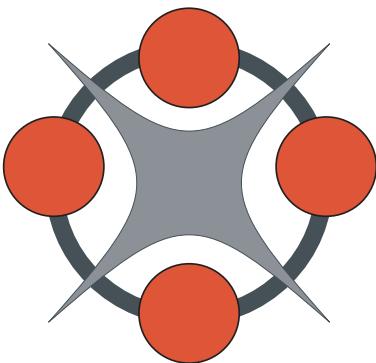


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Maximizing Freight Movements in Local Foods Markets

As interest in local food continues to grow, both practitioners and planners are seeking ways to scale up local and regional food distribution to expand the availability of local products in new and larger markets. Increased demand for local products from mid-to high-volume buyers has revealed inadequacies in distribution systems designed for farm-direct sales on the one hand, and high volume, national broad-line distributors on the other. Because producer profit margins are slim and consumer prices for local products are high (compared to conventionally sourced products), farmers and distributors are seeking economic efficiencies to keep local food prices competitive while ensuring fair returns for farmers.

The Maximizing Freight Movements in Local Foods Markets (CFIRE 04-23) project was conducted as a collaboration between CFIRE and the University of Wisconsin-Madison Center for Integrated Agricultural Systems (CIAS) and was led by CFIRE Director Teresa Adams and CIAS Associate Director Michelle Miller. The project team included staff and graduate students from both CFIRE and CIAS.

A literature review revealed that while local food supply chain research is becoming more widespread and is emerging from all sorts of places—academia, governmental agencies, and industry—there is still a lack of research that specifically looks at the actual hauling of local goods. Who is hauling (producers, distributors, hauling companies, etc.), how they are hauling (with owned vehicles, leased vehicles, by other modes, etc.), and the path on which they are hauling

(farm to store, farm to warehouse to store, farm to wholesaler to warehouse to store, etc.) are questions that must be answered when attempting to gain maximum efficiency along the supply chain.

The research team employed a series of case studies to identify how the local food supply and distribution system functions in Upper Midwest States and means by which local food transportation movements can become more efficient.

This project focused on the Circle City region (as defined by P.H. Lewis, Jr. in *Tomorrow by Design*), which extends from the Twin Cities of Minneapolis and St. Paul southeast across Wisconsin to the Chicago metro area. Case study participants were selected to represent different scales and different products in order to identify the widest possible range of logistical needs and innovations in local and regional food supply chains. Researchers initially concentrated on three products—apples, potatoes, and beef—because they are produced in relatively large volumes in the region, they are represented in various scales of local and regional supply chains, and because they each present different distribution challenges due to distinct harvesting, storage, and processing requirements.

Case study subjects included:

- Esker's Apple Farm (Trempeleau, Wisconsin)
- Grass Run Farms (Spring Grove, Minnesota and Dorchester, Iowa)
- Driftless Organics (Soldiers Grove, Wisconsin)

From the Director's Chair



After a tumultuous Spring and a busy Summer, the days have once again grown cool and crisp, the trees have turned to their fall colors, and CFIRE students and staff are once again well into another semester at the University of Wisconsin-Madison.

The CFIRE staff has undergone significant change in the last several months. Ernie Wittwer has begun a well-earned retirement. In Ernie Wittwer's place as MAFC Facilitator, Ernie Perry comes to us from the Missouri Department of Transportation, where he was most recently the Administrator of Freight Development. Having a new facilitator named Ernie will help with continuity. Researcher Bob Gollnik has relocated to Minneapolis and program assistant Jessie Hanz has accepted an assistantship in the UW-Madison Latin American Studies department. Both Ernie and Jessie continue to work for CFIRE in a limited capacity. Maria Hart has joined CFIRE as a researcher from the Wisconsin Department of Transportation, bringing 18 years of planning experience, much of which focused on freight rail. Lisa Beneker comes to CFIRE from UW Engineering Career Services to serve as the CFIRE program assistant; she also brings a strong background in computer science.

Change is also in the air for the entire University Transportation Centers program. In August, the Research and Innovative Technology Administration of the US DOT released the long-awaited RFP for the next round of UTC funding, in which they will award \$3.5 million to each of the centers selected. In order to compete for this round of funding, we expanded the CFIRE consortium, which now includes the original members: University of Wisconsin-Madison, the University of Wisconsin-Milwaukee, the University of Wisconsin-Superior, the University of Illinois at Chicago, the University of Toledo; and, new members: the University of Memphis, the University of Southern Mississippi, Vanderbilt University, the University of Alabama at Huntsville, and Michigan Technological University. Our proposal focuses on multimodal freight systems and their role in the vitality of the US economy and our quality of life. I'm excited about the initiatives we proposed for CFIRE consortium.

As we look forward to the next phase of CFIRE, we are busy completing our current research activities. Over the summer, we awarded the funding for projects in CFIRE's fifth grant year. Work has already started on a number of these projects and all of them look promising. A number

of CFIRE-funded projects from prior grant years have also been recently completed, including work that focuses on a wide range of freight-related topics: local foods movements, the effect of the Panama Canal expansion on Midwest agricultural commodities, the value of delay for truckers and carriers, using recycled materials for reconstruction of railway infrastructure, elderly mobility issues in Wisconsin, and the use of lean techniques in transportation construction management. You can read about these new and recently completed projects in the pages that follow.

For the states of the Mid-America Freight Coalition, we have completed research projects about the movement of commodities in the region, performance measures for multi-state projects, and the microsimulation of commodity flows. We've also added a new section to the MAFC website devoted to providing freight-related information about the ten MAFC states and the coalition as a whole.

Since January, I have been actively working with other UTCs through CUTC to organize the National Transportation Workforce Summit. CUTC is leading the effort with involvement from the US Departments of Transportation, Labor, and Education, and the National Science Foundation, as well as AASHTO and several other professional organizations. Together we have raised \$185,000 in funding commitments. The Summit will be held in Washington, DC on April 24-26, 2012. More information and the call for papers (due on November 11, 2012) is available at cutcworkforce.com.

And finally, we'd like to extend our congratulations to two of CFIRE's students. Patrick Fuchs was selected for the prestigious Presidential Management Fellowship program. He credits the Transportation Management and Policy program and his work at CFIRE for the transportation-related and analytical knowledge that he needed for this position. Scott Janowiak was awarded the 2011 Andrew Muzi Yellow Jersey Fellowship, in large part for his work with the City of Madison and Madison B-cycle, in which he helped implement Madison's new bike-sharing service.



Teresa Adams, PhD
CFIRE Director

Continued from page 1...

- Keewaydin Organics (Viola and Viroqua, Wisconsin)
- Local Harvest Supply (Coralville, Iowa)
- Bix Produce (St. Paul, Minnesota)
- Edina Couriers (Eden Prairie, Minnesota)
- Sodexo (Gaithersburg, Maryland)

Farmers, distributors, shippers, and broad-line food services are represented.

Conclusions

Taken together, these case studies allowed the research team to draw a series of conclusions about local foods movements in the Circle City region.

- Producers find a real or perceived trade-off between efficient distribution of their products and their ability to personally represent them in the field.
- Markets exist for local haulers, especially those that specialize in carrying local and regional food products.
- Route planning strategies are related to scale. Smaller producers and haulers rely on maps and local knowledge while larger producers tend to rely more on route planning software.
- The use of inventory management systems is also related to scale. Smaller producers, while aware of the benefits of these systems, are unable to afford them. Larger producers are more likely to use them.
- Retention of product origination information throughout the supply chain is related to scale. The larger and more complicated the supply chain, the harder it is to retain this information.
- Producers and haulers would prefer to increase their back-hauling opportunities, but most companies found arranging back-hauled loads to be difficult.
- Conflicting interstate trucking regulations present challenges for smaller-scale distribution.
- There is a business case for facilitating the distribution of local foods into the product lines of larger producers and distributors.

Based on these conclusions, the project team advances a series of recommendations for outreach materials and for future research about the movement of local foods.

Audience-based fact sheets. These fact sheets could explain how producers could calculate their distribution costs, how distributors could create and market services for local producers and markets, how buyers can find such distributors and how policy-makers can change state regulations that encourage multi-state distribution of local food products.

