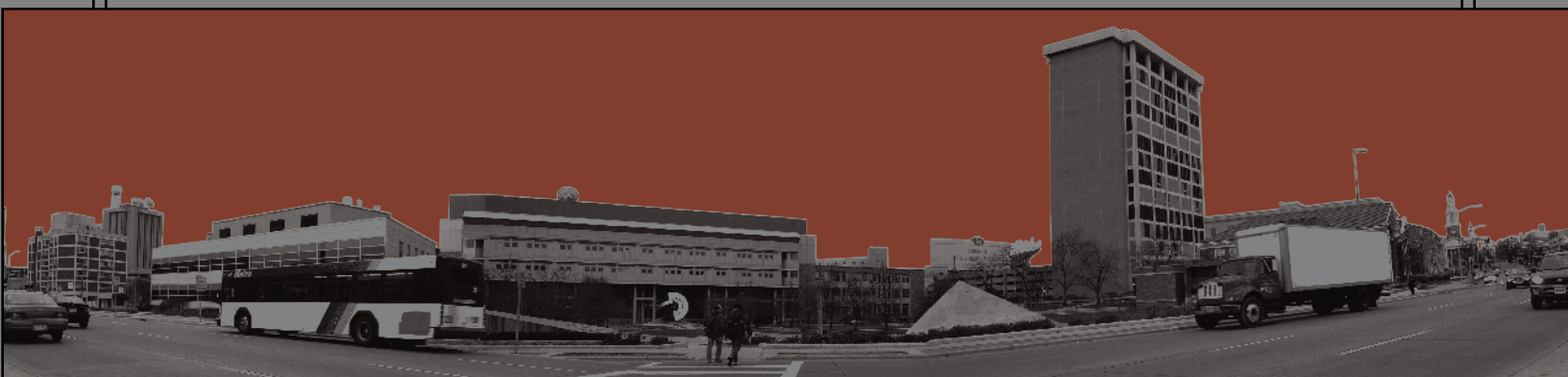


NATIONAL CENTER FOR
FREIGHT & INFRASTRUCTURE
RESEARCH & EDUCATION

CFIRE

ANNUAL
REPORT

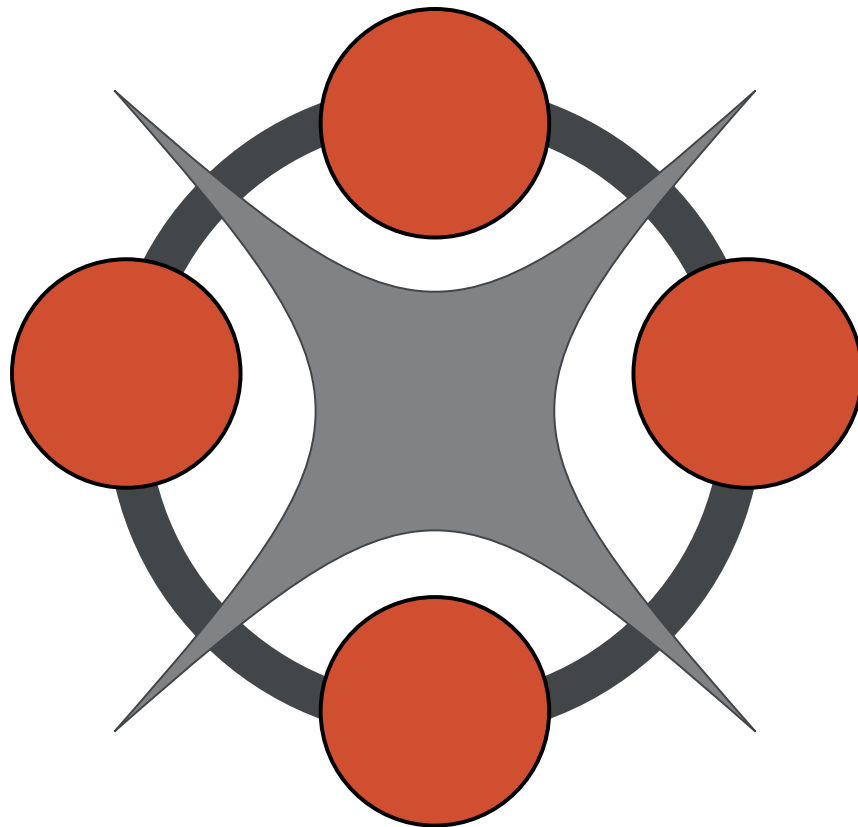
2007
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2008



THE UNIVERSITY OF WISCONSIN - MADISON

NATIONAL
CENTER FOR **F**REIGHT &
INFRASTRUCTURE
RESearch & **E**DUcATION

ANNUAL REPORT
AUGUST 15, 2007 - SEPTEMBER 30, 2008



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DIRECTOR'S

MESSAGE



I am pleased to present you with the first Annual Report for the National Center for Freight & Infrastructure Research & Education (CFIRE). This report summarizes our undertakings from August, 2007 through October, 2008. This was our first year as a National UTC, as authorized by

SAFETEA-LU. We are fortunate to continue a legacy of excellence established by our previous charter as the Region V Midwest Regional University Transportation Center (MRUTC). This first year, we have focused on implementing our Strategic Plan through promoting research, education and outreach.

Serving as a National UTC poses its challenges as we engage in coordinating five partner institutions, various state departments of transportation and many researchers and students. With our center theme of "Sustainable Freight Transportation Infrastructure and Systems," we have sought to integrate various disciplines in policy, planning, engineering and economics in order to address the pressing freight problems this nation faces.

By any measure (tonnage, value, volume) and in all modes (truck, rail, air, water) freight transportation experienced tremendous growth and radical change over the past two decades. Conservative projections demonstrate freight growing by 50 to 75 percent over the next 20 years. Our infrastructure and systems are not currently able to absorb that growth. With this in mind, we have begun in this first year to be a recognized provider of freight-focused research,

training and educational programs. We have funded 18 projects in this first reporting period alone. Our efforts in technology transfer are reflected in our hosting various conferences, such as the Midwest Transportation Research Forum in 2008. We have testified for the "Transportation for Tomorrow" National Surface Transportation Commission Report, and the Mississippi Valley Freight Coalition provided recommendations.

Our students continue to win transportation awards, being recognized by the Transportation Research Board, the Eisenhower Transportation Fellowship, the Eno Transportation Fellowship, the Chicago Transit Authority and Graduate Engineering Research Scholars Program. In this manner, we are certainly beginning to train a new group of freight managers, understanding both the public sector capacities and private industry demands on our system.

In short, I am proud in the foundation of accomplishments and the tone we have set in this first year. As you read about our efforts, I am confident you will find that we are beginning to fulfill a broader mission of addressing 21st Century transportation problems through research, education and outreach.

Sincerely,

A handwritten signature in black ink that reads "T M Adams". The signature is fluid and cursive.

Teresa M. Adams, Ph.D.
Director
Professor of Civil & Environmental Engineering





SUSTAINABLE FREIGHT TRANSPORTATION INFRASTRUCTURE AND SYSTEMS

The Center conducts research, sponsors training opportunities, and develops academic coursework and/or continuing education programs reflecting these four areas.

Additionally, the Center sponsors potential research on performance measurements, policy, economic effects, and emergency management across these specialties.

The Center works with consortium partners at the University of Wisconsin-Milwaukee, University of Wisconsin-Superior, University of Illinois-Chicago and the University of Toledo.

SIGNATURE AREAS

-  Design, Materials, and Construction Processes for Highway, Harbor, and Rail Infrastructure
-  Multimodal Systems Planning and Optimization
-  Traffic Operations and Safety
-  Energy and Environment

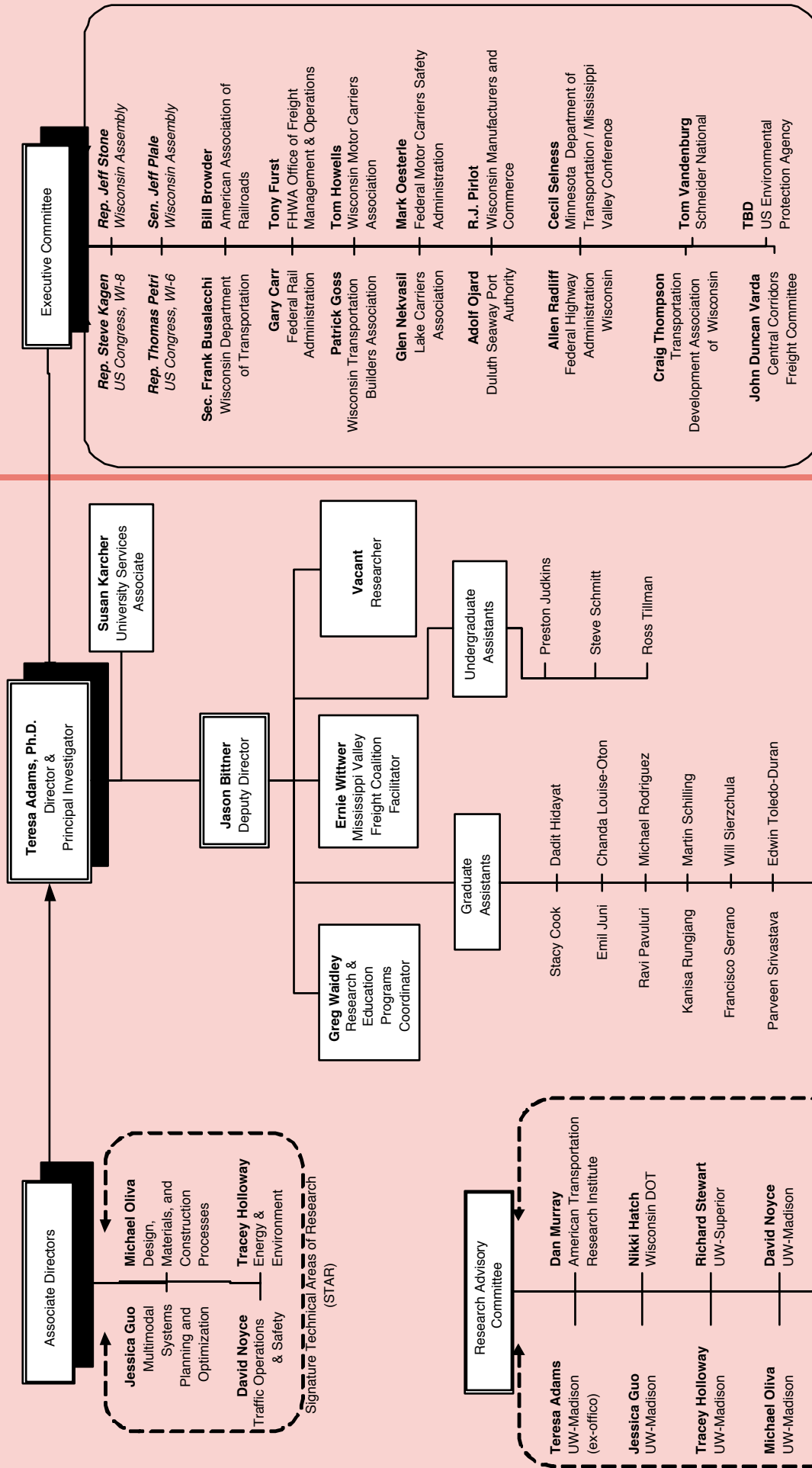
MISSION

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 at the University of Wisconsin-Madison and its partner institutions.

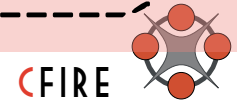
VISION

The National University Transportation Center at the University of Wisconsin-Madison will 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.

C F I R E O R G A N I Z A T I O N



Italics : Honorary Member



M E M B E R

I N S T I T U T I O N S



T R A N S P O R T A T I O N P R O G R A M S

THE UNIVERSITY OF WISCONSIN - MADISON (LEAD INSTITUTION)

PRINCIPAL INVESTIGATOR - TERESA ADAMS, PH.D.

The University of Wisconsin - Madison is unique in that transportation topics are studied across several different parts of campus. With the help of CFIRE, these departments are working together more. Students benefit greatly from this cooperation, as they get to look at different perspectives of a complex topic. The Transportation Management and Policy Graduate Certificate Program has furthered the education of transportation students by providing a cross-disciplinary opportunity to study transportation. As the CFIRE lead institution, UW-Madison students and faculty gain from being at the center of cutting-edge interdisciplinary transportation research from various institutions.

THE UNIVERSITY OF ILLINOIS - CHICAGO

FACULTY REPRESENTATIVE - KAZUYA KAWAMURA, PH.D.

