations for the development of the Qinghai-Tibet Railway (QTR). The researchers briefed RTP representatives with some of the greatest challenges and lessons learned from the QTR project and discussed their similarities and differences with the environmental conditions in and around Alaska. While the areas traversed by the proposed line between Alaska and Canada differ from the conditions in Tibet, Chinese experiences should be understood and considered during the development process.

International Heavy Haul Association (IHHA) Conference

Dr. Lautala and Shane Ferrell presented a paper “Cold Climate Freight Railroads” at the 9th International Heavy Haul Association (IHHA) Conference in Shanghai, China. IHHA is an organization that supports collaboration and development of heavy haul railways around the world. The three day conference had over 500 participants and included more than 100 presentations. Shane Ferrell was one of the students that were awarded an IHHA student scholarship to attend the conference.

Russia

Siberian Transport University, Novosibirsk

The RTP visited the Siberia Transportation University (STU) in Novosibirsk, Russia. STU is one of the prominent universities in Russia providing railway education and research. It was established in 1932 and has approximately 11,000 students concentrating in various topics and majors related to rail transportation. Similar to the visits in China, the objective was two-fold; 1) to interview researchers and professors about Russian practices and experiences in cold climate railway engineering and 2) to take a first step in developing a more formal collaboration between the two universities. As part of the discussions, the potential to submit a joint grant proposal to the “Improving Research and Educational Activities in Higher Education between Russia and US” program was also explored.

Omsk Branch of the Federal Research Transportation Institute

Researchers from Omsk Branch of the Federal Research Transportation Institute were met to discuss their experiences in construction and engineering of transportation facilities on areas of deep seasonal frost and permafrost, especially embankment solutions on permafrost. The Institute concentrates on the design, construction and monitoring of the highways and other transportation infrastructure in the Eastern part of the Russian Federation. They also have practical hands-on experience in projects on the Baikal-Amur railroad line, including construction of stable roadbeds from local frozen materials.



Temperature controlled research “rooms” (freezers) in CAREERI for investigating frozen embankments and their thawing.



Railway embankment constructed for research purposes outside of the Siberian Transportation University in Novosibirsk, Russia.

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Finland and European Union (EU)

Sixth Consecutive Year of Summer in Finland Program

Seventeen students from several disciplines participated in the International Railroad Engineering and Finnish Cultural Enrichment Study Program in Finland, increasing the total number of participants to 95 over the lifetime of the program. The group included a participant from George Mason University and one from Northeastern University. The Finlandia Foundation National (FFN) provided a \$3,000 grant to assist in the cultural program activities.

One of the Summer in Finland 2009 participants, Ryan Rintamaki from the Civil and Environmental Engineering Department at Michigan Tech, was able to remain in Finland until the end of summer expanding his railroad experience through an internship with Tampere University of Technology (TTY). His work concentrated on railroad embankment research, focusing on the effects of the embankment width and slope angle to their permanent deformation characteristics. The internship was a collaborative effort between the RTP and TTY and the outcomes were considered highly satisfactory by all the parties. In addition to his research work, Ryan was able to travel around Finland to meet with some of his friends and relatives.

Michigan Tech Awarded a Grant by Department of Education in Railway Higher Education

Michigan Tech was recently awarded a research grant by the Department of Education to “tune” and intensify the railway higher education knowledge exchange and collaboration between the European Union and the United States. The project uses comparisons and benchmarking analyses to define the extent, contents, structure, and objectives of current programs, and to identify how well they address the key aspects of modern railway systems. In addition to Michigan Tech, the participating institutions include University of Illinois at Urbana-Champaign in the United States, and Instituto Superior Técnico, Universidade Técnica de Lisboa, Portugal and Technische Universität Braunschweig, Germany in European Union. All funding for this two-year, \$76,000 federal grant comes from the Fund for the Improvement of Post-secondary Education (FIPSE) in the U.S. Department of Education.