Topic-based fact sheets could focus on route planning strategies, valuing costs of distribution, and how to match supply with demand, among others.

Online tools. Virtual product aggregation points serve to aggregate products, connect producers with distributors and buyers, and facilitate orders. These tools could also be used for route planning and for identifying back-hauling opportunities.

Further Research

Because this project focused on a literature review and on a series of case studies, its scope was necessarily limited. As such, the research team has identified a series of opportunities for further research: sustainability of farming practices and other production practices; the spatial relationship between production, consumption, and transportation networks within a specific region; the transportation and economic implications of food hubs in a given region; methods for valuing the cost of distribution when a producer scales up; and, the economic impacts of the development of regional food systems.

The next phase of this project (CFIRE 05-17) will continue the exploration of regional food supply chains, particularly in relation to aggregation, transportation, and logistics. This will help to determine where regional supply chains still exist and where they may benefit from re-investment and rebuilding. Research will be concentrated on the Driftless Area and Central Sands region of Wisconsin.

The second phase is a collaboration between CFIRE, the Center for Integrated Agricultural Studies, and the Minnesota-based Land Stewardship Project.

For more information, visit the project pages for [phase 1 \(CFIRE 04-23\)](#) and [phase 2 \(CFIRE 05-17\)](#) of the Maximizing Freight Movements in Local Food Markets project.

Assessing the Value of Delay to Truckers and Carriers

Freight transportation plays a vital role in the economy because it connects suppliers, distributors, vendors, and consumers. Together with international freight, the United States transportation system moved, on average, 53 million tons of freight each day in 2002, worth \$36 billion. By 2008, this grew to 58.9 million tons. FHWA estimates that freight tonnage will grow faster in the future than in the past, reaching an estimated total volume of more than 37,000 million tons in 2035. Freight is also increasing in value and increasing at a higher rate than tonnage. Between 2002 and 2008, the value of freight grew 26.8 percent while tonnage grew 11.8 percent in the same period. Much of this disproportionate growth is generated by the use of supply chains in which goods are delivered more frequently and in smaller amounts each time.

As both tonnage and value of freight continue to grow, the congestion of our nation's highways takes an economic toll. This project, Assessing the Value of Delay to Truckers and Carriers (CFIRE 03-15), was led by CFIRE Director Teresa Adams and Dr. Bruce Wang of Texas A&M. It evaluated the Value of Delay (VOD) to commercial vehicle operators due to highway congestion in two geographic areas: south Texas and southern Wisconsin. The value of delay for congestion is a fundamental parameter influencing the private sector's response to public freight projects and policies such as corridor construction and tolling. By understanding the value of delay, freight planners can order freight congestion relief projects by rank. However, estimating the value of delay is complex; it includes factors as direct operational cost, travel length, travel time variation, inventory holding, and warehouse management.

The project team used two methods to estimate the value of delay for truckers and carriers: a stated preference (SP) survey and a carrier fleet operational simulation. The survey addressed the perceived value of time that directly affects travelers' route choice decisions. The simulation provided an estimate of the economic impact in the context of commercial fleet network operations in a reasonable competitive market.

The simulation framework used ArcGIS and C++ to generate a freight network based on the Houston highway system. A set of customers was randomly generated, each having a random demand for service and associated with time windows for delivery and pickup. The heuristic algorithm dispatched vehicles for truckload service on a continuous time horizon. The average value of delay is the ratio between additional operational cost and the delay caused by the congestion. This ratio was assessed for two

scenarios: a single depot and two cooperating depots. Simulations based on different demand sizes, demand distribution patterns, time windows, and locations of congestion revealed a range of value of delay from \$94/hour to \$121/hour for the case of a central depot and \$80/hour to \$84/hour for the case of two depots. Based on the simulation, the project team concluded that:

1. The VOD increases with the growth of demand size, especially in the case of a central depot.
2. For the cases with 80 percent demands known at the beginning of the day, the standard deviation increases with the time window.
3. The VOD in the two depots case is smaller than the VOD in the single depot case, no matter the congestion location.

The survey collected the stated preference from truckers and carriers in two scenarios. The first scenario assumes a driver running late by 30 minutes on a congested road, while the second scenario assumes on time delivery or pickup. Several hypothetical tolling alternatives were offered as alternatives to test the driver's willingness to pay. The data were regressed using maximum likelihood estimation. A generic utility function estimates value of delay in the range of \$25/hour to \$65/hour, with the following conclusions:

1. The drivers are willing to pay more when running late.
2. The drivers paid by-the-mile perceive a slightly higher VOD than the others.
3. Private carriers perceive a higher VOD when compared with owner-operators and for-hire drivers.
4. The drivers who pay the tolls by themselves are less willing to use toll road.

A comparison between the survey and the simulation results indicated that drivers perceive a significantly lower value than they may actually experience. The result also indicated that willingness to pay is much less than what is needed to resolve congestion.

This is a collaborative research project between CFIRE and University Transportation Center for Mobility (UTCM) at Texas A&M University. The support and funding from the two university transportation centers promoted collaborations between regions and university programs, and improved geographic coverage of stakeholders in this study.

For more information and to read the final report, visit cfire.wistrans.org/research/projects/03-15/.

Addressing Elderly Mobility Issues in Wisconsin

The aging of baby boomers poses significant challenges to Wisconsin's existing transportation infrastructure and specialized transit programs. From 2010 to 2035, the number of elderly Wisconsinites is projected to grow by 90 percent, an increase of 702,760 persons. By 2035, residents age 65 and over will comprise nearly a quarter of the population of Wisconsin, as every county in the state will experience growth in the elderly share of their population.

This project, Addressing Elderly Mobility Issues in Wisconsin (CFIRE 04-05), was led by CFIRE Deputy Director Jason Bittner and funded in part by the Wisconsin Department of Transportation (WisDOT). In this study, the project team analyzed Wisconsin's existing transportation services for older citizens, collected information from elderly residents using a survey and a series of focus groups, and reviewed national and international best practices for providing mobility to elderly citizens.

Recommendations

Based on this work, researchers were able to provide a series of recommendations (presented in no particular order). It should be noted that these recommendations are not solely limited to policies only affecting elderly citizens, in some cases these recommendations apply to older and partially disabled citizens.

1. Explore the initiation of a Medical Advisory Board to guide state policies with respect to medical fitness to drive and to provide a conduit between WisDOT and the state's medical community. Encourage broad participation from members of the medical community from across the state.
2. Review the vacant nurse practitioner position in the Medical Review Unit to improve program outreach regarding reporting requirements and state processes for license cancellation. This position could also help develop informational resources, participate in data collection and program evaluation, and expand computer-based reporting to medical professionals. With more older drivers on the road, awareness and implementation of state policies relating to reporting at-risk drivers will become more critical in future years.
3. When mailing license cancellation notices, always send contact information and resources about local transportation alternatives. Increase communication between Aging and Disability Resource Centers (ADRC), mobility managers, etc., and the Medical Review Unit on this issue. Support individual mobility planning as a part of mobility manager activities. In general, support a smoother transition from driving to other alternatives.
4. Develop high-quality informational resources and self-assessment tools and make them available online and in print at regional locations such as senior centers. Include information about the impacts of the aging process upon driving, local transportation alternatives, and relevant state policies. Resources can help assist mobility managers and support awareness of existing services and guidelines.
5. Analyze crash trends involving elderly individuals and use the results to help guide installation of engineering countermeasures and state licensing policies. The state should also adopt appropriate recommendations from the forthcoming FHWA Highway Design Handbook for Older Drivers and Pedestrians and disseminate standards to local agencies and private partners.
6. Enhance roundabout education materials and activities specifically targeted towards older drivers. New design practices, and especially roundabouts, are a chief concern for elderly drivers. WisDOT should consider holding outreach sessions and developing educational materials geared towards an older audience.
7. Work with the Officer of the Commissioner of Insurance and other parties to explore requiring insurance companies operating within the state to provide discounts to individuals who complete a state-approved driver-improvement course like AARP's Driver Safety Program course. Additionally, work with insurance companies on issues related to coverage for volunteer transit drivers and research the expansion of coverage for occupational therapy services related to driving skills.
8. Use Rural Transit Assistance Program (RTAP) funds to help build technical expertise regarding budgeting, data collection, and program application processes. RTAP courses or webinars focusing on these subjects could help inexperienced program applicants gain a clearer understanding of how best to leverage limited resources and collect data to support state-level evaluation and technical assistance activities.
9. Prioritize highway improvement or maintenance projects that will support elderly mobility in competitive application processes and include Aging Agency representatives on project selection committees. For competitive transportation programs, applications should include questions and/or award points for projects that will significantly improve elderly mobility in an area. Examples could include the creation of a

Continued on page 11...