Since 1979, Urban Transportation Center at UIC has worked with national, state, regional and local transportation agencies, non-profits, industry and other universities to address issues such as congestion and demand management, land-use and urban sprawl, transportation data and software, freight planning and forecasting and social equity in mobility and accessibility of all sectors of urban populations, to mention a few research topics. The interdisciplinary center brings together faculty, students, and staff from various departments to address transportation issues.

THE UNIVERSITY OF WISCONSIN - MILWAUKEE

FACULTY REPRESENTATIVE - ALAN HOROWITZ, PH.D.

At the University of Wisconsin - Milwaukee, transportation is highlighted at the Center for Urban Transportation Studies (CUTS), an interdisciplinary group of faculty and students who share a common interest in the various aspects of transportation. Faculty associated with the Center for Urban Transportation Studies have participated in a wide range of outreach activities ranging from teaching of short courses, workshops, and institutes to provision of on-line transportation information retrieval services

THE UNIVERSITY OF WISCONSIN - SUPERIOR

FACULTY REPRESENTATIVE - RICHARD STEWART, PH.D.

The University of Wisconsin - Superior, Wisconsin's public liberal arts college, offers an undergraduate major in Transportation and Logistics Management. This program was designed with the aid of business educators and industry leaders, and it is the first of its kind in Wisconsin. Students majoring in this program enjoy the benefits of UW-Superior's personal attention to students and its quality business programs, as well as Superior's role as a Midwest transportation hub.

THE UNIVERSITY OF TOLEDO

FACULTY REPRESENTATIVE - PETER LINDQUIST, PH.D.

In addition to being a CFIRE consortium member, The University of Toledo University Transportation Center (UT-UTC), a Tier II UTC, focuses on economic development through transportation research and education. The initial plan for the Center was articulated by businesses that depend on transportation to compete successfully in a global economy. The focus and activities of the UT-UTC meet the needs expressed by these external stakeholders. The University of Toledo is also the home of the Intermodal Transportation Institute, whose vision is to develop technology-enabled intermodal transportation systems and supply chains that promote economic development and quality of life.

RESEARCH

CFIRE ENGAGES in innovative research with the aim of advancing freight knowledge to better meet current and future needs. **CFIRE** also awards research project across a wide range of freight-related topics.

Our projects and research are focused under four Strategic Technical Areas of Research (STAR):

- Design, Materials, and Construction Processes for Highway, Harbor, and Rail Infrastructure, **Dr. Michael Oliva, Associate Director**
- Multimodal Systems Optimization and Planning, **Dr. Jessica Guo, Associate Director**
- Traffic Operations and Safety, **Dr. David Noyce, Associate Director**
- Energy and Environment **Dr. Tracey Holloway, Associate Director**

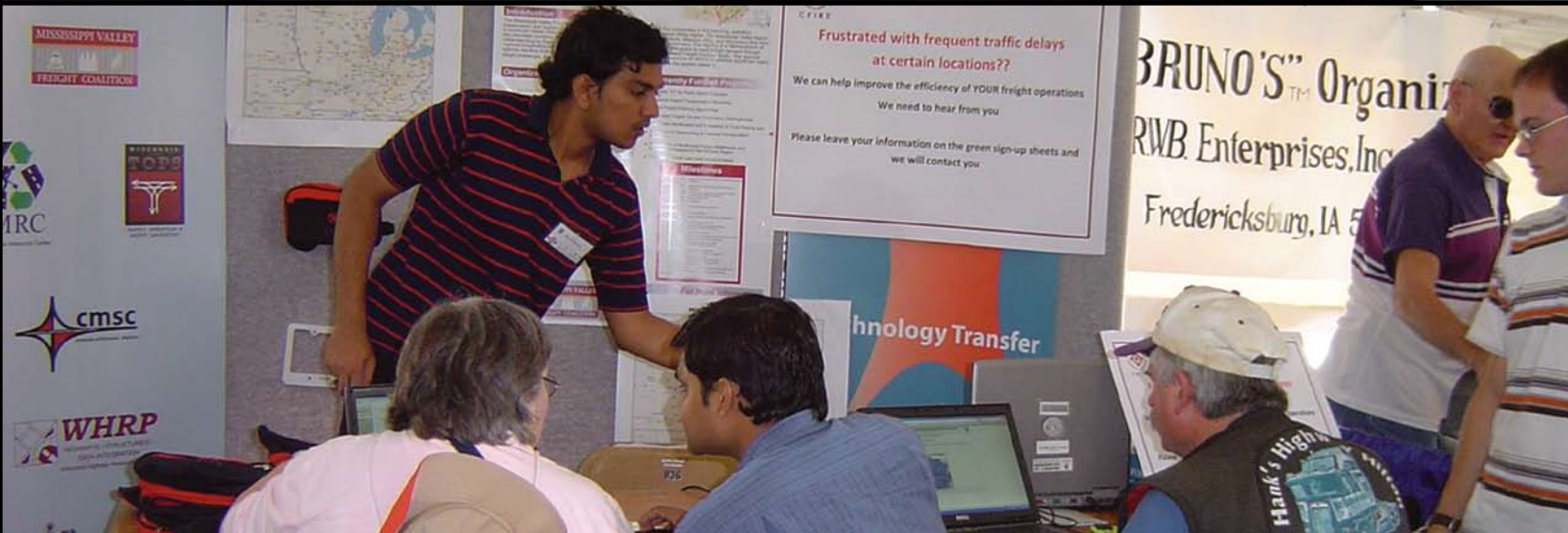
Research at **CFIRE** is undertaken by an experienced and professional team of researchers from various disciplines and multiple institutions working in a collaborative manner in order to address our nation's issues in sustainable freight transportation infrastructure and systems.

Our rigorous research selection process aims to highlight activities that are ongoing at the Federal Highway Administration, State Departments of Transportation, affiliated trade organizations and other academics. The multi-step

review process begins with designated STAR Associate Directors leading a technical review group. STAR groups have the responsibility for developing Requests for Proposals in their specific area, coordinating peer reviews of Proposals and RFPs received, and prioritizing recommended activities to the Research Advisory Committee, which finalizes approval for projects.

All **CFIRE** funded projects support sustainable freight transportation infrastructure and systems under our identified STAR areas. As of October, 2008 there have been 37 projects funded through **CFIRE**.





FUNDING PROJECTS

CFIRE COMPLETED RESEARCH PROJECTS

CFIRE PROJECT 01-01

TITLE: Trucker's Guide to Wisconsin - Regulations and Requirements for Wisconsin Motor Carriers

PRINCIPAL INVESTIGATOR: Teresa Adams, Department of Civil and Environmental Engineering, University of Wisconsin - Madison

SUMMARY: In 1990, a Trucking Wisconsin Style booklet was published outlining legal and safe motor carrier operation in the state. Since then, the booklet has not been kept current and the motor carriers in Wisconsin requested that the Wisconsin Department of Transportation produce an informational booklet.

The Handbook has been completed, and is a reference of commonly requested information for dispatch operators and owner operators.

The objectives of this project were:

- Write, layout and format the Handbook as a Microsoft Word document that can be converted to PDF format for printing and/or web dissemination.
- Facilitate a discussion with members of the Wisconsin Motor Carriers Association to get their input on the format, scope, outline and contents of the Handbook.
- Identify and then work with an advisory team of three (one representative each from the motor carriers, Wisconsin State Patrol and WisDOT DMV) to develop the Handbook. The Advisory Team will guide in information gathering and serve as reviewers of the Handbook.

CFIRE ONGOING RESEARCH PROJECTS

CFIRE PROJECT 01-02

TITLE: Analysis of Permit Vehicle Loads in Wisconsin

PRINCIPAL INVESTIGATOR: Jian Zhou, Department of Civil Engineering and Mechanics, University of Wisconsin - Milwaukee

SUMMARY: To ensure highway safety while keeping competitive business capability in Wisconsin, an

investigation is needed for a clear understanding of permit vehicles and their impact on the state highway infrastructure.

The objectives of this project are:

- Gather and evaluate the representative OSOW permit vehicles that WisDOT processed in recent years. A database was created for overweight permit vehicles with detailed configuration information, such as statistical distribution of gross vehicle weights, axle weights, and axle spacing.
- Identify vehicle configurations that best envelop the permit vehicles in Wisconsin
- Propose modification to Standard Permit Vehicle(s) based on moment and shear in representative bridge spans caused by the collected permit vehicles.
- Provide modifications to Chapter 45 of the Wisconsin Bridge Manual; provide examples to bridge rating and permit vehicle checking for the Bridge Manual; and provide counterpart information consistent with the AASHTO LRFD Specifications.
- Establish guidelines for future evaluation and adaptation of further increased permit vehicle weights and future overweight vehicle configurations.
- Collect and document existing research and state-of-practice on OSOW permit issuance, with a focus on other state DOT practices and the latest federal regulations and documents.



CFIRE PROJECT 01-03

TITLE: Assessing Environmental Impacts Associated with Bases and Subgrades Stabilized with Coal Combustion Products (CCPs)

PRINCIPAL INVESTIGATORS: Tuncer Edil and Craig Benson, Department of Civil and Environmental Engineering, University of Wisconsin - Madison

SUMMARY: Conventional construction materials are becoming increasingly expensive as demands on resources intensify. In addition, concerns regarding energy use and greenhouse gas emission associated with manufacturing and delivering conventional construction materials has led to significant interest in exploring alternative materials such as recycled materials.

Stabilizing bases and subgrades with coal combustion products (CCPs) represents a way to upgrade highway infrastructure while utilizing recycled materials. This project will use WiscLEACH to assess groundwater impacts caused by the leaching of trace elements from pavement materials stabilized with CCPs.

The objectives of this project are:

- Determine groundwater impacts of pavement materials stabilized with CCPs.
- Analyze how different pH conditions affect leaching from CCP materials.
- Prepare a report describing the findings from the leaching tests and the modeling efforts.

CFIRE PROJECT 01-04

TITLE: Low Cost Strategies to Increase Truck Parking in Wisconsin

PRINCIPAL INVESTIGATORS: Teresa Adams, Department of Civil and Environmental Engineering, University of Wisconsin - Madison and Xiubin Wang, CFIRE Researcher

SUMMARY: There is currently a shortage of overnight parking options for trucks in Wisconsin. This shortage increases safety risks to both truckers and the traveling public.

The Federal Highway Administration's Study of Adequacy of Parking Facilities, which was completed

in 2002, outlined the lack of adequate parking facilities for truckers and the mismatch between available facilities and trucker needs with regard to location, amenities, and functional characteristics. This issue is of particular urgency due to the increasing volume of commercial traffic on the Interstate Highway System, new Hours of Service (HOS) regulations implemented by the FHWA in 2005, and increasing awareness of the connection between driver fatigue and traffic accidents.

The primary purpose of this project is to provide a detailed examination of the current truck parking facilities available in the state of Wisconsin (outside of those along interstate routes 80, 90, and 94) and to identify optimal locations and low cost strategies for providing truck parking.

Stabilizing bases and subgrades with coal combustion products (CCPs) represents a way to upgrade highway infrastructure while utilizing recycled materials. This project will use WiscLEACH to assess groundwater impacts caused by the leaching of trace elements from pavement materials stabilized with CCPs.

The objectives of this project are:

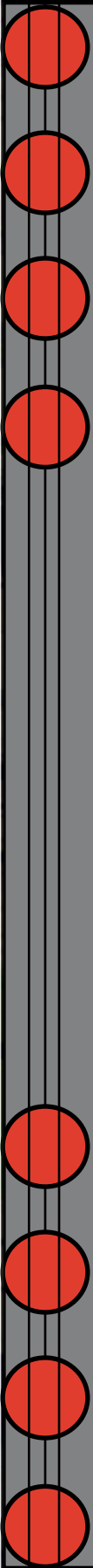
- To provide the information necessary for the state of Wisconsin to consider increasing short term truck parking availability in locations where it is needed most along the state highways.
- Create a GIS inventory of designated truck parking facilities along state highways.
- Identify issues associated with truck parking and explore (low cost) strategies to address the truck parking problems.

CFIRE PROJECT 01-05

TITLE: Costs and Benefits of Increasing Load Size for Certain Circumstances of Freight.

PRINCIPAL INVESTIGATORS: Jason Bittner, CFIRE Deputy Director

SUMMARY: Current gross vehicle weight limit of all axles is 80,000 pounds, except for non-divisible loads such as heavy machineries. This limit especially proves to be constraining to shipments slightly higher than 80,000lbs. Following the practice in a few other states, Wisconsin has been considering the possibility of adjusting its current policy in certain situations for the divisible loads. The focus of this project is to identify



FUNDLED PROJECTS

and quantify the impacts in Wisconsin of increasing the gross vehicle load limit for international containers to above 80,000lbs.