Summer in Finland students outside high-speed train maintenance facility in Helsinki, Finland



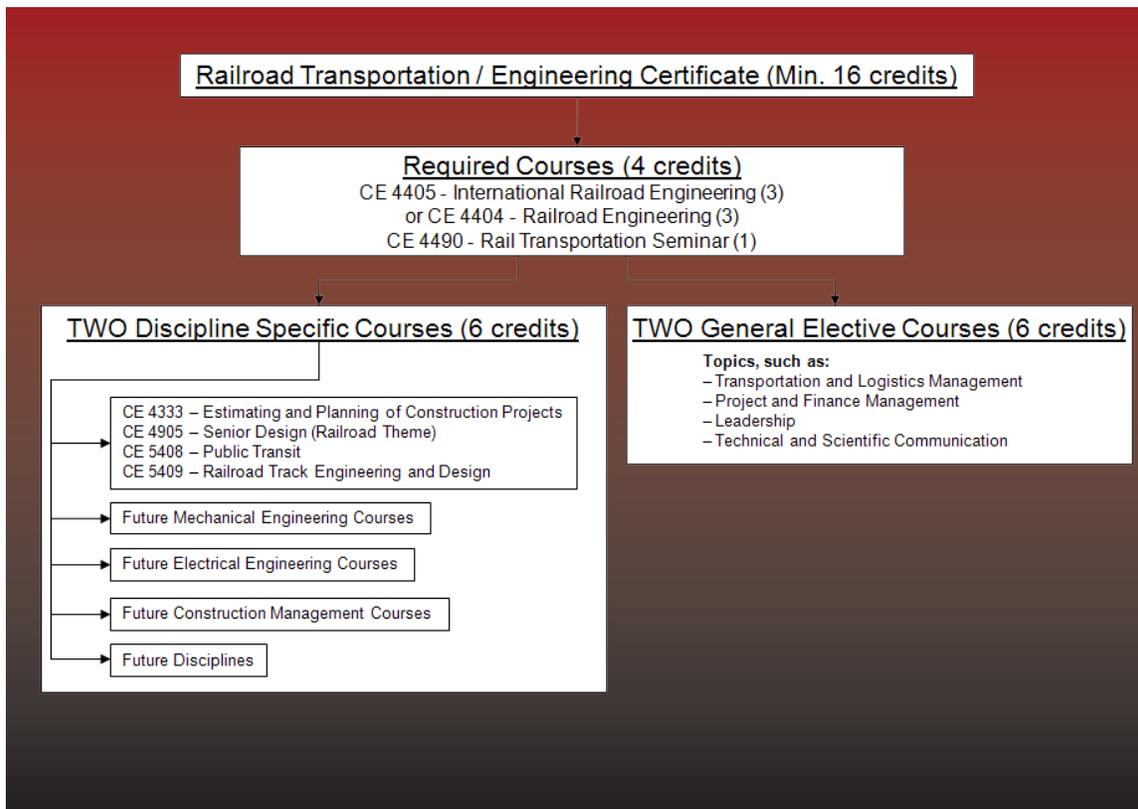
Ryan Rintamaki constructing laboratory railway embankment at the Tampere University of Technology.



CERTIFICATE DEVELOPMENT

At Michigan Technological University (Michigan Tech), cross discipline education and research are significant goals of the university. The Rail Transportation Program (RTP) at Michigan Tech is in the process of developing a Certificate in Rail Transportation Engineering for undergraduate and graduate students at Michigan Tech and other universities. The development of the certificate is entering its final stages and it is expected to be implemented in 2010. The current plan consists of a total of 16 minimum credits and will be initially targeted for civil engineering students. In the future, it is expected to expand to other disciplines, such as both Electrical and Mechanical Engineering.

The certificate will include several technical courses in rail topics, some of which are developed for students from multiple disciplines while others are discipline-specific. Technical courses will be complimented with courses that improve students' non-technical skills, such as leadership and communication. Upon completion of the certificate, students will have a sufficient knowledge base in rail transportation engineering so that they can become effective contributors in their positions on various sides of the rail industry in a short time frame. The tentative certificate structure and included courses are presented below.



RAILROAD ENGINEERING AND ACTIVITIES CLUB



Luke Gublo

Since the inception of the Railroad Engineering and Activities Club (REAC) four years ago, the club has served the Michigan Technological University (Michigan Tech) community by educating students about the many opportunities that exist in the rail industry, and by opening up networking opportunities with professionals within the rail industry.

REAC is one of only two student chapters of the American Railway Engineering and Maintenance-of-Way Association (AREMA) - the other one is the Illini Railroad Club at the University of Illinois. REAC boasts a membership of over 30 students from six different degree programs, ranging from Business Administration to Civil Engineering. Our student group is very active on campus, hosting monthly general meetings and social events, as well as going on field visits aimed at broadening perspectives of the many facets of the rail industry. In addition, our 4th Annual Railroad Night was extremely successful with 131 attendees.