Panama Canal Expansion and Midwest Agricultural Exports

The Panama Canal is a vital conduit for maritime shipping to and from the United States, including grain exports from the Midwest. The current expansion of the Canal's capacity is expected to have significant impacts on agricultural supply chains. With the construction of a third set of locks underway and scheduled for completion by 2014, the Canal will be capable of accommodating more and larger bulk and container ships, creating the potential for greater economies of scale, reduced delays, and greater feasibility for all-water routes.

The Midwestern United States currently produces approximately 75 percent of the nation's corn, wheat, and soy; 60 percent of the nation's agricultural exports originate in the region. In particular, Illinois and Iowa are dominant producers and exporters of coarse grains.

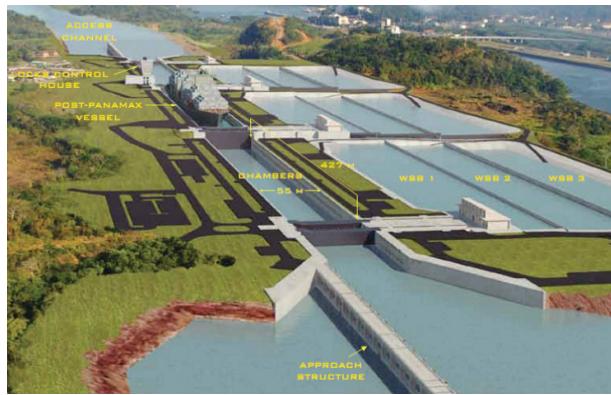
As demand expands in less-developed markets and macroeconomic trends point towards more favorable currency valuations for exporters, grain is anticipated to remain an important piece of American exports. With export volumes projected to rise in coming years, future changes in the transportation network that moves agricultural commodities abroad—including the expanded Panama Canal, competing ports, and the inland waterway and surface modes that support maritime freight—deserve serious assessment. To that end, the Understanding the Economic, Environmental and Energy Consequences of the Panama Canal Expansion on Midwest Grain and Agricultural Exports project (CFIRE 03-18), led by CFIRE Deputy Director Jason Bittner, examined the expected impacts of the expansion project on the Canal's operations, as well as interactions with trends in the agricultural and freight sectors.

In order to determine the impacts of the expansion project on agricultural exports, the project team employed both quantitative modeling methods and qualitative examination of existing literature, economic trends, and expectations of the agricultural production and transportation industries. Researchers used both production and commodity flow data to characterize current grain movements. These data also served as a basis for GIS-based analysis of energy consumption and greenhouse gas emissions. The project team also collected and distilled expectations from industry associations, federal agencies, and industry analysts.

Conclusions

The opening of a third lock on the Panama Canal by 2014 will significantly change the capacity of the Canal for inter-ocean movements, affecting the decisions of Midwest grain and agricultural product exporters and improving the all-water routes through which much of the region's exports are shipped.

However, there is limited information available regarding market expectations once the expansion is completed, due to uncertainties in grain markets in general and the fact that toll prices will be subject to change up to the opening of the expanded Canal and beyond. As with any predictive analysis, great uncertainty exists in anticipating grain trade patterns driven by economic, environmental, political, and technical factors years into the future.



Third Set of Locks

Insofar as a consensus exists, there appears to be agreement between experts, exporters, and government agencies that transit times for grain shipments will likely decrease. The Canal's ability to accommodate post-Panamax bulk and containerships may erase some of the advantages of the US intermodal system, providing

increased incentives for the containerization of grain and improvement of Gulf and East Coast port facilities. Volumes of Midwestern grain leaving via California ports are expected to experience slower growth than shipments leaving from the Gulf Coast or Pacific Northwest.

In the long term, the Panama Canal's expanded capacity to transit more and larger vessels may give it a favorable position to take advantage of the expected growth in grain exports to Asia, but this is not necessarily meaningful to the short-term logistics decisions of exporters. Finally, despite the reduced energy intensiveness of maritime freight transportation, increased grain traffic through the Panama Canal may lead to higher energy consumption and greenhouse gas emissions.

For more information about this project and to read the final report, visit cfire.wistrans.org/research/projects/03-18/.

Applying Lean Techniques in Delivery of Transportation Infrastructure Projects

Construction productivity has been declining since the 1960s, and studies have shown that only 40 percent of construction workers' time is considered to be value-added work. Lean techniques are being used successfully on general construction and other non-transportation projects throughout this country, and their use is growing. Manufacturing and vertical construction have shown that a project using Lean techniques can be delivered in less time, at lower costs, and with improved quality.

The implementation of Lean techniques with a Lean Project Delivery (LPD) method can lead to higher quality projects, faster project completion, and more efficient delivery. However, Lean techniques are not currently being used by State Transportation Agencies (STAs). To implement these techniques, the transportation industry as a whole needs to work closely together using non-traditional approaches to achieve the necessary improvements.

The Applying Lean Techniques in Delivery of Transportation Infrastructure Projects (CFIRE 03-11) project, conducted by the Construction and Materials Support Center with funding from CFIRE, focuses on the benefits of Lean techniques in the delivery of public infrastructure projects, along with potential impediments to adoption.

Lean Project Delivery uses a holistic, non-traditional project delivery approach to managing the various collaborative relationships that exist on a project for better integration of the individual management components to maximize project benefits. Lean Techniques systematically identify and minimize waste (non-value-added activities) through continuous improvement.

Two of the most popular forms of LPD in the transportation industry are the use of a Design Build (DB) or Construction Manager at Risk (CM@R) contracting method. Two of the newer transitions into Lean are Project Alliancing and Public-Private Partnerships (P3s).

A work sampling study was conducted on a county highway bridge project to observe the actual tasks being performed and help identify wasteful activities within the process. The work sampling study found that the rebar installation task consisted of only 32 percent direct work, with 29 percent of all activities consisting of pure waste. Asphalt paving work was found to include only 35 percent direct work, with 51 percent of all activities consisting of pure waste.

Researchers also conducted case studies of public projects to learn more about the application of Lean

techniques in foreign markets. Lean techniques used in the case studies included an improvement team, strategic gap analysis, pareto charts, standard work, fishbone diagrams, process mapping, workflow simulation, 5-S strategies, value stream mapping, system diagnosis, process simulation, pull operations, standard work, improved supply chain logistics, the Define-Measure-Analyze-Design-Verify (DMADV) process, and a voice of the customer study.

The project team also identified promising lean techniques for transportation projects. These techniques were ranked according to their ease of implementation in the transportation industry, and the amount of agreement between the technique and the current STA delivery process, including the overall delivery system, individual resistance to change, and legal issues. Techniques ranked highly included:

1. Collaborative Planning
2. Daily Huddle Meetings (Pre-Task Planning)
3. Last Planner System
4. Pull Schedules
5. Simulation and Modeling
6. Standard Work
7. Value Stream Mapping (VSM)

Researchers also identified specific barriers to implementation of Lean techniques in public transportation projects were also identified. For public construction contracts, there are often restrictive laws governing the selection of contractors through competitive bidding. Lean relies on the careful selection of contractors and subcontractors early in the project cycle, which conflicts with several of the characteristics of a competitive bidding process. In most cases, an organization will initially lack some of the resources, including budget, knowledge, and experience to successfully implement a new delivery system. Researchers also developed a management plan for the adopting of Lean techniques at state transportation agencies.

For more information about this project and to read the final report, visit cfire.wistrans.org/research/projects/03-11/.