This research will look into the international containers that are forced to split before entering Wisconsin along select corridor(s) of freight between Wisconsin and its neighboring states, as well as the potential use of larger containers for select commodities that have significant regional interest.

The objectives of this project are:

- Make efforts to quantify issues associated with increasing load for international containers.
- Comprehensively examine the container vehicle load limit regulations within Wisconsin and its neighboring states, making an attempt to highlight the key factors in determining the container vehicle load limit such as the major barriers and major motives.
- Conduct case studies on select freight corridors and select commodities of local/regional interest.

CFIRE PROJECT 01-06

TITLE: 2007 Compass Data Analysis and Reporting

PRINCIPAL INVESTIGATOR: Teresa Adams, Department of Civil and Environmental Engineering, University of Wisconsin - Madison

SUMMARY: Past efforts include data analysis and reporting performance and outcomes for signs, pavement, shoulders, roadsides, drainage, traffic, and bridges. In the 2005 Compass report, measures for bridge inspection and maintenance were added, and historic data was transformed from District to Region-levels. The 2006 Compass reports presented distinct biennial trends for pavement data associated with the agency's biennial inspection cycle. This will be continued in the 2007 Compass report. In addition, the 2006 Compass report took on a slightly more customer-focused approach by presenting overall results as a report card and by organizing the measures according to their maintenance objectives such as safety, stewardship, and aesthetics.

The primary project deliverables for the Compass 2007 work order include data reduction and preparation of data tables and figures to be included in two reports: 1) Compass Wisconsin State Highway 2007 Maintenance, Traffic, and Operations Conditions Executive Overview

Report and 2) Compass Wisconsin State Highway 2007 Maintenance, Traffic, and Operations Conditions Operational Report on:

- Shoulders, roadsides, drainage, traffic features (field review data)
- Signs (SIMS database)
- Pavement (pavement van data)
- Bridges (BOS highway structures inventory (HSIS) data)
- Winter commodities that have significant regional interest.

The objectives of this project are:

- Work with the Compass Program Manager and other Compass team members to create useful and meaningful measures for understanding and changing maintenance conditions.
- Work with the Compass Program Manager and Bureau of Highway Operations (BHO) managers to assess, revise, and develop the analysis and reporting procedures used for Compass.

CFIRE PROJECT 01-07

TITLE: Develop an Asset Management Tool for Collecting and Tracking Commitments on Selected Environmental Mitigation Features

PRINCIPAL INVESTIGATOR: Jason Bittner, CFIRE Deputy Director

SUMMARY: Wisconsin has constructed many environmental mitigation projects in conjunction with transportation projects that have been implemented pursuant to the National Environmental Policy Act. Other mitigation projects have been constructed pursuant to discussions and negotiations with WDNR. These mitigation projects offset or replace a



certain environmental function(s) lost as a result of construction of the transportation project. Examples include storm water management facilities, wetland replacement projects, stream restoration projects, reforestation projects, construction of sound walls, replacement of parklands and wildlife crossing structures.

Wisconsin DOT (WisDOT) has identified the need for better understanding the costs of selected features



in the overall scheme of project development and ongoing maintenance. Projects including cultural resources, routine hazmat commitments, wetlands, and wildlife accommodations are of particular interest at this time.

The objectives of this project are:

- Collect documentation on existing cultural resources, hazardous materials, wetlands, and wildlife accommodation commitment throughout Wisconsin to compile an inventory of such information.
- Provide a review of the state of the practice in other states and municipalities for collecting and tracking environmental commitments. Perform a detailed investigation of the reports contained in the WisDOT Transportation Synthesis Report (T.S.R.) on this topic dated 02/28/2008 provided by WisDOT.
- Develop electronic inventory and asset management tool to assist WisDOT managers in collecting this information.
- Provide recommendations for additional inventory features by commitment and feature type and primary maintenance responsibilities.

CFIRE PROJECT 01-08

TITLE: Effective Depth of Soil Compaction in Relation to Applied Contactive Energy

PRINCIPAL INVESTIGATOR: Dante Fratta, Department of Civil and Environmental Engineering, University of Wisconsin - Madison

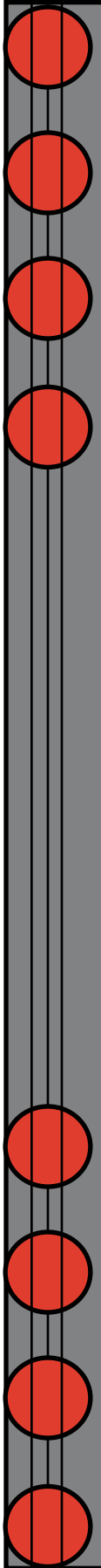
SUMMARY: The WisDOT uses up to 10% of its annual improvement project budget on embankment construction. During the construction of embankments, compaction operations are designed to create stable structures that should be able to transmit traffic loads to the foundation soil while undergoing acceptable deformation levels and contributing to the overall health of pavement or embankment structures.

To achieve stable embankment structures, WisDOT has developed specifications for compaction density and water contents. It has also established specifications for the thickness of embankment lifts during construction. These construction specifications limit the lift thickness to 8 inches for most soil conditions and up to 12-inch lift thickness for granular soils. These lift thickness limits were established based on field experience and the typical WI contractors' methods and equipment. This practice also has practical implications as it contributes to adequate embankment compaction without the need of a demanding inspection operations by the DOT.

However, the systematic use of 8-inch lifts during embankment construction may have created unnecessary construction costs. Furthermore, modern earth moving equipment has increased in size and weight and new compactors are capable of delivering greater energy levels. Some studies have claimed that modern dynamic compaction equipment are capable of properly compacting lift layers as thick as 6 ft (and even greater thicknesses – see Zou et al. 2005). For these reasons, the WisDOT would like to re-evaluate the 8-in lift embankment construction requirement and carefully develop energy and compaction efficiency data. These data and analyses will determine if the limitations in lift thickness can be increased while maintaining construction quality, embankment performance, and, at the same time, reducing construction costs.

The objectives of this project are:

- Collect data and develop analyses needed to determine optimum lift thickness for WisDOT embankment construction projects.



FUNDLED PROJECTS

- Establish a relationship between the applied compaction energy and the level of compaction achieved at increasing depths for a number of different soils and moisture contents.

- The data, analyses, and correlations will help WisDOT officials in proposing possible revisions to current constructions specifications including the need to change the established 8-inch lift thickness in the construction of compacted embankments.

- The successful completion of this research will also help WisDOT officials in improving construction operations by creating more stable and economical subgrade structures.

CFIRE PROJECT 01-09

TITLE: Operational Resilience of the Beloit-Hudson Corridor for Freight Movements

PRINCIPAL INVESTIGATOR: Teresa Adams, Department of Civil and Environmental Engineering, University of Wisconsin - Madison

SUMMARY: The National Infrastructure Protection Plan (NIPP) defines resilience as the “capability of an asset, system or network to maintain its function during or to recover from a terrorist attack or other incident.”

For Wisconsin, the I-90/94 corridor supports high volumes of freight and passenger travel. The I-90/94 corridor plays a unique role as the critical backbone to freight and passenger mobility and accessibility. Research to better leverage our knowledge of the corridor is key to preparedness and response to unanticipated events. Recent events have shown us how truly fragile sections of the I-90/94 corridor can be.

The objectives of this project are:

- To provide information that will help the state of Wisconsin ensure reliable function of the major corridor between Hudson and Beloit while maintaining the normal pass through capacity for the entire corridor.

- Provide recommendations of areas in need of enhancement and strategies for navigating traffic on to alternate routes in times of need.

CFIRE PROJECT 01-10

TITLE: 21st Century Workforce Development Summit

PRINCIPAL INVESTIGATOR: Teresa Adams, Department of Civil and Environmental Engineering, University of Wisconsin - Madison

SUMMARY: The transportation professionals of 2020 will require different skill sets than those of today. This change will require the workforce to adapt by altering curriculums, partnerships and training.

The proposed summit will feed into and build upon several related efforts among the UTCs. The Council of University Transportation Centers (CUTC) has planned a series of regional workforce summits, including ones scheduled this spring in Massachusetts and this fall in West Virginia. The CUTC program of activities will focus on the federal role in transportation education, pipeline issues and partnerships between education and business to promote life-long learning. While CFIRE’s 21st Century Transportation Workforce Summit recognizes these immediate issues, the primary focus in Madison will be on the evolution of the profession, speculating on the needs of the next generation of transportation professionals and how to maintain high quality employees.

The objectives of this project are:

- Conduct pre-summit surveys of State and FHWA Divisions, Universities and consultants with respect to workforce challenges.
- Prepare assessment of current workforce status.
- Sample best practices for current and future workforce development and recruitment.
- Coordinate ongoing activities of CUTC and FHWA in this area.

CFIRE PROJECT 02-01

TITLE: Wisconsin Truck Size and Weight Study

PRINCIPAL INVESTIGATOR: Teresa Adams, Department of Civil and Environmental Engineering, University of Wisconsin - Madison

SUMMARY: 2007 AB 238 requires the Department of Transportation to conduct a comprehensive study to review the system of motor vehicle weight limits on Wisconsin’s highways and bridges. Laws regarding allowable weight limits, lengths, and widths of commercial motor vehicles are designed to ensure safe vehicle operation on Wisconsin’s roadways and

to preserve the state's investment in highway and bridge infrastructure. Federal laws govern limits on the Interstates and other selected state highways. Truck size and weight laws affect the cost of transportation for Wisconsin's freight shippers and carriers. At the same time, studies have documented the impacts of heavily loaded and overloaded trucks on pavement surfaces and bridge structures. In light of changing patterns of economic growth and logistics, continued increases in truck traffic, and numerous requests for changes to laws, it has become apparent that a comprehensive review of Wisconsin's state TS&W laws is needed.

The objectives of CFIRE's role in this project are:

- To participate in Stakeholder Outreach and Advisory Committee activities of the Size and Weight Study; Review Interim Project Materials
- Coordinate the Peer Review Panel and Facilitate the Peer Review Process
- Review Changing Business Practices and Economic Forces
- Develop Performance-Based Process for Evaluating and Administering Wisconsin TSW Laws

CFIRE PROJECT 02-02

TITLE: Rapid Replacement / Construction of Bridges

PRINCIPAL INVESTIGATOR: P.J. Sriraj, Urban Transportation Center, University of Illinois - Chicago.

SUMMARY: Highways and railways move the major volume of freight tonnage in the nation. The impact to the freight hauling industry created by disruption due to construction is tremendous. Bridges are the most sensitive components for construction in both railroad and highway systems. While highways and rail lines can be repaired relatively quickly, bridges require special planning, engineering, materials procurement, and longer construction time. This study proposes to develop a bridge replacement/ construction decision-making framework using possible Analytical Hierarchy Process (AHP), and exploit innovative methods for accelerated construction of highway and railway bridges that explicitly address materials, design and prefabrication of bridge elements, and construction machinery for assembling the structural components. The findings will be added to a graduate-level course in transportation asset management at the University of Illinois at Chicago and Illinois Institute of Technology.

The objectives of this project are:

- To advance technology, knowledge, and expertise in the planning, design, construction, and operation of sustainable freight transportation infrastructure through education, research, outreach, and training.

CFIRE PROJECT 02-03

TITLE: Bridge Analysis and Evaluation of Effects under Overload Vehicles

PRINCIPAL INVESTIGATOR: Michael Oliva, Department of Civil and Environmental Engineering, University of Wisconsin - Madison

SUMMARY: Movement of industrial freight infrequently requires special overload vehicles weighing 5 to 6 times the normal legal truck weight to move across highway systems. Transportation agencies are asked to provide special permits for these vehicles along a specified pathway. Because of the unusual configuration of the vehicles it is difficult for those agencies to evaluate the effect of the vehicles on highway bridges. It is a time consuming job for the local agency since simple analysis methods for determining effects on bridges subjected to those overloads are not well established and the possibility of errors in estimating the impact of the loads on these structures could affect safety. The work proposed in this project aims to help agencies in evaluating the impact of these vehicles on structures.

The objectives of this project are:

- The development of a simplified analysis method to predict the effects of overload vehicles on a bridge system – including deck, girders, bearings, diaphragms, joints and other major components.