REAC's general monthly meetings congregate REAC officers and members at large to discuss matters of business and planned business (such as future events). In addition, meetings also include a presentation from a guest speaker. These presentations are meant to shed light on a wide variety of issues and sectors within the rail industry, as well as to help students build relationships with professionals in the industry.

Speakers during the past year included Anthony Hatch (ABH Consulting, Wall Street Analyst), James Hyslip (Hyslip Engineering), James Michel (HNTB), and Melvin Burda (BNSF). Meetings have also included presentations from past Michigan Tech rail industry student interns, as well as graduates who now are employed within the industry.

Field visits and conferences are highlights of REAC activities and provide students with a firsthand look at the

rail industry by viewing rail facilities and meeting with rail professionals from all around the world. This allows our students to be in tune with issues that face the rail industry today. In 2008, we attended the AREMA Annual Conference in Salt Lake City, Utah. In addition, our field visits included the Lake Superior & Ishpeming railroad, where students were able to observe the transport of iron ore, along with a weekend trip to three sites in the Minneapolis-Saint Paul Metro area. The sites included the Loram Maintenance-of-Way Headquarters in Hamel, Minnesota; two Union Pacific bridges in Saint Paul, Minnesota; and the Northstar Commuter Rail facility in Big Lake, Minnesota.

REAC also participates and sponsors activities on campus, such as the Rail Info Night, Make a Difference Day, a bowling social, the Michigan Tech Transportation Expo, and the Michigan Tech Preview Day. These activities help to increase REAC's presence as a member of the Michigan Tech community, as well as to help strengthen membership. We were also excited about the opportunity to help the Lake Linden Historical Railroad to improve their track during the Make a Difference Day.

This past year was a very successful and busy year for the Railroad Engineering and Activities Club, and I have every reason to believe that this upcoming year will be even more successful. REAC will continue to put an emphasis on informing students of the exciting opportunities that exist in the rail industry. We can't wait for the CN Rail Transportation Education Center (CN RTEC) to open up, as having our own place to work and convene will help tremendously in building a camaraderie among REAC members and officers. We appreciate the support of our corporate sponsors, as in addition to CN RTEC, their generous contributions allow us the opportunity to sponsor many of our events and field visits. The future is full of opportunity for the rail industry, and we intend to continue to be the standard bearer for informing students of the exciting opportunities that lie ahead.

Luke Gublo

REAC President



REAC Students leveling the Lake Linden Railway Museum track during "Make a Difference Day"

RTP ACTIVITIES AND EVENTS

Michigan Tech Hosts National Summer Transportation Institute

Michigan's National Summer Transportation Institute (NSTI), the first to be held in Michigan, was hosted by Michigan Technological University (Michigan Tech) July 19 through August 7, 2009. With funding from the Federal Highway Administration, thirty students, ages thirteen to seventeen, spent two weeks on the Michigan Tech campus learning about the transportation profession. Through the AASHTO TRAC (Transportation and Civil Engineering) modules, the students covered topics including bridge design, city planning, highway design and construction, public transit, airports, and railroads. Dr. William Sproule presented an introduction to public transit in North America and Dr. Pasi Lautala introduced the students to railroad transportation and engineering. The presentation covered the history of the railroad network in the United States, what makes rail transportation efficient, and the future of passenger and freight rail in the U.S. To see pictures from the program visit www.misti.mtu.edu and click on one of the NSTI web page links.



Students participating in the National Summer Transportation Institute on the old truss bridge in Eagle River, Michigan.

Fourth Annual Railroad Night

The Fourth Annual Railroad Night was held on February 17, 2009 in conjunction with the Michigan Tech 2009 Spring Career Fair. The annual Railroad Night is an opportunity for students, faculty, staff, and administration to meet and socialize with representatives from companies in the Rail Industry. The event, supported by the RTP partners and hosted jointly by the RTP and the Railroad Engineering and Activities Club (REAC), attracted a record-breaking 131 participants. The program featured a visionary keynote speech from a past FRA Administrator, Mr. Gil Carmichael, on the potential for a rail-based "Interstate II" system, as well as the recognition of Dr. Bill Sproule as an honorary REAC member.