Costs and Benefits of LCVs

Dan Kleinmaier, Project Assistant

In 1991, the federal government put a freeze on the use of long combination vehicles (LCVs). This meant that states that already allowed the use of LCVs could continue to do so, but also that states not already allowing them could not implement the use of LCVs. Safety was cited as the primary reason for the freeze. Because of their increased length and more challenging handling, LCVs were thought to be less safe than a single trailer truck. However, recent studies have not been able to prove conclusively that LCVs are less safe. Some studies have even found LCVs to be safer because they decrease the number of trucks on the road and are more stable due to their increased length. As a result, policy makers across the country are showing renewed interest in expanding the use of LCVs. This study, Longer Combination Vehicles: Do They Improve Freight Flows and Operational Efficiency and Reduce Highway

estimated the additional costs of training drivers to operate LCVs, LCV-specific infrastructure, and additional LCV-related labor costs, which counter the gains realized in the previous categories. Ultimately, the monetized benefits of using LCVs exceeded the monetized costs of using them.

In addition to the cost-benefit analysis, a survey will be distributed to the public to take a closer look at the consequences of moving freight. The public will be asked to prioritize these consequences in order to get a better understanding of what goals and outcomes are desirable when freight is transported. This prioritizing of consequences will assist public agencies in the decision-making process of allocating funds for transportation projects.

Researchers also discussed the use of LCVs with representatives from both the public and private sectors in order to determine whether LCV use would increase if allowed and whether allowing LCV use was feasible for states. This is especially important because increased use of LCVs would generate increased benefits as some costs were distributed over more trips. While it is not realistic to provide a detailed estimate, a representative from a major carrier said the increase would be significant as the benefits for carriers are obvious. For example, he said that 100 percent of truck shipments moving from distribution center to distribution center would employ the use of LCVs if it were legal. From the public point of view, the use of LCVs has not been problematic. A DOT representative from a state that currently allows the use of LCVs says there would be some initial costs, but these costs would be minimal.

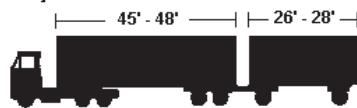
For example, highway patrol officials may need a half day of training in order to properly regulate the use of LCVs. However, if substantial infrastructure upgrades were needed in order to accommodate LCVs, these costs could increase significantly.

Preliminary results of the cost-benefit analysis suggest that there is a net benefit to the use of LCVs. When complete, this project will include a detailed benefit-cost analysis of LCV use, a summary of the feedback from public surveys regarding the priorities associated with the movement of freight, and an estimate of how truck traffic would be influenced by increased LCV use.

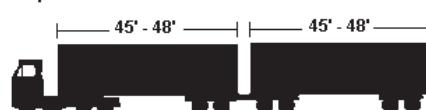
For more information, visit the [CFIRE 05-01 project page](#).

Common LCVs

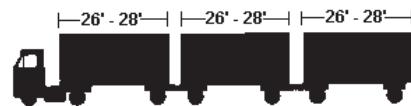
Rocky Mountain Double



Turnpike Double

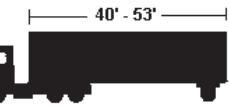


Triple

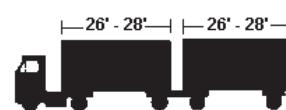


Common Non-LCV Trucks

Combination With Single Trailer



Combination With Twin Trailers



Straight Truck With Trailer Connected With Draw Bar (Lengths Vary)



Congestion? (CFIRE 05-01), takes a closer look at the benefits and costs associated with the use of LCVs.

This research project includes a cost-benefit analysis (CBA) of LCV use. Data from the Ohio Turnpike provided the data for this analysis. We obtained the number of double and triple trailers traveling on the turnpike during 2008 and then converted these into single trailer trips to simulate the counterfactual case (40,313 doubles and 101,413 triples converted to 233,750 single trailers). We then compared the costs associated with operating doubles and triples versus single trailers. We estimated the costs of fuel use, emission production, labor, pavement maintenance, and depreciation on trucks and trailers. Costs were lower for LCVs in all categories. Further, we

Midwest Agriculture, Freight Investment, and Long-term Export Goals

Steve Wagner, Communications Coordinator

The Obama Administration's National Export Initiative (NEI) aims to double US exports by 2015 and support the creation of 2 million new jobs. The NEI creates a Cabinet-level focus on US exports, expands export financing, prioritizes government advocacy on behalf of US exporters, provides new resources to exporters, and seeks to ensure a level playing field for US exporters in global markets.

The USDA projects a \$44 billion surplus in agricultural trade for the 2011 fiscal year (1). The USDA also projects continued growth in agricultural exports—soybeans and corn in particular—in the coming decade (2). The export of agricultural commodities form a substantial part of the US economy—and the economy of the Midwest in particular.

Approximately 60 percent of US agricultural exports originate in the Midwestern United States (4). Grains—wheat, corn, and soybeans—make up the bulk of these exports. More than 90 percent of the grain exported from the Midwest reaches port via the inland waterways (64.4 percent) or by rail (26.4 percent) (5).

At the same time, overseas markets for Midwest grain continue to expand. For example, the 2007 Corn Refiner's Association Annual Report projects that the markets for corn products in South America, Eastern Europe, and especially Asia will continue to grow (8). Markets for higher-value containerized agricultural commodities such as identity-preserved grains, oilseeds, and food-grade soybeans are also gaining popularity in Asian markets (9).

While agricultural exports have continued to increase and are projected to increase in the coming years, investment in the transportation infrastructure required to move these commodities from farm to market has lagged. By 2007, US investment in transportation infrastructure dropped to 2.4 percent of GDP, leaving the United States behind Europe (5 percent) and China (9 percent) (3). This hamstrings our ability to use our transportation system for competitive advantage in the marketplace. Other countries are expanding their transportation infrastructure. Brazil—our biggest competitor in agricultural markets—is investing billions to model their inland river systems after ours.

The US inland waterway system, which carries the bulk of Midwestern grain to port, is in particular need of increased investment. The average age of all federally owned and operated locks is 60 years: 92 of these locks are more than 60 years old, and 30 were built in the 1800s. All of these locks are past their planned designed life (6). Estimates for

the investment needed to repair, maintain, and modernize the inland waterway system range from \$7.6 billion to \$18 billion over the next 20 years (7). A failure of any one of these locks could seriously hamper the ability to ship grain from Midwest producers to ports on the Gulf of Mexico, increasing the cost of shipping and stressing the capacity of both the rail and highway modes as cargos are shifted to compensate.

Yearly shortfalls of \$20 million dollars in the USACE dredging in the lower Mississippi are causing a recurring problem in this part of the river and making it difficult to maintain the 45-foot channel depth (7). This also increases the cost of shipping by limiting the size of the ships that can reach upstream ports on the Lower Mississippi. With the expansion of the Panama Canal, deeper drafts will become even more valuable for US agricultural exports.

The efficient movement of freight is the foundation of the US economy in general and crucial to the agricultural economy of the Midwest. Without increased investment in the maritime, rail, highway, and intermodal facilities that move agricultural commodities from Midwest farms to the world market, the United States will be hard pressed to excel in the world economy and meet the goals of the National Export Initiative. Unfortunately, the NEI pays little attention to the aspects of the export system that move goods from their points of origin to US ports for export to foreign markets. Freight infrastructure plainly falls into this area of omission.

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Reconstruction of Railroads and Highways with In-Situ Reclamation Materials

Increased maintenance of road and railroad infrastructure due to heavier freight load is a major concern facing the freight transportation industries in the United States.

This project, Reconstruction of Railroads and Highways with In-Situ Reclamation Materials (CFIRE 02-04), focuses on the sustainable construction of highways and railways for increasing freight capacity of the transportation systems in the United States. The project team developed a methodology for increasing freight capacity of highways using sustainable geo-materials and system for determining service life and freight capacity of railroad systems in various substructure conditions.