CFIRE PROJECT 02-04

TITLE: Reconstruction of Railroads and Highways with In-Situ Reclamation Materials

PRINCIPAL INVESTIGATOR: Tuncer Edil, Department of Civil and Environmental Engineering, University of Wisconsin - Madison

SUMMARY: Development of freight transportation infrastructure, whether it is highway or rail, will need to address several issues to be sustainable and economic. The new infrastructure should sustain higher loads but also last longer, be economic to build, and minimize energy consumption and generation of green house gases for materials production and



FUNDLED PROJECTS

construction. Upgrading the existing infrastructure to meet the increased load requirements and satisfy sustainability is a challenging prospect. One such approach that meets these requirements is reconstruction of highways and railroads by in situ reclamation of existing materials (subgrade, unbound/bound pavement materials, and ballast in the case of railroads) and enhancing their mechanical properties by additives to meet the enhanced load bearing requirements and durability. Such additives can be derived from conventional construction materials but also from industrial byproducts enhancing the sustainability aspects such as self-cementing fly ash, cement kiln dust, and other products. This project will evaluate such an approach.

The objective of this project is:

- To develop methods for in-situ strengthening of transportation roadbeds and rail corridors by reclaiming existing materials in a manner that will: 1) be able to sustain heavier loads, 2) have a long life, 3) be economical, 4) minimize energy consumption, 5) minimize greenhouse gas generation during production and transportation, and 6) not introduce new toxic materials into the environment.

CFIRE PROJECT 02-05

TITLE: 3D Design Terrain Models for Construction Plans and GPS Control of Highway Construction Equipment

PRINCIPAL INVESTIGATOR:

Awad Hanna, Department of Civil and Environmental Engineering, University of Wisconsin - Madison

SUMMARY: Use of Global Positioning System (GPS) technology to guide earth-moving equipment is quickly becoming common place in transportation facilities construction because it speeds project delivery and cuts costs. A requirement of this technology is a 3D representation of the design surface. Current design

products for highways and other transportation facilities are 2D plans, profiles, and cross sections. To employ GPS machine guidance, these design products must be converted to 3D models prior to construction. Ironically, the technology used for producing 2D plans is often capable of 3D outputs. This research is intended to aid transportation organizations in developing strategies to overcome institutional, cultural, and legal impediments to adoption of 3D design and creation of more seamless data and work flows from design through construction. The full potential of new, spatial technologies to increase efficiencies in transportation facilities delivery cannot be realized without addressing these issues.

The objectives of this project are:

- Describe the state of the art in adoption of 3D transportation design and construction technologies.
- Describe potential benefits and productivity gains of utility of 3D technologies in transportation design and construction.

- Identify and characterize technological, institutional, cultural, and legal impediments to adoption of 3D design / construct technologies.

- Suggest strategies to overcome identified impediments.

- Incorporate aspects of this research in the educational program of the Department of Civil and Environmental Engineering.

CFIRE PROJECT 02-06

TITLE: Understanding and Modeling Freight Stakeholder Behavior

PRINCIPAL INVESTIGATOR: Jessica Guo, Department of Civil and Environmental Engineering, University of Wisconsin - Madison

SUMMARY: This project will develop a conceptual model of private-sector freight stakeholder decisions and interactions that impact freight demand and that are impacted by policy variables and system conditions. Using East Central Wisconsin as a study area, empirical



models will be estimated for selected elements of this conceptual model that are fundamentally significant to the production/attraction, spatial distribution, and modal split of freight movements. The empirical results will be used to formulate recommendations to the ECWRPC on freight planning and demand model enhancement.

The objectives of this project are:

- To develop a comprehensive representation framework of freight stakeholder decision-making processes for forecasting freight demands in response to key policy variables.
- To develop behavioral models of selected freight-decision dimensions, identify the underlying behavioral determinants, and make policy/investment recommendations.
- To develop recommendations on ways of enhancing and verifying East Central Wisconsin Regional Planning Commission's (ECWRPC) current freight demand model.

CFIRE PROJECT 02-07

TITLE: Understanding Freight Land Use Interrelationships

PRINCIPAL INVESTIGATOR: Kazuya Kawamura, Urban Transportation Center, University of Illinois - Chicago

SUMMARY: The research will carry out the in-depth examination of, using both quantitative and qualitative techniques, the effects of land use on freight transportation, and vice-versa to: expand the understanding of the full impacts of land use decisions on the efficiency of freight movement and also the efficacy of measures to improve freight transportation toward increased economic competitiveness of a region. A set of strategies to better integrate the land use and freight transportation planning will be developed based on the findings.

The objectives of this project are to collect, generate and document the knowledge on the following relationships:

- Effects of the performance of transportation infrastructure, as they relate to freight movement, on the location decisions of various types of businesses.
- Effects of the performance of transportation infrastructure, as they relate to freight movement, on the regional economic indicators.

- Effects of land use on the efficiency of freight movement for different components of most common types of supply chains.
- Effects of land use and socioeconomic characteristics of a region on the demand for freight transportation.

CFIRE PROJECT 02-08

TITLE: Traffic Management of Heavy Vehicles in Work Zones

PRINCIPAL INVESTIGATOR: David Noyce, Department of Civil and Environmental Engineering, University of Wisconsin - Madison

SUMMARY: Work zones have become the rule rather than the exception on highways today. Work zones are a major contributor to the delay experienced by motorists. Compounding this issue of work zones and delay are the increasing traffic volumes on our roadways. Data show that truck travel in the United States is increasing at a much faster rate than the overall vehicle travel (total VMT) and this growth trend is expected to continue. Therefore, designing any effective traffic management strategies should explicitly consider truck drivers and their response to such systems.

Intelligent transportation systems (ITS) such as advanced traveler information systems (ATIS) can be used to effectively manage the demand and available capacity in work zones and mitigate the mobility impacts of work zones. However, designing effective ATIS systems requires an understanding of drivers' perception and understanding of the provided information, their decision-making and consequent reaction. None of the studies focused on vehicle type, specifically trucks and how the ATIS affected their diversion.

This proposal presents a plan to address the issues of truck drivers' responses to real-time travel information, their willingness to take alternate routes, and the factors that affect their choice in order to design effective truck traffic management systems.

The objectives of this project are:

- Develop an understanding of truck drivers' diversion behavior and decision resources when provided with real-time information.
- Develop guidelines for designing effective truck traffic management systems in work zones.



FUNDLED PROJECTS

CFIRE PROJECT 02-09

TITLE: Sustainable Freight Infrastructure to Meet Climate and Air Quality Goals

PRINCIPAL INVESTIGATOR: Tracey Holloway, Center for Sustainability and the Global Environment, University of Wisconsin - Madison

SUMMARY: This project will evaluate the potential of expanded rail routes to reduce freight transport by truck, taking into account total freight transport demands (now and projected into the future), costs of rail-based freight transport, and the emission impact of broader rail use. By evaluating the potential environmental and freight transport benefits of the MWRRI, the full costs, benefits, and potential synergies of an expanded Midwest rail system may be evaluated. To conduct this analysis, we will use the current and projected 2020 freight transport data from the Freight Analysis Framework, in concert with the proposed rail improvements from the MWRRI. This project will combine these plans of action for 2020 with U.S. EPA emissions models, including MOBILE6 and GREET. Distributed air quality impacts of emissions changes will be input into the CMAQ model. Throughout the project, the research group will work with the National Center for Freight Infrastructure, Research, and Education (CFIRE) and stakeholder groups to ensure that rail/freight scenarios are realistic and relevant to long-term freight planning.

The objective of this project is:

- To quantify the air quality and climate benefits from expanded use of railroad freight transport, building on the routes identified by the Midwest Regional Rail Initiative (MWRRI).

CFIRE PROJECT 02-10

TITLE: Assessment of Near-Term Strategies for Freight Transport Emission Reduction

PRINCIPAL INVESTIGATOR: Paul Meier, Energy Institute, University of Wisconsin - Madison

SUMMARY: There are trade-offs when attempting to reduce both greenhouse gas and criteria air pollutants for freight transport, as the control strategies are not necessarily complimentary. While emission controls can remove ozone precursors and particulate from vehicle exhaust streams, greenhouse gas emission can only be mitigated by either reducing fuel consumption

or switching to lower carbon-content fuel. One near-term alternative that can readily reduce fuel consumption is the reduction of freight vehicle speed. To lower the carbon-content of freight transportation fuel, the primary near-term alternative is to increase blending of biodiesel.

The cost-effectiveness of the emission reduction strategy will be characterized from the freight carriers' viewpoint, by comparing the direct costs to estimates of indirect costs and fuel savings. Multiple scenarios will be modeled using EPA's MARKAL model to simulate implementation of the proposed measures. MARKAL will be used to quantify the system-wide effects of changes in resource supply, technology availability, and account for CO₂, SO₂, NO_x, PM, and VOC emissions.

The objectives of this project are:

- To evaluate the costs and benefits of limited bio-diesel blending and strategic speed of travel reduction for heavy duty diesel vehicles, in order to achieve reductions in emissions from Midwest freight transportation.
- To provide spatially explicit spatially quantification of the net changes in ozone precursor, particulate matter, and greenhouse gas emissions.
- To consider potential adverse impacts, infrastructure requirements, barriers to implementation, and opportunities to maximize air quality and human health benefits.

CFIRE PROJECT 02-11

TITLE: Implementing DTMs for Construction Plans and Earthwork Quantities

PRINCIPAL INVESTIGATOR: Awad Hanna, Construction and Materials Support Center, University of Wisconsin - Madison

SUMMARY: Use of Global Positioning System (GPS) technology to guide and control earth moving equipment such as dozers, motor graders, and excavators is quickly becoming common place in highway construction because it speeds project delivery and cuts costs. Current design practice is to design highways and other infrastructure facilities in two-dimensions using traditional computerized design programs. GPS machine guidance technology requires that these designs then be converted to three-dimensional (3D) representations before they

can be used. This conversion is currently being done by the construction contractor which adds time, cost, and introduces a source of error into the system. To leverage the advantages of the technology throughout project delivery, the design phase must produce the Digital Terrain Model (DTM).

The Wisconsin Department of Transportation (WisDOT) is in the process of implementing new 3D design software which will accomplish this task. However, there are numerous cultural, legal, and work process questions which must be answered before WisDOT begins to distribute DTM's as contractual documents, eliminates traditional cross sections, uses them as a basis for determining final quantities, and allows contractors to construct directly from them. These are not trivial issues. For example, only one State highway agency currently claims to be using agency produced DTM's for these purposes. The issues and agency/industry ramifications must be carefully identified and studied before making the policy changes needed for implementation of DTM's in this capacity.

The objective of this project is:

- To assist WisDOT in the preliminary stages of identifying the relevant design and construction work process that would be impacted, the consequences, and the legal issues that could arise by directly providing agency produced DTM's to contractors for contractual purposes.

CFIRE PROJECT 02-12

TITLE: Implementation of GPS Controlled Highway Construction Equipment - Phase II (2007)

PRINCIPAL INVESTIGATOR: Awad Hanna, Construction and Materials Support Center, University of Wisconsin - Madison

SUMMARY: During 2006, WisDOT and the Construction Materials and Support Center at UW-Madison worked together to develop a specification and QC/QA procedures for GPS machine guidance on highway construction grading operations. These specifications and procedures are intended for incorporation in contracts on two to five pilot projects during the 2007 construction season. The 2006 work, and the 2007 pilot projects, are the first two steps in a phased implementation plan that includes refinement of the specification and procedures after the 2007 pilots, additional pilots during 2008, and potential statewide implementation of optional GPS machine guidance for

grading on 2009 contracts.

The objectives of this project are:

- Planning and conduct of two to five pilot projects that use GPS machine control for grading on WisDOT highway projects.
- Structured data collection and analysis of the pilot projects' experiences.
- Application of the results of objective 2 to refinement of the specification and field procedures.

CFIRE PROJECT 02-13

TITLE: Implementation of GPS Machine Controlled Grading - Phase III (2008) and Technical Training

PRINCIPAL INVESTIGATOR: Awad Hanna, Construction and Materials Support Center, University of Wisconsin - Madison

SUMMARY: Beginning in 2006, WisDOT and the Construction Material and Support Center (CMSC) at UW-Madison worked together to develop the specifications and the QA/QC procedures for GPS machine guidance on highway grading projects. These specifications and procedures were the basis for the 2007 Pilot Program using GPS machine control grading on two projects. A phase II contract with CMSC was developed to monitor and analyze the 2007 pilot projects. The end result of this contract was the refinement of the specifications and procedures to be used in the 2008 pilot program.

