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Project Summary

Technology Transfer Outreach Publication

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Project Title
Study of Greenhouse Gas Savings with Congestion Reduction using Multi-Modal optimization of Timber Shipments in the North Central United States

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

The competitiveness of the forest products industry in North Central United States (the northern third of Wisconsin, Minnesota and the Upper Peninsula of Michigan), is dependent on efficient truck, marine, and rail transportation. Many of the industry products shipped are heavy, bulk and raw materials such as logs, that benefit from economies of scale and bulk modes of transportation. Current estimates suggest that truck log delivery systems in the region may be operating at less than 50% loaded capacity. The "empty miles" impact not only increases truck rates but also contributes to needless production of green house gasses and carbon emissions.

The optimization of the use of truck, rail and marine modes with an efficient intermodal linkage would result in the reduction of transportation costs, congestion and harmful air emissions. Without improvements, the current transportation system could contribute to a loss of regional competitiveness of the forest products industry located in the region and might have adverse/indirect impact for the entire regional economy. A healthy business climate for the region's wood products industry will help create improved regional economic benefits and potential growth.

Research Objectives

The objective of this project is to assist in the optimization of the delivery of logs to the wood products industry in the region. The project will investigate a multi-modal (rail/water/truck) surface transportation solution set and evaluate the effects of transportation optimization on traffic congestion and air emissions. It will also evaluate the potential benefits of modal shifts and investigate the usability of log consolidation yards to improve the forest products supply chain.

Rail Transportation Program
Michigan Tech Transportation Institute • Michigan Technological University

www.rail.mtu.edu

University Facts

Total Enrollment	6,550
Graduate Enrollment	916
Number of Faculty	417
Placement Rate	95%

Michigan Tech is located in Houghton, MI on the south shore of Lake Superior. This rural area is known for natural beauty, pleasant summers, abundant snowfall, and numerous all-season outdoor activities. In addition, the University maintains its own downhill and cross-country ski facilities and golf course. There are numerous cultural activities and opportunities on campus and in the community. Michigan Tech has also been rated as one of the safest college campuses in the United States, and the local community provides excellent resources conducive to an outstanding quality of life.

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Methodology

- Based on the input from the forest products industry, carriers, and government agencies, assess the current logging truck operations and intermodal connectivity to rail in Northern Wisconsin, Minnesota, and the Upper Peninsula of Michigan.
- Use tracking data collected by Third Party Logistics (3PL) provider on actual movement data to identify opportunities to reduce empty miles and consolidate shipments. This pilot program will be compared against data collected previously and held by the regional industry groups.
- Conduct a sensitivity analysis on the economics of truck transportation system and how the cost of fuel might impact the modal selection, if prices increase 20%, 30%, or 40%.
- Evaluate the net benefit in the reduction of greenhouse gases using air emission modal models from sample optimization of log movements. The green House gas reduction model used by industry leaders will be one of the tools used in evaluating emissions reduction.
- Explore the potential to improve log transportation by establishing a multi-modal log consolidation yard.

Anticipated Research Findings

This research will be completed by January 31, 2010. The final product will be a narrated report that outline the following: tracking and routing methods for the pilot, opportunities for modal shifts of log traffic, methodology for estimating emissions reduction and the outcome of the application on the optimization model, the log consolidation yard evaluation, and the sensitivity analysis on the cost-effectiveness of modal shifts, using cost of fuel as a variable. Important findings will be identified and their relevance to the project will be highlighted.

Benefits

The results of this research will be used to develop recommendations for the improvements in the movement of heavy, bulk and raw materials by the forest products industry in the North Central United States. The optimization of a multi-modal transportation network in the region would result in the reduction of transportation costs, congestion and harmful air emissions.

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