Highways

Recycling part or all of the pavement materials in an existing road during rehabilitation and reconstruction is an attractive construction alternative. For roads with a hot mix asphalt (HMA) surface, the HMA, underlying base, and a portion of the existing subgrade often are pulverized to form a new base material referred to as recycled pavement material (RPM). Similarly, when an unpaved road with a gravel surface is upgraded to a paved road, the existing road surface gravel (RSG) is blended and compacted to form a new base layer. Recycling pavement and road materials in this manner is both cost-effective and environmentally friendly. Recycled road materials may contain asphalt binder, fines, and/or other deleterious materials that can adversely affect strength and stiffness. To address this issue, chemical stabilizing agents such as cement, cement kiln dust (CKD), or cementitious fly ash can be blended with RPM and RSG to increase stiffness and to limit rutting. Use of industrial byproducts for stabilization, such as CKD or self-cementing fly ash, is particularly attractive in the context of sustainability.

Researchers investigated the resilient modulus and plastic deformation of two recycled base course materials, recycled pavement material (RPM) and road surface gravel (RSG) using a large-scale model experiment (LSME) and laboratory bench-scale resilient modulus (BSRM) tests. The LSME results showed that stabilization of RPM and RSG with 10 percent by weight of Class C fly ash increased the summary resilient modulus (SRM) two to five times. Moreover, the SRM increased with layer thickness in the LSME. However, the RPM and RSG exhibited the rate of plastic deformation three to four times higher than the Class 5 base. Stabilized RPM and RSG had the lowest plastic deformation. The moduli obtained from the LSME were used to develop an equivalency-based design for the recycled materials with and without fly ash.

Stabilization of the recycled materials by fly ash reduced the required thickness of a pavement base course up to 30 percent in accordance with the AASHTO-1993 design guide. The SRM and plastic deformation from LSME tests were incorporated in the Mechanistic Empirical Pavement Design Guide (MEPDG) to predict the lifetime expectancy of the three recycled materials in a pavement alone and with fly ash stabilization. The results showed that stabilization of recycled materials with fly ash increases the lifetime of pavements constructed with 0.3-m-thick alternative recycled materials from 17 to 21 years.

Railroads

Surface deviation of railroad tracks caused by accumulation of deformation of track substructures, including ballast and subgrade, is the main cause of the need for railway maintenance. Among these components, railway ballast has a significant role in effectively distributing the train loads to the underlying subgrade. Ballast degrades under repetitive train loads and ultimately deviates from the original specifications. Generation of fines within ballast creates "fouled ballast," which is one of the main causes of track surface deviation. Fouling drastically changes the deformational behavior of railway track and increases related maintenance costs. There is limited data available to characterize the deformational behavior of ballast in various states of fouling and predict the ballast-related maintenance. Improvements in the mechanistic-based characterization of plastic (permanent) deformation of railway ballast greatly assist in the prediction of surface deviation of rail tracks and associated maintenance planning. Improved characterization techniques for railway ballast and prediction of the mechanistic behavior would allow railway professionals to evaluate initiatives for increasing the freight capacity and speed in railway systems. The mechanistic-based approach reduces the uncertainties in prediction of track lifetime and related maintenance especially in the absence of historical track performance data related to heavier freight loads and higher speed.

Researchers developed a testing protocol and guidelines for testing fouled ballast that simulated the behavior of ballast under a range of geotechnical conditions, including the amount and fineness of fouling materials, moisture content, and ballast composition. A cohesive fouling index (CFI) was introduced to account for these factors. In this perspective, the indices for fouled ballast are expected to provide useful tools for assessing track condition. Depth and moisture content of fouling were evaluated using time-domain reflectometry (TDR) technique.

The project team then developed, as a practical application of this study, a maintenance planning and scheduling program for railway substructure. A deformation model including fouling impact phase and initial compaction phase was developed based on the data obtained from the LSCT apparatus. FIP and ICP in the deformation model were characterized in various fouling conditions, moisture contents, and states of stress. These were used to develop maintenance planning and scheduling software application that incorporates the mechanistic-based predictive model for railway substructure by limiting the surface deviation of the railway track. Developing a maintenance planning for railway track based on deformation of substructure reveals the need for a mechanistic characterization of ballast. Based on the developed model and a given track condition, ballast with initial fouling of 5 percent requires four maintenance activities (i.e., tamping events) to level the track surface during six years of evaluation. Based on this model, fouling is expected to increase to 25 percent after six years.



The Reconstruction of Railroads and Highways with In-Situ Reclamation Materials (CFIRE 02-04) project was funded by CFIRE with additional funding from the Minnesota Local Roads Research Board, and the Recycled Materials Resource Center.

In addition, the research team received assistance from Amtrak, BNSF Railway, and Wisconsin and Southern Railway.

For more information and to read the final report, visit cfire.wistrans.org/research/projects/02-04.

Continued from page 5...

channelized left-turn lane, the installation of pedestrian countdown timers at intersections, or expanding the hours of a transit service heavily used by older individuals.

10. Continue efforts toward coordination at both state and local/regional levels. At the state level, make the case for a stronger Interagency Council on Transportation Coordination (ICTC) by recognizing and publicizing the potential efficiency gains associated with closely coordinated transit services. Continue supporting the

mobility management perspective and nurturing the state's growing mobility management community. At the local and regional levels, explore opportunities for joint marketing and advertising, including partnerships with other transportation programs or other non-transportation services for the elderly. Explore innovative approaches to advertising and marketing; for instance, an agency could install distinctive vehicle wraps as a relatively low-cost way to use existing capital.

11. Work with the Department of Health Services to evaluate Medicaid non-emergency medical transportation (NEMT) broker performance based upon reimbursement levels, customer satisfaction, and coordination with existing local services. The transition to Logisticare as a statewide broker of NEMT services holds potential in terms of augmenting the state's reimbursement rate; however, the move has sparked controversy for its potential impacts upon customer satisfaction and upon existing service providers. In seeking a NEMT broker, the Department of Health Services issued a Request for Proposals that included a paragraph indicating that the Department hoped that the broker would participate in a mobility management pilot project funded through the Community Transportation Association of America. Beyond this text, there was no requirement that the broker participate in the ICTC or any other coordination activities. In any renewal or renegotiation of this contract, coordination mandates should be included. Additionally, the state should evaluate the effects of a statewide broker upon customer satisfaction and local service providers.
12. Continue to identify and respond to transit service gaps for elderly riders. In particular, consider expanding evening and weekend options for older riders. This could be accomplished via mandates or incentives to provide such service.
13. Continue gathering information about the needs of older individuals; encourage local governmental units to incorporate findings in plans for land use and housing. Demographic, social, and economic trends will continue to shape the dimensions surrounding the mobility needs of Wisconsin's older populations. The state should continue to evaluate these needs and prioritize methods to address them. State agencies should also encourage municipalities to consider elderly transportation needs when thinking about future land use and housing patterns in their communities.

For more information about this project and to read the final report, visit cfire.wistrans.org/research/projects/04-05.

Spring 2011 TMP Reception

At the end of the Spring semester, students in the TMP Practicum and the TMP Colloquium present the results of their group projects to interested staff and faculty, as well as other students.

Each semester, CFIRE hosts a reception for the students in the Transportation Management and Policy (TMP) program. Students, faculty, and staff share a buffet lunch, sponsored by a donation from Cambridge Systematics, Inc. CFIRE also awards the Muzi Fellowship during this reception.

TMP Colloquium

Students in the Transportation Management and Policy (TMP) program take two one-credit colloquium modules as part of the TMP curriculum. These colloquia provide students with the opportunity to discuss transportation issues with leaders in the field. Each semester, the topic and guest speakers vary. Students also work in small groups on projects related to the topic at hand. The theme for the Spring 2011 TMP Colloquium was Maritime Freight Issues.

At the Spring 2010 TMP program reception, colloquium students presented the results of their small-group projects.

- Patrick Fuchs, Tony Smick, and Keisuke Kiyotani gave a presentation entitled “An Analysis of the Harbor Maintenance Tax.”



- Tim Baird, Liz Heyman, and John Coburn gave a presentation entitled “Community Involvement In/Reaction to Port Operations.”