Currently there are five (5) grading contracts that were selected by the regions as good candidates for GPS machine guidance and will be let with specifications that will permit the use of GPS machine guidance in lieu of setting blue tops. In addition, there is one (1) more project that is in the process of doing a no cost contract change order to use GPS machine guidance and will be part of the 2008 pilot program.

CFIRE PROJECT 02-14

TITLE: Great Lakes Timber Professionals Project

PRINCIPAL INVESTIGATOR: Michael Oliva, Department of Civil and Environmental Engineering, University of Wisconsin - Madison

SUMMARY: Part of project 02-20. See for more details.



FUNDING PROJECTS

CFIRE PROJECT 02-15

TITLE: Innovative Bridge Research and Construction 2005

PRINCIPAL INVESTIGATOR: Michael Oliva, Department of Civil and Environmental Engineering, University of Wisconsin - Madison

SUMMARY: The goal of this project is to design and construct an effective and efficient system of precast substructure elements and precast superstructure elements. The team will assess the overall costs and risks of these structures in the state of Wisconsin by comparing the proposed system to existing slab bridge systems. The results are to be applicable to future bridge systems. The cost benefit analysis includes traffic and freight impacts.

CFIRE PROJECT 02-16

TITLE: Rapid Repair and Replacement Techniques for Transportation Infrastructures Damaged From Natural and Man-made Disasters

PRINCIPAL INVESTIGATOR: Michael Oliva, Department of Civil and Environmental Engineering, University of Wisconsin - Madison

SUMMARY: An operating transportation infrastructure to move people and goods efficiently and safely is critical to state of Wisconsin and its importance cannot be overstated. The impact on the state and national economy created by disruption of a major highway route from a natural or man-made disaster is tremendous. It is critical that repair/replacement procedures to the physical infrastructure from such disasters be accomplished as quickly as possible. Within the highway infrastructure, the most vulnerable components are the structures that span waterways, other highways, and railroads.

The objective of this study is to identify very rapid construction and contracting techniques being used by other State Highway Agencies (SHA's), the railway industry, and internationally to repair/replace damaged bridges and other structures; evaluate the identified procedures for applicability by the Wisconsin Department of Transportation (WisDOT) and the Wisconsin construction industry; and recommend potential construction and procurement processes for future use by WisDOT.

CFIRE PROJECTS 02-17, 02-18, 02-19

TITLE: Deck Truss Monitoring; Analytical Model Development and Analysis of the McCleary Bridge; Structure B-37-364 PI (McCleary Bridge)

PRINCIPAL INVESTIGATOR: Michael Oliva, Department of Civil and Environmental Engineering, University of Wisconsin - Madison

SUMMARY: These projects that are examinations of specific bridges and loadings on them in northern Wisconsin. The project goals are to analyze and define truck effects on these bridges. This work was done by students in combination of field and lab assessments.

CFIRE PROJECT 02-20

TITLE: Rational System for Rating Wisconsin Bridges for Truck Loads

PRINCIPAL INVESTIGATOR: Michael Oliva, Department of Civil and Environmental Engineering, University of Wisconsin - Madison

SUMMARY: The State DOT recently revised load limits for highway bridges in Wisconsin to allow heavier trucks, particularly if truckers had additional axles attached to their trucks to spread loads. Most of the companies involved in transporting timber in northern Wisconsin added the required extra axle at substantial cost. Unfortunately the load ratings for bridges on most county highways are set by local officials and may not reflect actual load capacities. Though the truckers added the extra axles, many counties still placed load restrictions on essential bridges of local roads. This project will focus on developing guidelines to aid county officials in deciding whether load ratings are needed, evaluate whether selected posted bridges should be posted, and look at defining usable routes for timber haulers. Removal of non-essential load ratings will save the Wisconsin trucking industry many thousands of dollars in fuel costs and reduce truck emissions by shortening haul routes.



MISSISSIPPI VALLEY



FREIGHT COALITION

THE MISSISSIPPI VALLEY FREIGHT COALITION

(MVFC) is a regional effort for cooperation in the planning, operation, preservation, and improvement of transportation infrastructure in the Mississippi Valley region. The Mississippi Valley region

includes ten states (Illinois, Indiana, Iowa, Kansas, Kentucky, Michigan, Minnesota, Missouri, Ohio, and Wisconsin) that share key interstate corridors, rail infrastructure, and inland and Great Lakes waterways. The signing of a Memorandum of Understanding by these states' Departments of Transportation indicates their willingness to meet freight demand through regional cooperative efforts. The MVFC is built upon the work of the Upper Midwest Freight Corridor Study.

MVFC 2008-2010 PLAN

1. Develop and disseminate outreach materials to enhance freight investment in the region.
2. Develop regional recommendations for reauthorization.
3. Commodity and industry profiles for the MVFC.
4. Performance measures for evaluating projects.
5. Resiliency of MVFC Corridor: Ranking key nodes.
6. Member Services: workshops, newsletters, website and meetings.

MVFC RENEWED

At the July 2008 Mississippi Valley Conference of the American Association of State Highway and Transportation Officials, the MVFC was renewed for two years at \$750,000. This renewal will also mark the first time all ten states of the Mississippi Valley Conference are finally supporting the regional freight coalition



FUNDING PROJECTS

MISSISSIPPI VALLEY FREIGHT COALITION COMPLETED RESEARCH PROJECTS

MVFC PROJECT 01

TITLE: Regional Freight Transportation Workshop and Meetings

PRINCIPAL INVESTIGATOR: Teresa Adams, Department of Civil and Environmental Engineering, University of Wisconsin - Madison

SUMMARY: Recognizing current and future funding challenges, Congress created The National Surface Transportation Policy and Revenue Study Commission in 2005 under Section 1909 of SAFETEA-LU to examine the condition and future needs of the nation's surface transportation system. Congress will use the Commission's findings as input in developing the next transportation bill. The Commission was tasked with recommending the steps necessary to reach a 50-year vision for the future.

The Mississippi Valley Freight Coalition provided testimony to the Commission on its vision of the freight transportation system in the Midwest. Included as a part of this vision was the role of the federal government in freight activities as well as the need for funding and a multi-modal approach.

The objectives of this project were:

- To prepare testimony for the spring 2007 field hearings of the National Surface Transportation Policy and Revenue Study Commission on behalf of the Mississippi Valley Freight Coalition (MVFC).
- To further define the strategic direction of the MVFC. To prioritize near-term projects for the MVFC Pooled Fund.

MVFC PROJECT 02

TITLE: Logistics for the Public Sector Training Course

PRINCIPAL INVESTIGATORS: Ernie Wittwer, MVFC Facilitator, and Bruce Wang, CFIRE Researcher

SUMMARY: The primary purpose of the Course is to provide information to public sector – DOT and Metropolitan Planning Organization – staff who work with freight providers or in freight planning or logistics. This information will help them better understand the needs of the freight community and help them better perform their daily activities. The course is now available through the CFIRE website.

The objectives of this project were:

- Develop a short two-day session to bring to public agency staff members concepts of logistics that are common and important to private sector shippers and carriers.
- The goal is not to develop trained logistics specialists, but rather to make public sector employees familiar with issues and concepts that are significant to the industry.

MISSISSIPPI VALLEY FREIGHT COALITION ONGOING RESEARCH PROJECTS

MVFC PROJECT 03

TITLE: Model Freight Planning Approaches

PRINCIPAL INVESTIGATOR: Jessica Guo, Department of Civil and Environmental Engineering, University of Wisconsin - Madison



FUNDED PROJECTS

SUMMARY: The Midwest Regional University Transportation Center (MRUTC) participated with six other states in the upper Midwest on the Upper Midwest Freight Corridor Study. The outcomes of this study were taken to the AASHTO's Mississippi Valley Board of Directors for their approval (through the signing of a Memorandum of Understanding) to establish a regional organization to cooperate in the planning, operation, preservation and improvement of transportation infrastructure in the Mississippi Valley region.

The Board of Directors had several requests. Those included adding three additional states in our activities (Kansas, Kentucky, and Missouri), and the formation of an executive committee, technical committee and customer committee. All ten member states' representatives on the Board of Directors then signed the MOU at their October 29, 2006 meeting in Portland. Then during a November 30, 2006 teleconference of the MVFC Executive Committee, the charter, pooled fund, and three priority initiatives were approved.



The objectives of this project are:

- To accumulate, analyze, assemble and communicate the best practices in use for freight planning. The primary product of the effort will be a manual that state and MPO planners use to assist them in preparing the freight components of their long-range plans. Since this is to be an applied product, it must be made to mesh with the requirements of the planning processes and with the level of expertise present at state and MPO planning agencies.

- To understand the state of the art of freight planning approaches as well as best practices at the state and metropolitan levels in the U.S.
- To understand the freight planning process currently adopted and the planning challenges faced by the state DOTs and the major MPOs in the Mississippi Valley Freight Coalition (MVFC).
- To develop a guidebook that can be used by state and MPO planning agencies to more effectively integrate freight interests into their long-range planning process.

MVFC PROJECT 04

TITLE: Mississippi Valley Freight Coalition Expanded Truck Parking

PRINCIPAL INVESTIGATOR: Teresa Adams, Department of Civil and Environmental Engineering, University of Wisconsin - Madison

SUMMARY: This project builds upon the Federal Highway Administration's Study of Adequacy of Parking Facilities on the NHS, which was completed in 2002 and outlines the lack of adequate parking facilities for truckers and the mismatch between available facilities and trucker needs with regard to location, amenities, and functional characteristics. The urgency of this issue is a result of the increasing volume of commercial traffic on the Interstate Highway System, new Hours of Service (HOS) regulations implemented by the FHWA in 2005, growing incidents of truck parking ramps, and increasing awareness of the connection between driver fatigue and traffic accidents. The research team is conducting a related project for WisDOT.

The objectives of this project are:

- Provide information necessary for states to consider increasing short term truck parking availability in the locations where it is needed most along the interstate highways in the region.
- Supply states in the 10-state Mississippi Valley region with valuable information regarding where parking facility improvements are most needed and why, along with important characteristics of new facilities.

MVFC PROJECT 05

TITLE: Assessment of Multimodal Freight Bottlenecks and Alleviation for Upper Midwest Region.



FUNDING PROJECTS

PRINCIPAL INVESTIGATOR: Jessica Guo, Department of Civil and Environmental Engineering, University of Wisconsin - Madison

SUMMARY: The freight that passes through the Mississippi Valley Region is high volume and has a substantial impact on the economy of the region. According to the BTS-sponsored Commodity Flow Survey, trucks carried almost 2.5 billion tons of freight across the highways of the 10 states of the Mississippi Valley region in 2002. During that same year, the region's rails moved 540 million tons of freight, and the region's waterways moved approximately 250 million tons of freight. Efficient movement of freight through this region is critical to the economic competitiveness of the nation.

The Upper Midwest Freight Corridor Study, completed by the Midwest Regional University Transportation Center (MRUTC) and six states, revealed that major bottlenecks exist in all modes of the freight transportation system throughout the region. According to the 2005 FHWA-sponsored report, "An Initial Assessment of Freight Bottlenecks on Highways," more than 60 highway-related freight bottlenecks exist in our region. Three of the largest bottlenecks in the country are in Chicago and total over 38.4 million annual hours of delay for all vehicles. With current estimates indicating that by the year 2020 a 62% and 44% increase in the amount of freight carried on the nation's highways and rail, respectively, it is clear that steps must be taken to improve the efficiency of the freight network. Bottlenecks also account for long delays at the ports of entry, intermodal freight terminals and yards, and locks and dams. These delays result directly in additional expenditures for shippers, carriers and for the public in general.

Furthermore, as global economic competitors have invested heavily in their transportation infrastructure, the transportation cost advantages historically held by the United States are beginning to decline. Bottlenecks in all modes are significantly increasing the cost of transporting goods through the region, which in turn is contributing to the decline of the nation's transportation cost advantage. The MVFC Executive Committee agreed at its July 10th, 2007 meeting that addressing regional freight bottlenecks is one of the most significant projects for the coalition to undertake.

The objectives of this project are:

- To identify freight bottlenecks on regionally significant routes and modes including highway, rail, and water.
- To identify and apply criteria to rank the bottlenecks within each mode.
- To assess bottleneck rankings across the multiple modes of transportation.
- To develop an inventory of planned projects across the region for addressing identified bottlenecks.
- To recommend additional bottleneck solutions for the region.