Gil Carmichael, retired FRA Administrator, gives the keynote presentation at the Fourth Annual Railroad Night.

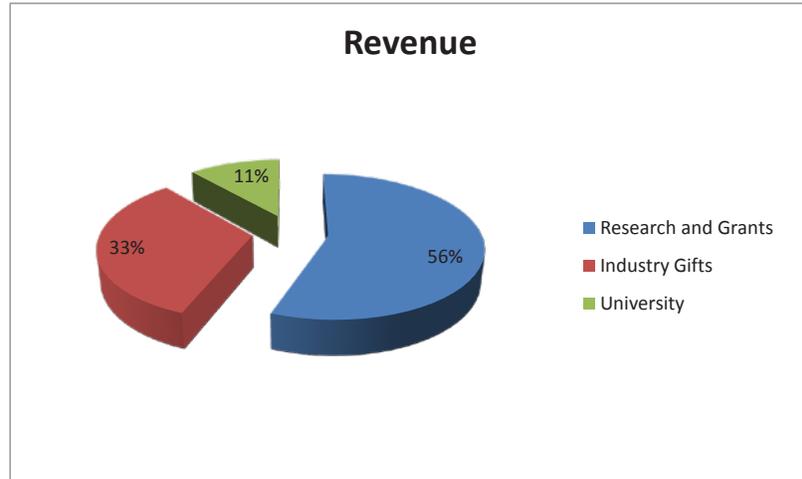
Papers, Presentations, and Publications

- Ferrell, S., Lautala, P.T. and Sproule, W.J. "Railroad Engineering Club Involves Students and the Community." Poster presented at Transportation Research Board (TRB) 2009 Annual Conference, Washington D.C., January 11-15, 2009.
- Lautala, P.T. and Sproule, W.J. "Rebuilding Railroad Engineering Education in the United States with Industry-University Partnerships." Transportation Research Board (TRB) 2009 Annual Conference, Washington D.C., January 11-15, 2009. (Paper accepted for publication in the Transportation Research Record journal).
- Lautala, P.T., and Ferrell, S. "Cold Climate Freight Railroads." Paper and presentation at International Heavy Haul Association (IHHA) conference, Shanghai, China, June 21 - 24, 2009.
- Lutch, R.H., Harris, D.K., and Ahlborn, T.M. "Causes and Preventative Methods for Rail Seat Abrasion in North America's Railroads." Paper and presentation at the American Society of Civil Engineers (ASCE) 14th Conference on Cold Regions Engineering, Duluth, Minnesota, August 30 - September 2, 2009.
- Lautala, P.T., and Brokaw, C. "Development of University Rail Transportation Certificate." Paper and presentation at the American Railway Engineering and Maintenance of Way Association (AREMA) 2009 Annual Conference, Chicago, Illinois, September 19 - 23, 2009.
- Lutch, R.H., Harris, D.K., and Ahlborn, T.M. "Prestressed Concrete Railroads Ties in North America." Paper and presentation at the American Railway Engineering and maintenance of Way Association (AREMA) 2009 Annual Conference, Chicago, Illinois, September 19 - 23, 2009.

FINANCES

RTP Funding

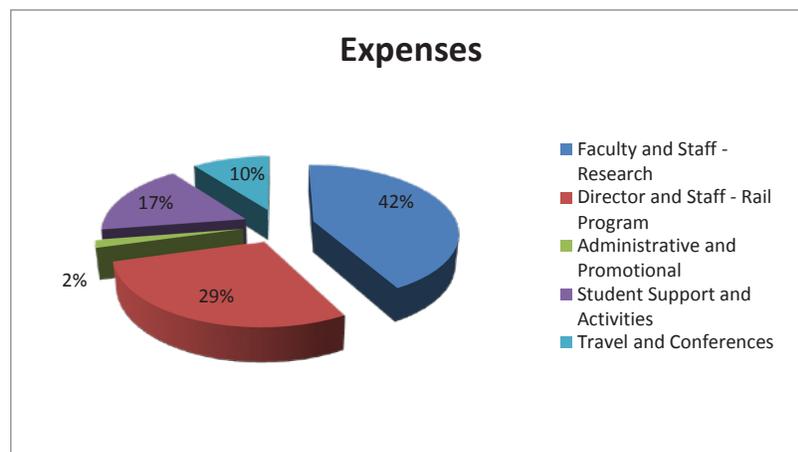
Michigan Tech financial support for the Rail Transportation Program is received from the Office of Vice President for Research (VPR) at Michigan Technological University, as well as the Michigan Tech Transportation Institute (MTTI) and the Department of Civil and Environmental Engineering (CEE). External funding consists of industry partner contributions, gifts from private individuals and sponsored research or grant funding.