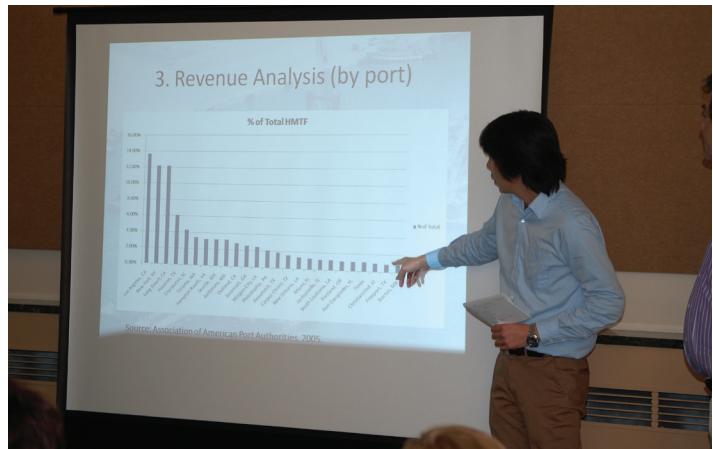
TMP Practicum

In the Transportation Management and Policy (TMP) program, students take a practicum course where they work on a solution to a real-world transportation-related problem.

At the Spring 2011 TMP program reception, two groups of practicum students presented the results of their practicum projects.

- Dan Kleinmaier, Austin Outhavong, Liz Heyman, and Ashwat Anandanarayanan gave a presentation entitled “An Assessment of Parking Needs at Passenger Rail Stations.”
- Scott Janowiak, Keisuke Kiyotani, Adam Smith, and Glenn Halstead gave a presentation entitled “A Cost-Benefit Analysis of Gravel Surfaces for Low Volume Roads.”

After each student group finished presenting their findings, they answered questions from the faculty and staff members in the audience.



The Transportation Management and Policy (TMP) program prepares students for professional work with public sector transportation agencies, consulting firms, and other organizations concerned with sustainable transportation management and policy. CFIRE provides support and coordination for the TMP program and CFIRE Director Teresa Adams serves as program chair. For more information, visit cfire.wistrans.org/cfire/education/for-students/tmp/.

Great Lakes Maritime Transportation Teacher Institute

On June 20-24, 2011, nineteen teachers from Michigan, Wisconsin, and Ohio attended the Great Lakes Maritime Transportation Teacher Institute in Door County, Wisconsin, where they explored the historical, economical and environmental aspects of Great Lakes shipping. The Institute is designed to provide K-12 educators with an understanding of maritime transportation—its history, current operations, and future challenges—that will facilitate teachers' ability to develop standards-based lessons for their science, math, social studies, and language arts classes.

Participants learned about the Port of Green Bay, visited a NOAA weather station and the Neville Public Museum in Green Bay, the Wisconsin Maritime Museum and SS Badger in Manitowoc, the Coast Guard station and Sturgeon Bay shipyard, and lighthouses in Door County. They also investigated invasive species and shipwrecks, took a guided excursion of Sturgeon Bay ship canal, and learned about current-day maritime careers. The Institute also explored the many facets of the shipping industry within the context of intermodal transportation, port safety, Great Lakes ports, and global destinations.

In particular, the institute addressed the following topics:

1. How goods are moved from source to the store via rail, highway, air, and water.
2. What is shipped, from where, to where, and to make what.
3. How do the economic, environmental and social aspects of Great Lakes shipping compare to rail, air, and highway transportation?
4. How does Great Lakes shipping contribute to the economy and development of the region and the United States?



CFIRE Director Teresa Adams

5. What makes a good harbor?
6. What are the roles and functions of the Coast Guard in managing/regulating Great Lakes shipping?
7. How do ships move between lakes of different elevations?
8. What are challenges to the Great Lakes shipping industry?
9. How do ships navigate safely?
10. How are ships designed?
11. Who works in Great Lakes shipping and what skills are required?

About the Institute

This course is taught by University of Wisconsin faculty (including CFIRE Director Teresa Adams, who spoke about benefit-cost analysis of transportation choices), maritime educators, the US Coast Guard, shipwreck historians, and those in the maritime professions of ship design, construction, and maintenance. The course is coordinated by Joan Chadde, education program coordinator for the Center for Science & Environmental Outreach at Michigan Technological University.

Funding is provided by the Great Lakes Maritime Research Institute at University of Wisconsin-Superior and the University of Minnesota-Duluth and CFIRE

Since 2006, the course has been taught three times in Duluth, and also in Michigan's Upper Peninsula and Toledo, Ohio. This is the first time the course is being taught in Door County.



Institute Participants and Instructors

Perry Joins CFIRE as MAFC Facilitator



We are pleased to announce that Ernest Perry joined CFIRE as the new facilitator of the Mid-America Freight Coalition, starting October 3.

As MAFC Facilitator, Perry will focus on creating and driving innovation and partnerships that enable transportation agencies to provide and manage the freight

infrastructure and services that move us, keep us safe, and support our economic growth.

Perry comes to CFIRE from the Missouri Department of Transportation (MoDOT), where he's worked since 1994. Most recently, he served as the Administrator of Freight Development in MoDOT's Multimodal Operations Division. In this role, Perry led the creation of MoDOT's nationally recognized Freight Development program, developed a freight tonnage estimator tool, partnered with the Missouri River waterway industry to increase freight movements on the river, and led intermodal studies to increase modal share for rail and waterways. Previously in his tenure at MoDOT, he also served as Research Director, Organizational Results Administrator, Senior Environmental Specialist, and Socioeconomic Specialist.

Perry has worked closely with freight leadership at AASHTO, FHWA, and MARAD, served on three NCFRP panels, participated in the Scan of European Union Freight Corridors, and hosted a number of regional and national freight conferences.

"The MAFC Program Director position is an incredible opportunity to support and lead freight development in the ten-state region," says Perry. "It is an opportunity to build relationships and make a difference through research and implementation approaches that create efficiencies and bring jobs and economic development to the states and the region."

Perry holds a BS in Animal Science, an MS in Rural Sociology, and a PhD in Rural Sociology from the University of Missouri-Columbia.

You can reach Ernie at ebperry@engr.wisc.edu.

Hart Joins CFIRE Staff



Maria Viteri Hart recently joined the CFIRE staff as an associate researcher. She is a professional planner with 18 years of experience in intercity planning at the state level. Before joining CFIRE, Hart worked for the Wisconsin Department of Transportation (WisDOT) where she specialized in rail planning. Hart developed Wisconsin's Rail

Crossing Information System, produced the Wisconsin Railroads Map, and worked on numerous planning efforts including Translinks21, Connections 2030, the Wisconsin Rail Issues and Opportunities Report, and the Wisconsin State Rail Plan 2030.

In addition, she has served as a DOT representative on the Mid-America Freight Coalition technical committee since 2006. Before working as a planner, Hart worked for the University of Wisconsin-Madison and Tulane University marketing their MBA programs throughout the United States.

Hart holds a BA in Geography and a Masters in Urban and Regional Planning from the University of New Orleans.

You can reach Maria at mhart@engr.wisc.edu.

Beneker Joins CFIRE Staff



Lisa Beneker has joined the CFIRE staff as a University Services Associate 2. In her role as the Center's USA, she provides administrative assistance to the CFIRE staff.

Before joining the CFIRE team, Beneker worked as an Office Manager/Financial Specialist/Career Adviser with Engineering Career Services at the University of Wisconsin-Madison College of Engineering. She has also worked as a development programmer at Data General and IBM.

Beneker holds a BS in Computer Science from North Carolina State University.

You can reach Lisa at beneker@engr.wisc.edu.

Fuchs a Presidential Management Fellow



CFIRE project assistant Patrick Fuchs was recently named a Presidential Management Fellow in the Office of Information and Regulatory Affairs, Office of Management and Budget in the Executive Office of the President.

During his two-year fellowship, Fuchs will focus on reviewing federal transportation and homeland security regulations

before they are published. This review aims to ensure that the President's policies and priorities are reflected in agency rules and that agencies comply with the regulatory principles stated in Executive Orders #12866 and #13563. Fuchs will assess whether agencies used the best available techniques to quantify anticipated present and future benefits and costs as accurately as possible. He will also evaluate whether agencies considered values that are difficult or impossible to quantify, promoted public participation and scientific integrity, and produced analysis of more flexible or streamlined approaches to rule making. Additionally, Fuchs will review information collection practices of agencies with the intent of minimizing the paperwork burden on businesses and citizens. Amongst many agencies, his branch works most heavily with Department of Homeland Security, Department of Transportation, and Department of State.