MVFC PROJECT 06

TITLE: Mississippi Valley Freight Information Clearinghouse

PRINCIPAL INVESTIGATORS: David Noyce, Department of Civil and Environmental Engineering, University of Wisconsin - Madison

SUMMARY: Reliable and timely information is essential to efficient and safe commercial vehicle operations, which play a significant role in the Mississippi Valley Region. Many transportation-related information systems have been developed by agencies and

governments to serve various local needs. However, as freight-travelers make their way through multiple localities in the region, the current decentralized structure of the region's information infrastructure results in suboptimal driving decisions being made by motor carriers. Proliferation of the current information systems is a problem, as is the consistency and completeness of the information in these systems. A centralized, one-stop shop for information would allow freight-travelers to make accurate and up-to-the-minute adjustments in their routes, which would improve efficiency and lower costs for freight travel throughout the region.

The objectives of this project are:

- Design the basic architecture of a reliable traveler information clearinghouse for the 10-state Mississippi Valley Region that provides necessary information to commercial vehicle operators and associated industries to improve region-wide mobility and safety.

MVFC PROJECT 07

TITLE: 2008 Workshop on Responding to National Transportation Initiatives

PRINCIPAL INVESTIGATOR: Teresa Adams, Department of Civil and Environmental Engineering, University of Wisconsin - Madison

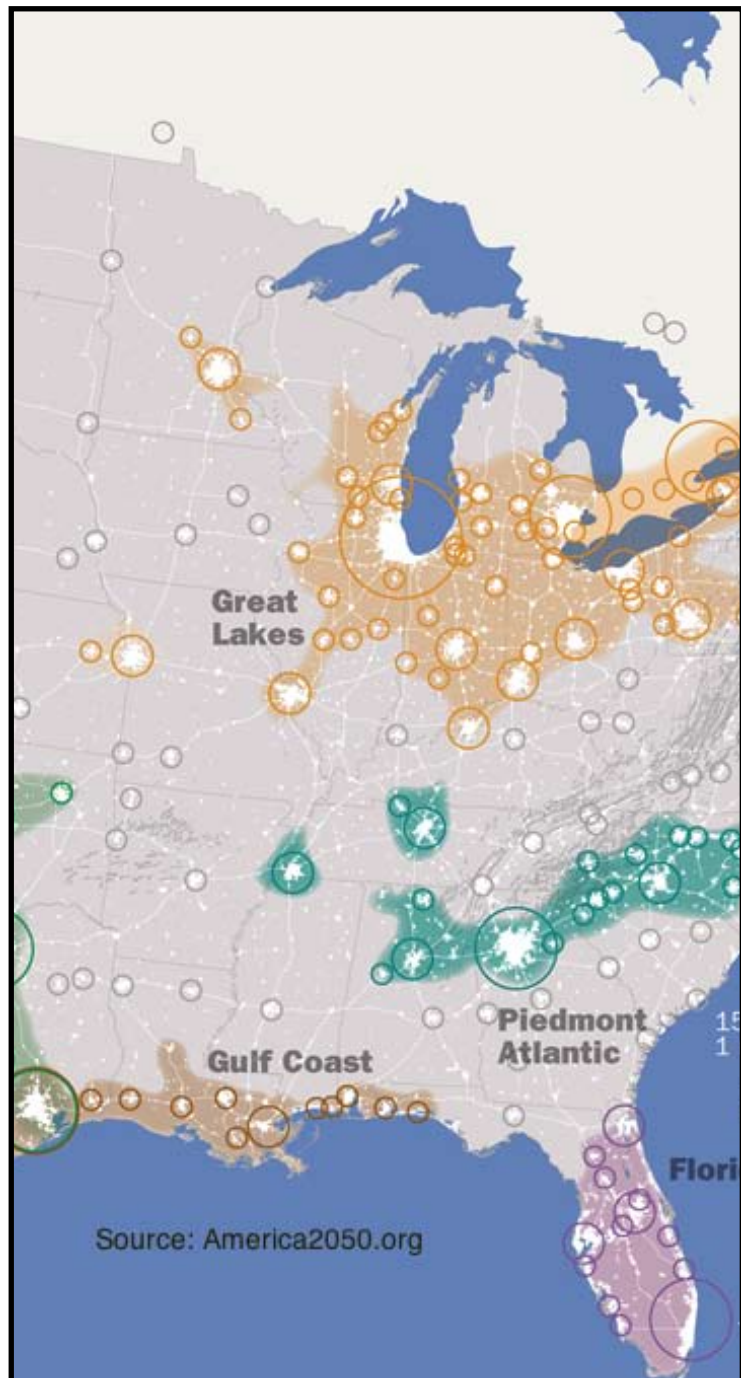
SUMMARY: Recognizing current and future funding challenges SAFETEA-LU authorized formation of two primary commissions to review transportation policy and revenues. The National Commission on Surface Transportation Policy and Revenue (more info: www.transportationfortomorrow.org) and National Surface Transportation Infrastructure Finance Commission were formed to explore these issues.

In a similar vein, AASHTO recently sponsored a transportation vision summit that attracted key transportation leaders. 10 elements were identified to prepare such a vision: Increased funding, modernization, transition from fuel taxes, new funding, public transportation investment, transportation capacity investments, tougher laws to save lives, freight transportation investment to close the gap between economic growth and currently available traditional funding sources, preservation, and safety improvements.

ARTBA released its Critical Commerce Corridors Proposal and has asked the MVFC to endorse it. The MVFC Board of Directors will begin a dialogue on these issues during their July meeting. Such dialogue may lead to specific recommendations or activities.

The objective of this project is:

- To identify key areas of interest for the Mississippi Valley states to address and support. Conduct needed Coalition business.



EDUCATION

CFIRE'S EDUCATIONAL GOAL is fostering a multidisciplinary program of course work and experiential learning that reinforces the transportation theme of the center. **CFIRE** promotes greater understanding of freight and intermodal

Together with all Consortium Partners, there are 13 Master's Level and 8 Doctoral Level transportation-related degree programs offered at **CFIRE** institutions. In addition to traditional Civil Engineering programs, other programs include M.B.A. with a focus on supply chain management, Public Affairs, programs in Urban Planning, and Computer Science. UW-Superior also offers an undergraduate major in Transportation Management and Logistics through its Business and Economics program.

CFIRE also promotes student and faculty excellence through its programs. Each year, the Center nominates one Student of the Year to be honored at the Transportation Research Board's Annual Meeting. **CFIRE** also encourages students to compete in various fellowship programs including the FHWA's Eisenhower Graduate Fellowship in Transportation and the Eno Transportation Fellowship.

Faculty excel in research and have won many awards for their contribution to the transportation field.

Education is the core of academic institutions, and **CFIRE** continues to promote programs that foster transportation leaders for 21st Century transportation needs. Through course offerings, encouraging academic excellence in transportation, and promoting transportation curricula, **CFIRE** will continue to lead in fostering transportation professionals and scholars.

systems in its traditional transportation engineering curriculum. This is accomplished by using the Transportation Management and Policy Graduate Certificate Program Curriculum to highlight freight related projects. The STAR Associate Directors and Consortium Partner representatives each weave freight focused activities into their courses.

The programs are interdisciplinary in nature, in cooperation with the School of Business Grainger Center for Supply Chain Management and Industrial Engineering's RFID Center.





safe, humane and democratic environment
by providing quality transportation services
in the greater Madison area



EDUCATION

STUDENT AWARDS

CFIRE STUDENT OF THE YEAR BILL HOLLOWAY

Bill Holloway graduated with a Master of Science in Urban and Regional Planning in the Spring 2008. While a student, he specialized in transportation and land use, with an emphasis on finance. He also earned a graduate certificate in Transportation Management and Policy offered at UW-Madison, and plans to pursue a career focused on the interaction between transportation infrastructure and land use in urban areas. He has a bachelor's degree from Colorado College.

Beginning his work with CFIRE in 2006, Mr. Holloway played major roles in the production of the Wisconsin Trucker's Guide, a succinct in-truck resource for Wisconsin commercial freight policies and operations; has performed research in the area of commercial truck parking and freight laws through the Mississippi Valley Freight Coalition; and has helped CFIRE prepare for and conduct several major conferences. In 2006 and 2007, Mr. Holloway was a member of the UW Student Bus Pass Advisory Committee and one of three student representatives on the university's Campus Transportation Committee, which is responsible for negotiating the unlimited transit pass program available to all UW students, staff and faculty.

Mr. Holloway was honored at the 2008 Transportation Research Board Annual meeting at the Council of University Transportation Centers 11th Annual Awards Banquet.

Mr. Holloway now works as a Transportation Analyst in Austin, Texas with Cambridge Systematics, a nationally recognized transportation research consulting firm.

CFIRE STUDENT WINS THREE PRESTIGIOUS FELLOWSHIPS

Michael A. Rodriguez is a graduate student enrolled in a dual-degree program at UW-Madison, seeking his Master of Public Affairs and Master of Science in Urban & Regional Planning. He specializes in transportation policy and planning, with emphasis on transit policies and the planning of transit systems. He is also seeking a graduate certificate in Transportation Management and Policy. Intending to graduate in Spring 2009, Mr. Rodriguez seeks to pursue a career



Bill Holloway



Edwin Toledo-Duran

Francisco Serrano

focused on mass transit systems. He completed his bachelor's degree at the United States Military Academy at West Point .

Mr. Rodriguez was named a 2007 Eisenhower Graduate Transportation Fellow by the Federal Highway Administration. He was honored among other fellows from across the country at the 2008 Transportation Research Board Annual Meeting. As part of his fellowship, he produced a research paper



Jessica Guo

from renown transportation leaders from across the country and had a chance to interact with other graduate students pursuing transportation careers.

Mr. Rodriguez is the most recent in a long group of CFIRE students to earn this fellowship. Jennifer Blonn (M.P.A. '07), a former graduate assistant at CFIRE, was named an Eno Fellow in 2007. Many UW-Madison students have been selected as Eno Fellows, dating back to the MRUTC. Deputy Director Jason Bittner was also an Eno Fellow.

Finally, the Chicago Transit Authority named Mr. Rodriguez a CTA Presidential Fellow, appointing him to a 12-week internship at CTA Headquarters in Chicago. While there, he developed a performance management system to evaluate the performance of revenue equipment repair workers and improve efficiency of the repair system.

CFIRE STUDENTS NAMED UW GRADUATE ENGINEERING RESEARCH SCHOLARS

Edwin Toledo-Duran and Francisco Serrano were named a Graduate Engineering Research Scholar (GERS) beginning the Fall 2008 semester. This honor is given by the UW-Madison department of Civil and Environmental Engineering. He is a graduate assistant at CFIRE and pursuing his Ph.D. in Civil Engineering. Dr. Teresa Adams nominated Mr. Toledo-Duran and Mr. Serrano for the fellowship, which aims to provide graduate study opportunities to diverse communities.

GERS is a unique fellowship program designed to offer students much more than monetary support. Through GERS, students become members of a supportive community of UW-Madison engineering graduate students, faculty and staff.

FACULTY AWARDS

CFIRE RESEARCHER WINS AWARDS

Prof. Jessica Guo, a CFIRE researcher on intermodal transportation and assistant professor of Civil and Environmental Engineering at UW-Madison, has won two awards for her planning/experimentation and design/implementation research on applying Engage, a computer simulation game model, to academic research and education. Prof. Guo's current project involves design and implementation of a prototype computer simulator tool using the Madison, Wisconsin, transportation system as a model.



Michael Rodriguez

focusing on racial equity in the placement of train stations in FTA New Starts programs. He will be presenting his findings at the 2009 TRB Annual Meeting.

The Eno Transportation Foundation also named Mr. Rodriguez as an Eno Fellow. As a member of the Eno Fellowship Class of 2008, he attended the Eno Leadership Development Conference in Washington, D.C. During the one-week conference, fellows heard

"In theory, our design would allow us to simulate several types of transportation system problems and projects," Prof. Guo said. "Right now, I am focusing on passenger travel, with particular focus on public transportation."

Computer simulations such as Engage might be compared to SecondLife and other virtual reality interactive online games that allow users to create simulated people, communities, and situations. If the simulator is implemented, Prof. Guo said, it could be modified and expanded to include freight transportation.

The three-phase project on began in January of 2006. The first phase included discussions of community needs for building, adapting and utilizing games and simulations in higher education. In November of that year, researchers hosted Play@Pyle where faculty and staff saw examples of how computer simulation technology was being applied at UW-Madison. The planning and experimentation phase (Phase II) began with the Play@Pyle demonstrations and concluded in April 2007.

The Transportation Research Board also honored Dr. Guo with its Pyke Johnson Award. The Pyke Johnson Award is presented annually by TRB for the outstanding paper published in the field of transportation systems planning and administration.