RTP Expenditures

Expenditures to support the rail transportation activities have been divided into the several categories.

- **Student support** includes expenses which benefit students directly such as tuition and stipends, expenses from conference fees and field visits, travel, and sponsorship for student events and REAC activities.
- **Travel and conferences** includes all non-student support for travel and participation in rail and educational conferences and meetings to facilitate the development of the rail transportation program. This includes travel expenses incurred in sponsored research projects.
- **Administrative and promotional expenditures** are expenses incurred in the operation of the rail program, such as phones, printers and maintenance fees and promotional and outreach materials.
- **Faculty and staff – research expenses** are faculty and staff salaries and includes overhead charges specific to sponsored research projects.
- **Director and staff – rail program** includes Director and staff salaries used to support and continuing development of the Rail Transportation Program.



RESEARCH PROJECTS

Research Projects In Progress

“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

Michigan Tech is in its second year of investigations related to the proposed rail link from Alaska to the rest of the North American rail system through northern Canada. This project investigates the literature and experiences of the existing and planned rail systems at deep seasonal and permafrost areas around the world and uses findings to develop recommendations for future investigations and project development of the proposed Alaska-Canada rail link. Over 300 papers, reports, and articles world-wide have been reviewed and “scan tours” have been conducted to Scandinavia, Alaska, Canada, China, and Russia to interview the local experts on their experiences in railway operations in cold climates. The project is nearing completion with the final report expected to be completed by the end of February, 2010. Award amount \$301,156. Project Schedule May 2008 - February 2010.

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

Dr. Pasi Lautala, P.E. (Principal Investigator), Dr. Gregory Graman, Dr. Kurt Paterson

The multi-modal optimization study will be completed in early 2010. This project analyzes optimization of the delivery of logs to the wood products industry in the region. It includes investigating a multi-modal rail/truck/surface transportation solution set and evaluation of the effects on traffic congestion and air emissions before and after optimization. As part of the project, Michigan Tech has completed a comprehensive map of all rail facilities capable of handling logs in the study area and has developed a model that can compare the transportation costs by rail and by truck based on the distance traveled. Award amount \$230,000 (Michigan Tech \$80,000). Project Schedule: January, 2009 – January, 2010.

Recently Awarded Research Projects

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

Dr. David Shonnard (Principal Investigator), Dr. Pasi Lautala, P.E., and several other Co-Principal Investigators

The primary objective of the ongoing study is to develop recommendations for an efficient, sustainable, and cost effective forest feedstock harvesting, processing, and hauling system for the Kinross, Michigan cellulosic ethanol facility developed by the Frontier Renewable Resources (FRR). The two-year project is being conducted in collaboration with Michigan State University (MSU) as part of the Center of Energy Excellence. The RTP leads the efforts to investigate and evaluate the alternatives for the multi-modal biomass transportation system. Award amount \$274,837. Project Schedule: September, 2009 – August, 2011.

“Policy Project on Tuning Transatlantic Cooperation in Rail Higher Education (TUNRail)”

Dr. Pasi Lautala, P.E. (U.S. Principal Investigator)

TUNRail is a policy-oriented research grant to “tune” and intensify the railway higher education knowledge exchange and collaboration between the European Union and the United States. The project uses comparisons and benchmarking analyses to define the extent, contents, structure, and objectives of current programs, and to identify how well they address the key aspects of modern railway systems. In addition to Michigan Tech, the participating institutions include the University of Illinois at Urbana-Champaign in the United States, and Instituto Superior Técnico, Universidade Técnica de Lisboa, Portugal and Technische Universität Braunschweig, Germany in European Union. All funding for this two-year federal grant comes from the Fund for the Improvement of Postsecondary Education (FIPSE) in the U.S. Department of Education. Award amount \$76,000. Project Schedule: September, 2009 – August, 2011.

Michigan Tech Rail Transportation Program Vision

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 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.

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.