He credits his experience at CFIRE with helping him develop the transportation-specific knowledge and analytical skills necessary for this position. "Through research and coursework at CFIRE, I have gained a deeper understanding of public administration as well as emerging and persistent infrastructure policy issues," Fuchs says. "More specifically, my research on elderly mobility issues in Wisconsin has allowed me to apply lessons from the classroom and enhance my ability to make an immediate contribution as a career public servant."

Fuchs is a Spring 2011 graduate from the University of Wisconsin-Madison with a Masters of Public Affairs from the La Follette School.

About the PMF Program

The Presidential Management Fellowship program places recent graduates with advanced degrees with federal agencies for two-year assignments. The program selects candidates using an extensive and highly competitive interview and testing process, and accepts only those

applicants who are committed to excellence in the leadership and management of public policies and programs. Upon completion of the two-year program, many Presidential Management Fellows advance to positions of greater responsibility in public service.

Janowiak Awarded Muzi Fellowship



Scott Janowiak has been awarded the 2011 Andrew Muzi Yellow Jersey Fellowship. Janowiak's growing interest in commuting, long-distance bicycle touring, and his internship with B-cycle all contributed to his selection for this award.

In 2009, Janowiak rode from Milwaukee, Wisconsin to Bar Harbor, Maine. In the course of this trip, he sustained a serious eye injury, took an award-winning photograph, and made a firm decision to attend graduate school in order to focus his career on urban planning and transportation.

During his internship with B-cycle (Madison's new bike-sharing program), Janowiak attended and participated in logistics meetings, met with a variety of city officials, and worked with Trek (B-cycle's parent company) to plan and select bike-share stations. This allowed him to apply his planning knowledge and provide station-location recommendations to program directors. This internship also gave him direct experience in helping plan a collaboration between a private company and several municipal agencies.

Janowiak is currently working toward a Master's degree in Urban and Regional Planning at the University of Wisconsin-Madison. He is also pursuing a certificate in Transportation Management and Policy (TMP). He is scheduled to graduate in 2012.

"After graduation next year, I hope to enter into a role in which I can improve a community's options for alternative transportation," says Janowiak. "Changing transportation behavior is a matter of access, convenience, and competitive levels of service compared to the automobile. I would like to find myself in a planning position that allows me to contribute to the improvements of these factors."

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One Hundred Percent Screening

Jason Bittner, Deputy Director

We live at a time when the sound bite is a more effective political tool than reasoned policy debate. Following several high profile events, politicians in the United States and others around the world have scored political points by advocating for increased, and often unrealistic, security enhancements in our freight transportation system. Often, politicians claim that to keep our borders secure, prevent potential attacks, and ensure compliance, we need to screen one hundred percent of cargo—every container imported into the United States, every package shipped as air cargo, and every package sent through our domestic shipping services.

One hundred percent screening sounds like a simple concept. Run each package through an X-ray or gamma device and let it continue on its way. Stage some random inspections and say we're secure. What these one hundred percent screening advocates fail to grasp is the sheer volume of packages and the chilling effect that one hundred percent screening would have on the US economy. Of course, that hasn't stopped reactive legislation from being passed. The 9/11 Commission Act of 2007 requires foreign seaports to scan one hundred percent of the cargo entering the United States by 2012. One hundred percent screening of domestic air cargo traveling in passenger aircraft was mandated by the middle of 2010. All international air cargo is supposed to be screened by the end of 2011.

This screening legislation was enacted even though evidence shows that blanket screening was wildly unrealistic and unfeasible. Over eleven million containers are imported to the United States each year. Air cargo shipments come in a variety of forms from hundreds of international airports. Domestically, nearly all passenger airline operators are screening packages, but this represents only a small slice of the freight market.

It is important to understand how our current system operates. Customs and Border Patrol (CBP) uses two primary means to screen and scan cargo containers destined for the United States. The Container Security Initiative places US agents at foreign seaports to ensure that high-risk cargo is scanned prior to departing for the United States. The Customs-Trade Partnership Against Terrorism (CT-PAT) works to develop voluntary partnerships among the international community, including private companies that negotiate for benefits (such as reduced cargo inspection), in exchange for providing cargo information for screening and improving internal security

practices. These practices have prevented any major disasters in the ports related to importing dangerous items.

However, this nearly spotless track record hasn't been enough to prevent potentially catastrophic congestion in our supply chain network. From a logistical point of view, few freight facilities, especially international ports, in the United States have the available land space to adopt the processes required for one hundred percent screening. Containers flow through ports in a systematic manner, spending as little time as possible in the port or other intermodal yards. The layouts required for one hundred percent screening would entail tremendous facility design changes and increased costs. Border crossings do not have adequate land space to scan containers moving by rail or the hundreds of crossings each day by trucks at Windsor, Blaine, or southern connections.

More importantly, a worldwide focus on the security of the supply chain is required to make this screening work. Not one country, port, or operator has complete responsibility for commodity security because of the way in which goods move through the supply chain. Cargo security needs to be ingrained and be a part of the shipping transportation process. It is a continual multilateral process. Some of our trading partners have even considered the unilateral one hundred percent screening initiative as an unfair trade practice. If considered to be a type of protectionism, the screening initiative may impact our global trade agreements and stifle opportunities to increase trade with developing nations.

A Government Accountability Office report from August 2008 also suggested that one hundred percent screening might increase the error rate for detection of potentially dangerous goods. In simple terms, as more cargo gets scanned, less attention is given to each piece of cargo—opening the door to serious security breaches.

While one hundred percent of domestic air cargo is screened, not all inbound international cargo shipments carried on passenger airplanes receive the same treatment. The Transportation Security Administration is working with international air cargo operators to increase the share of cargo placed on passenger flights that is screened, but one hundred percent screening may not be achieved until August 2013 (according to a Congressional Research Service report). Even this date is suspect as the many players involved in the supply chain multiply.

Typical air cargo shipments include high-value machine parts and manufacturing equipment, electronic components for manufactured goods, consumer electronics, jewelry, and perishable items such as flowers, fruits, and fresh fish. Specialized freight that requires specific handling—such as unique scientific instruments and highly specialized tools and equipment—is also transported as air cargo. Most outbound air cargo packages are consolidated at off-airport facilities and arrive at airports on bulk pallets or in special containers known as unit load devices. It is estimated that about 75 percent of all air cargo travels on bulk pallets. The complexity of consolidating these shipments, and screening them, at various international locations proves immensely challenging for a time sensitive industry.

In the future, containers and unit load devices will likely incorporate technology to assist in the security processes. The Department of Homeland Security is overseeing operational tests of promising anti-tampering detection, tracking devices, RFID communications and reporting elements that will allow carriers better control of their equipment and inventory to enhance commerce. But these technological innovations, besides being costly to develop and implement, are likely to be a long time coming.

Freight transportation is a crucial part of the US economy and freight policy should not be driven by sound bites and political rhetoric, but by sound economic and transportation policy. We are better off using the current Customs and Border Patrol measures that are based on risk assessment and sampling. The current processes impede commerce only slightly, and their benefits outweigh their costs. Moving to one hundred percent screening would likely threaten the recovery of the US economy and place the nation at a disadvantage on the world stage.

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CFIRE awards this \$500 scholarship to a bicycling enthusiast and student in the Transportation Management and Policy Program. The award is sponsored by the Dane County Bicycle Association “to honor the lifetime contribution of Andrew Muzi to cycling in the Greater Madison Area.” The award recipient is a cycling enthusiast who upon graduation plans to assume a professional position that will influence the future design of facilities and infrastructure that support safe and effective bicycling.

“Receiving the Muzi award is an honor,” says Janowiak. “Living in Madison has shown me the potential of the bicycle...close to a perfect machine! It’s been great to see constant improvements throughout the city to make cycling safer and easier for everybody.”

Join us in congratulating Scott Janowiak, the winner of the 2011 Muzi Fellowship.