The winning paper – "Effect of the Built Environment on Motorized and Non-Motorized Trip Making: Substitutive Complementary, or Synergistic?" – is available on the Compendium of Papers CD-ROM from the 86th Annual Meeting. The award, which honors the 23rd Chairman of the Board's Executive Committee, was be presented on January 14, 2008, at the Thomas B. Deen Distinguished Lecture and Presentation of Outstanding Paper Awards during the Board's 87th Annual Meeting.

TRANSPORTATION MANAGEMENT & POLICY PROGRAM (TMP) AT UW - MADISON

ABOUT THE TMP PROGRAM

The Transportation Management and Policy Program (TMP) was created in 2002 to satisfy the demand for transportation professionals who understand multiple dimensions of mobility management and planning, enabling them to make choices leading to more environmentally and socially sustainable

transportation systems now and in the future. TMP integrates studies of environmentally sensitive transportation planning and development with studies of the economic, political, and social dimensions of transportation development. The program is closely associated with the National Center for Freight and Infrastructure Research and Education (CFIRE) at UW-Madison.

Graduate students who complete the program receive a certificate in TMP to supplement their graduate degree. TMP is not available as a stand-alone graduate degree.

The program is housed within the Nelson Institute for Environmental Studies and administered by CFIRE staff.

TMP PRACTICUM

In order to complete the TMP Certificate, students are required to take a practicum course where they are given a real-world client and gain experience in helping that client solve a transportation-related problem. This year's practicum had two clients: Community Car of Madison, a local "car-sharing" company, and Union Cab, a local taxi company. Students were under the direction of CFIRE Director Teresa Adams and CFIRE Associate Director Jessica Guo.

The Community Car group wrote a report that studied the reasons people choose car-sharing on the UW-



Campus. Community Car's goal was to increase ridership in the UW-Campus area - a goal shared by UW Transportation Services. Students conducted an email survey and used statistical models to find which variables best explained people's willingness to use car-sharing. The group also tested different pricing schemes to determine user's price sensitivity.



The Union Cab group sought to help the taxi company reduce its cost of fuel and also diminish its carbon footprint through the use of alternative fuels. The students examined various vehicle options to determine what costs and benefits would be for each vehicle at different costs of fuel. They also surveyed people on the UW-Madison campus to determine their willingness to pay a small carbon offset credit when they ride in a taxi.

Both reports were presented before the clients and other faculty and students at the UW-Madison. The Community Car

group presented their findings at the Mid-Continent Transportation Symposium hosted by CFIRE in Madison.

TMP COLLOQUIUM

Students are also required to take two one-credit colloquium modules as part of their TMP curriculum. These colloquia are opportunities to gather in a small setting and discuss various transportation issues with leaders in the field. Each semester's topic varies, as are the guests who are invited.

The objectives of this colloquium are to introduce some key issues and concepts to students of transportation; to provide an opportunity for those students to interact with people who are active in the transportation professions; and to provide an opportunity for transportation students from various departments to interact with other transportation students.

The Fall 2007 Colloquium theme was "Local and Regional Transportation Management." The Spring 2008 theme was "Transportation Options and Environmental Impacts." Students in both colloquia had the opportunity to interact with transportation professionals who provided vivid perspectives.

PROFESSIONAL DEVELOPMENT

ENGINEERING PROFESSIONAL DEVELOPMENT

The University of Wisconsin-Madison Department of Engineering Professional Development has been improving professional engineering and related fields since 1949 through its internationally-recognized continuing education program. There are more than 400 continuing education courses in engineering, design, operations, production, maintenance, management, and planning.

The Department of Civil & Environmental Engineering offers courses that are transportation and freight related to many professionals in Wisconsin, the Midwest and Nationally. Course topics include Docks and Marinas, Public Works, Railroad Engineering, and Streets Highways and Bridges. The Department highlighted freight in its "Freight Railroads: Best Operating Practices" course.

Professionals who participate in these courses benefit from state-of-the-art facilities, a variety of learning formats, and expert instructors drawn from industry, research, private practice, government, and education.

FREIGHT LOGISTICS FOR THE PUBLIC SECTOR

The Mississippi Valley Freight Coalition and CFIRE sponsored the development of an online Logistics Training Course for Public Sector Professionals. The primary purpose of this course is to acquaint the public sector with information about contemporary logistics practice and theory. This course intends to help the public sector better understand the needs of the freight community, and the driving forces behind the ebb and flow of freight on the roads.

EDUCATION

The audience of this course includes staff at DOT and Metropolitan Planning Organizations who work with freight providers or in freight planning. This course intends to help the public sector better understand the needs of the freight community, and the driving forces behind the ebb and flow of freight on the roads.

This course is comprised of two parts, each intended for one day. Part I is on transportation and general introduction to logistics management. Part II provides more details on contemporary logistics. The accompanying video clips voice opinions from the private sector representatives. They are mainly based on interviews with practitioners and executives in the transportation and logistics sector. They talk about operations, application of technologies, challenges, and concerns about public policies.

STUDENT ASSISTANTS

CFIRE sponsors the education of many undergraduate and graduate students, of many disciplines and departments through assistantships at the center. Graduate level project assistants receive tuition-remission at the University of Wisconsin - Madison. Students work at the center on various programs and projects, applying research, their disciplinary knowledge, and varied experiences to transportation problems. Many of the funded projects outlined in the Research section were completed with the assistance of our students. CFIRE also sponsors interns at the Wisconsin Department of Transportation.

The center considers the students at CFIRE to be the future of transportation leadership, and is committed to their education through funding and opportunities to work on cutting-edge research.

The following is a list of student assistants that worked at the center during this reporting period. We also congratulate our students graduated during this period note them with their graduation year.

Kaushik Bekkem Reddy - M.S. Civil Engineering
Jennifer Blonn - M.P.A. '08
Stacy Cook - M.S. Urban & Regional Planning
Christopher Dresser - M.S. Environmental Science '08
Dadit Hidayat - Ph.D. Environmental Studies
Perston Charles Judkins - B.S. Civil Engineering
Emil Juni - Ph.D. Civil Engineering
Myungook Kang - Ph.D. Civil Engineering

Stephanie Lind - M.S. Urban & Regional Planning '08
Chanda-Louise Oton - M.S. Civil Engineering
Ravi Pavuluri - M.S. Civil Engineering
Michael Rodriguez - M.P.A. / M.S. Urban & Regional Planning
Kanisa Rungjang - Ph.D. Civil Engineering
Martin Schilling - M.S. Urban & Regional Planning
Steven Schmitt - Non-degree Student, Communications
Francisco Serrano - Ph.D. Civil Engineering
William Sierzchula - M.P.A. / M.S. Urban & Regional Planning
Praveen Srivastava - M.S. Civil Engineering
Ross Tillman - B.S. Civil Engineering
Edwin Toledo-Duran - Ph.D. Civil Engineering
Kevin White - M.S. Urban & Regional Planning
Heather Williams - B.S. Civil Engineering
Dave Huwe (WisDOT Intern) - B.S. Civil Engineering
Kimberly Parry (WisDOT intern) - B.S. Civil Engineering '08
Orion Litzau (WisDOT intern) - B.S. Geological Engineering



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OUTREACH

CFIRE'S OUTREACH GOAL is to provide research results to potential users in a form that can be directly implemented, utilized or otherwise applied. Additionally, the Center fosters a culture of being active in the community and reaching out to the public.

CFIRE is involved with a number of outreach activities. During the past year, CFIRE hosted several workshops, conferences, and symposia. In addition, CFIRE publishes a quarterly newsletter that is distributed to over 3,600 transportation professionals

Staff and students of CFIRE are active participants in the Transportation Research Board. They have submitted several papers to be presented at the TRB Annual meeting in January 2009. Additionally, several students and faculty have submitted research

to be considered for publication in the Transportation Research Record, the Journal of the Transportation Research Board.

The staff and students of CFIRE are active participants in the academic and professional transportation community. They have attended various national conferences, and hosted others. CFIRE Director Teresa Adams continues to promote participation with the outside community in order to increase the public benefit of the Center.

Outreach is vital to the mission of CFIRE. As an academic institution, the Center ensures to communicate findings to other professionals and the public in order to enhance societal benefits of our funded research. In this way, the Center can promote better solutions to transportation problems and encourage dialogue among professionals and academics.





Worksheet with text and a list of items.



HOSTED & SPONSORED EVENTS

MID-CONTINENT TRANSPORTATION RESEARCH FORUM, MADISON, WI, AUGUST 14 - 15, 2008

CFIRE was proud to host the 2008 Mid-Continent Transportation Research Forum in Madison, WI. This forum and workshop brought together the producers and consumers of transportation research in the Midwest. It featured mechanisms that move research into practice, specifically within public sector transportation agencies.

CFIRE Director Dr. Teresa M. Adams was the conference chair and a featured researcher. Hosted in Madison, many students, staff and faculty affiliated with CFIRE had opportunities to participate.

This year, the conference featured presentations of research from the Transportation Management and Policy Practicum. Andrea Bill presented on behalf of a research group that studied sustainable technology options for Union Cab. Jie Zheng and Michelle Scott presented on behalf of a research team that studied the market potential and behavioral models for car-sharing in university communities.

The two-day conference included transportation practitioners, managers, researchers and other professionals to discuss various transportation topics, including freight and logistics. Other topics included asset management, safety, operations, materials, and sustainability.

RAILROAD ENGINEERING EDUCATION SYMPOSIUM, URBANA, IL, JUNE 8 - 11 2008

The American Railway Engineering and Maintenance of Way Association (AREMA), the Federal Railroad Administration (FRA), and the Association of American Railroads (AAR), organized the symposium out of concern over the disappearance of railroad engineering from most engineering curricula in the U.S. and Canada. CFIRE was a sponsoring organization at the event held at the University of Illinois at Urbana-Champaign.

CFIRE director Teresa Adams participated in the symposium along with 33 professors from across the country and from as far away as Nigeria.

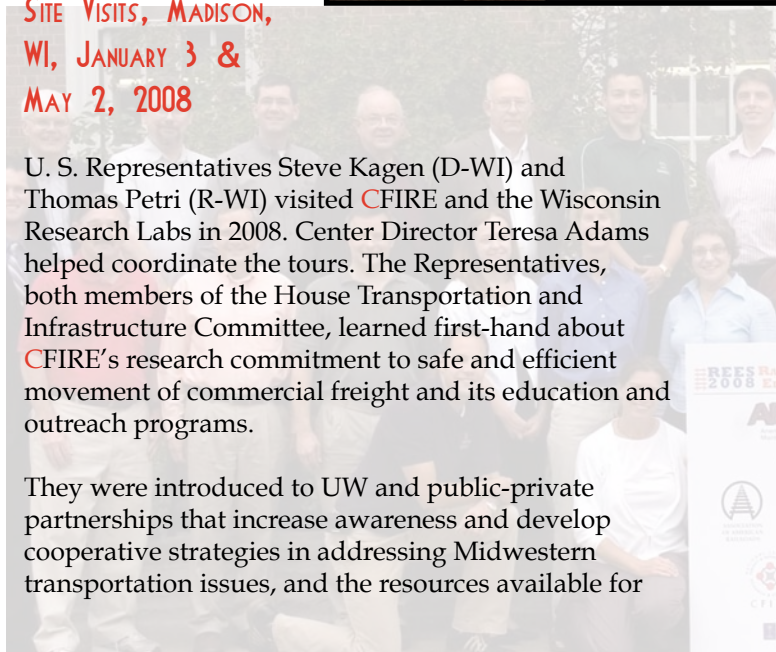
The symposium included two days of discussion on

railroad engineering materials, current and future research, and a visit to a local railroad facility. The classroom portion of the symposium involved presentation and discussion of the lecture materials that was also provided to the professors. Time was also set aside for presentation and discussion of railroad research activities and opportunities, and the current state of railroad engineering education. The field visit provided professors the chance to see the railroad environment first hand and illustrate the possibility of conducting organized field trips in cooperation with railroads near their respective institutions as part of their instructional activities.

U.S. REPRESENTATIVES SITE VISITS, MADISON, WI, JANUARY 3 & MAY 2, 2008

U. S. Representatives Steve Kagen (D-WI) and Thomas Petri (R-WI) visited CFIRE and the Wisconsin Research Labs in 2008. Center Director Teresa Adams helped coordinate the tours. The Representatives, both members of the House Transportation and Infrastructure Committee, learned first-hand about CFIRE's research commitment to safe and efficient movement of commercial freight and its education and outreach programs.