WisDOT Take Your Sons and Daughters to Work Day

On Thursday, April 28th Wisconsin DOT took part in a nationwide effort, “Take Your Daughters and Sons to Work Day.” This program’s aim is not only exposing girls and boys to what a parent or mentor in their lives does during the work day but also showing them the value of their education, helping them discover the power of possibilities associated with a balanced work and family life, and providing them an opportunity to share how they envision the future.



Greg Waidley, CFIRE’s Research and Education Programs Coordinator, attended the event and presented a short course for the children ages 9 to 14 entitled *Transportation 101*. He involved the children in discussion of the what, why, where, and how of

transportation. He then introduced them to transportation careers (the obvious ones and the ones behind the scenes) and the programs at the University of Wisconsin that can prepare them for those career fields. He ended the discussion with some fun research happening at CFIRE.

“The kids were really engaged, had a lot of fun, and asked a lot of questions,” says Waidley. “They definitely liked the videos I showed them, especially the one with car crashes that had a humorous spin to it. I hope to get invited back next year.”

MAFC Project Updates

Project teams have completed a number of projects conducted under the auspices of the Mid-America Freight Coalition.

Projects

The Develop and Disseminate Outreach Materials to Enhance Freight Investments in the Mississippi Valley Region (MAFC 08) project aimed to develop stories and provide materials that help assist the general public and policy makers across the MAFC region to better understand freight and the importance of freight investments in the economic competitiveness of the MAFC states, the region as a whole, and the entire nation. The results of this project are encapsulated in the new Outreach section of the MAFC website.

The Transportation Profiles for MAFC Commodities (MAFC 10) project aims to help inform planning efforts in the region by developing information about truck-based commodity flow information and route assignments at the county level for key commodities within the MAFC region.

The Performance Measures for Evaluating Multi-State Projects (MAFC 11) project outlines a method using the Chicago CREATE project as a case study that considers the impacts of geographic and industry distribution of project benefits, intermodal impacts, and reliability, as well as the traditional benefits of time savings, safety enhancements, and environmental benefit of freight investments.

Regional Freight Study

The project team continues to gather and analyze data for the Regional Freight Study, while also collecting stakeholder feedback.

In addition, the team has created an electronic mailing list and a new section of the MAFC website where ongoing information about the study will be published. See midamericafreight.org/projects/study for more information and to sign up for the mailing list.

For more information about these projects and others, visit midamericafreight.org.

Professional Development Courses

For more information about transportation-related professional development courses available through the University of Wisconsin–Madison Department of Engineering Professional Development, visit their website at epd.engr.wisc.edu/courses. Courses marked with an asterisk (*) are eligible for CFIRE scholarships.

Railway Bridge Engineering
November 16-17, Las Vegas, Nevada

Improving Intersection Safety and Efficiency
February 14-16, 2012, Madison, Wisconsin

Traffic Engineering Fundamentals
November 29-December 1, 2011, Madison, Wisconsin

Railroad Track Construction Project Management
March 12-14, 2012, Madison, Wisconsin

Highway Bridge Design
December 5-7, 2011, Madison, Wisconsin

Highway Rail Grade Crossing Safety
March 15-16, 2012, Madison, Wisconsin

Maintaining Asphalt Pavements
December 5-6, 2011, Las Vegas, Nevada

Traffic Impact Analysis and Access Design
April 10-12, 2012, Madison, Wisconsin

Maintaining Asphalt Pavements
January 9-10, 2012, Madison, Wisconsin

Roundabouts: Calculating Capacity
October 16-18, 2012, Madison, Wisconsin

Contributors

Content and photographs for this edition of the CFIRE News were contributed by Teresa Adams, Jason Bittner, Maria Hart, Dan Kleinmaier, Ernie Perry, Steve Wagner, Greg Waidley, Ernie Wittwer, and the authors of the reports referenced herein.

CFIRE Grant Year 5 Projects

CFIRE awarded funding to the 21 projects for Grant Year 4 (October 1, 2011 to September 30, 2012).

- **CFIRE 05-01:** Longer Combination Vehicles: Do They Improve Freight Flows and Operational Efficiency and Reduce Highway Congestion?
- **CFIRE 05-02:** North/West Passage Corridor-Wide Commercial Vehicle Permitting – Phase 2
- **CFIRE 05-03:** Cost Effective Maintenance Strategies of Managing Pavements in Poor Condition
- **CFIRE 05-04:** Compass 2010 Data Analysis and Reporting
- **CFIRE 05-05:** Great Lakes Maritime Education for K-12 Teachers (2011)
- **CFIRE 05-06:** Guide for Selecting Level-of-Service Targets for Maintaining and Operating Highway Assets
- **CFIRE 05-07:** Characterization of Aggregates for Sustainable Freight Transportation Infrastructure
- **CFIRE 05-08:** Evaluating the Methodology and Performance of Jetting and Flooding Granular Backfill Materials
- **CFIRE 05-09:** Lateral Deflection Contribution to Settlement Estimates
- **CFIRE 05-10:** Superhydrophobic Engineered Cementitious Composites for Highway Bridge Applications: Phase II
- **CFIRE 05-11:** Warning System for Safety and Maintenance of Freight Railways
- **CFIRE 05-12:** Protecting Prestressing Strand in Transportation Structures and Improving Strand-Concrete Bonding
- **CFIRE 05-13:** Evaluating Export Container Pooling Options in Minnesota, Wisconsin and Michigan's Upper Peninsula
- **CFIRE 05-14:** Preserving Vital Great Lakes Infrastructure: Assessment of Asset Management Activities in Great Lakes Ports
- **CFIRE 05-15:** New Framework and Decision Support Tool to Warrant Detour Operations during Freeway Corridor Incident Management
- **CFIRE 05-16:** Incorporating Greenhouse Gas Emissions and Fuel Consumption Measures into the Texas Transportation Institute's Urban Mobility Report
- **CFIRE 05-17:** Maximizing Freight Movements in Local Food Markets – Phase Two
- **CFIRE 05-18:** Toolbox for Strategic Truck Forecasting
- **CFIRE 05-19:** Characterization of Resilient Modulus of Base Aggregate for Mechanistic-Empirical Pavement Design Guide (MEPDG)
- **CFIRE 05-20:** Evaluation of Pavement Design using MEPDG
- **CFIRE 05-21:** Synthesis of Evidence of Truck Diversion through Work Zones
- **CFIRE 05-22:** Further Investigation on Urban Cooperative Delivery Strategies at the Firm Level

For information about these and other CFIRE research projects, visit cfire.wistrans.org/research.

Upcoming Events

Improving Roadway Safety Programs Through University-Agency Partnerships: A Conference
 November 2-3, 2011, Washington, DC
trb.org

Data Analysis Working Group Forum on Pavement Performance Data Analysis
 January 21, 2012, Washington, DC
trb.org

2012 TRB 91st Annual Meeting
 January 22-26, 2012, Washington, DC
trb.org

Innovation in Urban Freight
 February 6-7, 2012, Seattle, Washington
depts.washington.edu/ifreight/

9th National Conference on Asset Management
 April 16-18, 2012, San Diego, California
trb.org

2012 Joint Rail Conference: Technology to Advance the Future of Rail Transport
 April 17 - 19, 2012, Philadelphia, Pennsylvania
trb.org

CUTC National Transportation Workforce Summit
 April 24-26, 2012, Washington, DC
cutcworkforce.com

About CFIRE

The National Center for Freight and Infrastructure Research and Education (CFIRE) at the University of Wisconsin–Madison is one of ten National University Transportation Centers. The CFIRE consortium includes the University of Wisconsin–Milwaukee, University of Illinois–Chicago, University of Toledo, and University of Wisconsin–Superior.

CFIRE's mission is to advance technology, knowledge, and expertise in the planning, design, construction and operation of sustainable freight transportation infrastructure through education, research, outreach, training, and technology transfer. Our vision is to be an internationally recognized authority and resource that creates knowledge, advances understanding, develops technologies, and prepares leaders to meet the nation's need for safe, efficient and sustainable infrastructure for the movement of goods.

Call for Abstracts

CUTC National Workforce Summit

April 26-28, 2012, Washington, DC

Abstracts are due November 11, 2011

Visit cutcworkforce.com

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