They were introduced to UW and public-private partnerships that increase awareness and develop cooperative strategies in addressing Midwestern transportation issues, and the resources available for





developing safe, efficient, and environmentally-sound transportation modes during their respective visits.

The Representatives toured the Wisconsin Structures and Materials Testing Lab and was briefed on the asphalt pavement research program. Staff also briefed them on the Transportation Management and Policy (TMP) graduate program which provides students with opportunities to research topics of their choice and present them as part of their coursework.



UNIVERSITY TRANSPORTATION CENTER RESEARCH ISSUES IN FREIGHT CONFERENCE, WASHINGTON, D.C. OCTOBER 22 - 23, 2007

CFIRE director Dr. Teresa M. Adams and researcher Bruce Wang were prominently featured during the October 22- 23, Research Issues in Freight

Conference in Washington, D.C. The conference, cosponsored by CFIRE, is the second University Transportation Center-oriented conference organized by TRB and supported by the U.S. DOT Research & Innovative Technology Administration.

Dr. Adams led breakout sessions targeting research developments measuring the impact of congestion on the economy and presented in a session targeting institutional models for university-industry-government collaboration for improving the movement of freight.

Bruce Wang presented work related to the Mississippi Valley Freight Traveler Information Clearinghouse efforts. A poster was also presented on the Mississippi Valley Freight Coalition.

EVENTS PARTICIPATED

OHIO CONFERENCE ON FREIGHT, TOLEDO, OHIO, SEPTEMBER 16 - 17, 2008

MVFC Facilitator and former MRUTC director Ernie Wittwer met with colleagues at the Ohio Conference on Freight to consider the evolving nature of the freight transportation industry and the potential for the Great Lakes region to become a center for freight logistics innovation.

The two-day workshop held at Toledo, Ohio, featured sessions on freight planning and public-private partnerships, freight distribution and security, and site selection in the freight planning process.

The University of Toledo is part of the CFIRE consortium, based at University of Wisconsin-Madison. Research at the Toledo campus has focused on developing data storage systems for regional, intermodal freight transportation.

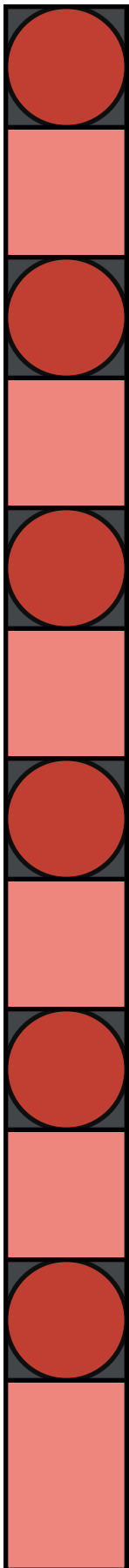
Ernie Wittwer presented in the workshop titled, "Critical Skills for Public Sector Freight Staff - Selling the Importance of Freight to Decision Makers and Financing Freight Projects." CFIRE Director Teresa Adams also attended the event.

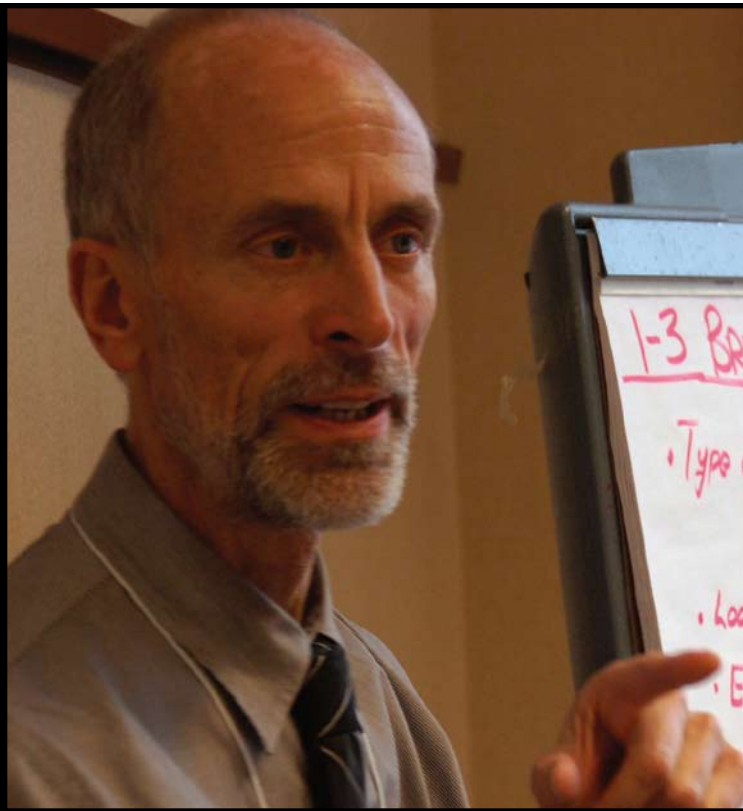
ACSP-AEOSP 4TH JOINT CONGRESS, CHICAGO, IL, JULY 6 - 11, 2008

The Association of Collegiate Schools of Planning (ACSP) and the Association of European Schools of Planning (AESOP) held their 2008 annual conferences together at the fourth Joint Congress, July 6 -11 in Chicago.

The conference theme "Bridging the Divide: Celebrating the City" focused on the mediating role of cities. Many cities are, to some degree, divided or contested. And cities themselves may play roles in reproducing identities that promote conflict between racial, ethnic, religious or national groups. A key question arises: How can innovative approaches to planning and governance help to bridge these divides?

CFIRE Research and Education Programs Manager Greg Waidley presented "Solving Multimodal Freight Challenges in the Chicago and Upper Midwest Regions," on behalf of the center.





NATIONAL URBAN FREIGHT CONFERENCE, LONG BEACH, CA, DECEMBER 5 - 7 2007

The purpose of the 2nd Annual National Urban Freight Conference 2007 was to examine the impacts of goods movement and international trade in metropolitan areas. CFIRE Director Teresa Adams, Deputy Director Jason Bittner, and CFIRE Associate Director Faculty Jessica Guo presented.

The first National Urban Freight Conference in 2006 afforded researchers and practitioners a unique opportunity to consider the "urban side" of freight across many disciplines. Our understanding of how freight and international trade affect urban areas remains limited. The distribution of economic and environmental impacts across metropolitan areas merits further documentation. The tools for modeling and forecasting freight flows within regions are not well developed. The nature of the goods movement supply chain is still poorly understood, and implications of the supply chain logic for urban areas are only developing.

NELSON INSTITUTE EARTH DAY CONFERENCE, MADISON, WI, APRIL 16, 2008

The 2008 Earth Day Conference covered topics such as sustaining Wisconsin's environment and economy, responding to climate change, findings of the Governor's Global Warming Task Force. The conference was related to the Wisconsin Initiative on Climate Change Impacts (WICCI). The theme, "Sustaining Wisconsin's Environment & Economy: Responding to Climate Change," was addressed by speakers at the conference. CFIRE Director Teresa Adams presented on "Designing Efficient Land-Use and Transportation Systems for Freight."

The conference at Monona Terrace was hosted by the Nelson Institute for Environmental Studies at UW-Madison. Tracey Holloway, the Director of the Nelson Institute, is also CFIRE Associate Director. She notes, "freight systems are important considerations for bettering the environment due to freight's levels of carbon emissions." Dr. Adams' presentation stressed this notion and provided insights into the issues and possibilities with freight in the US system. Her presentation is available online at the Wisconsin Department of Natural Resources website:

<http://media2.wi.gov/DNR/Catalog/>

Jason Bittner presented a paper titled "Freight Strategic Planning: What Our Customers Want." Professors Teresa Adams and Jessica Guo presented "Freight Activities and Planning Efforts Within Small Metropolitan Areas in the United States." These presentations were part of the track: "Policy and Institutional Issues in Urban Goods Movement."

FOUNDRY SAND IN INFRASTRUCTURE APPLICATIONS WORKSHOP, CHICAGO, IL, OCTOBER 31, 2007

CFIRE was proud to co-host the Foundry Sand in Infrastructure Applications meeting along with the UW-Madison Recycled Materials Resource Center (RMRC), FWHA and EPA. The goal of the Recycled Materials Resource Center is to reuse various scraps from foundry sand, asphalt shingles and textile scraps in the building of roads.

At this workshop, over 100 attendees heard from various experts in the field of asphalt and pavement materials. CFIRE affiliated faculty Dr. Hussain Bahia presented on "Bound Applications - Hot Asphalt Mix," and UW-Madison professor Dr. Craig Benson presented on environmental evaluation and retaining structures. The workshop has led to a webinar to be hosted by UW-Madison RMRC in 2008. More information can be found at: <http://www.foundryrecycling.org/>

CFIRE AT TRB ANNUAL MEETING 2008

CFIRE is an active participant in the Transportation Research Board. In 2008, over 50 CFIRE students and affiliated faculty were in attendance. Many are involved in TRB committees and others presented research. UW-Madison Professor Jessica Guo was honored with the TRB's Pyke Award.

CFIRE ON TRB COMMITTEES

TERESA ADAMS - Intermodal Freight Transport; NCHRP Project Panel on Communicating the Value of Research; NCHRP Project Panel on Operational and Low-Cost Improvements to Freight Transportation System Performance

HUSSAIN BAHIA - Characteristics of Bituminous-Aggregate Combinations To Meet Surface Requirements; NCHRP Project Panel on Superpavements; Support and Performance Models Management

JASON BITTNER - Transportation Asset Management; Conduct of Research (Secretary); NCHRP Panels on Transportation Research Thesaurus & Transportation Pooled Fund Website

TIM GATES - Traffic Control Devices.

JESSICA GUO - Geographic Information Science and Applications; Transportation Demand Forecasting

KAZUYA KAWAMURA - Transportation and Economic Development

ROBERT KENNEDY, JR. - Motorcycles and Mopeds

DAVID NOYCE - Operations; Traffic Control Devices (Chair); Identification of Factors Related to Serious Injuries in Crashes of Motorcyclists into Traffic Barriers (Chair)

MICHAEL OLIVA - NCHRP Project Panel on Evaluation of CIP Reinforced Joints for Full-Depth Precast Concrete Bridge Decks

XIAO QIN - Statistical Methodology and Statistical Computer Software in Transportation Research

HOWARD ROSEN - Transportation History

JEFFREY RUSSELL - NCHRP Project Panel on Best Practices on Accelerating Project Delivery Conception to Completion

RICHARD STEWART - Ports and Channels; Marine Environment

DONALD WALKER - Winter Maintenance (Emeritus Member)

XIUBIN WANG - Emerging and Innovative Public Transport and Technologies; Freight Transportation Planning and Logistics

GREG WAIDLEY - Intermodal Freight Terminal Design and Operations

GARY WHITED - NCHRP Project Panel on Performance-Related Specifications for Hot-Mix Asphalt Construction; TRB Long Term Pavement Performance (LTPP) Committee

BARBARA WOLFE - TCRP Project Panel on Cost Benefit Analysis of Providing Non-emergency Medical Transportation Benefits

JOY ZEDLER - Committee on the St. Lawrence Seaway: Options to Eliminate Introduction of Nonindigenous Species into the Great Lakes

CFIRE

TRB PRESENTERS

Teresa Adams
Marc Anderson
Hussain Bahia
Edward Biemborn
Jason Bittner
Yali Chen
Steven Cramer
Layali Dejeni
Shan Di
Tuncer Edil
Dante Fratta
Michael Greenwald
Jessica Guo
Junhee Han
Donald Harmatuck
Dadit Hidayat
Alan Horowitz
Jing Jin
Emil Juni
Myungook Kang

George Lu
Wilfung Martono
Jose Munoz
David Noyce
Anthony Pagano
Steven Parker
Xiao Qin
Zhijun Qiu
Bin Ran
Maria Isabel Rejedor
Jessica Sanfilippo
David Sokolowski
Richard Stewart
Todd Szymkowski
Alan Vonderhoe
Bruce Wang
Justin Warner
Haifang Wen
Tian Zhao
Jie Zheng

WISCONSIN TRB RECEPTION

The University of Wisconsin - Madison and CFIRE are proud cohosts, along with WisDOT and various other partners, of our Annual Wisconsin Reception at TRB. This allows an opportunity for Wisconsin transportation businesses and professionals to network with each other and with others nationwide.

**NATIONAL RURAL ITS CONFERENCE, TRAVERSE CITY, MI,
OCTOBER 7 - 10 2007**

Finding effective solutions to commercial freight congestion and safety issues is not a problem unique to urban areas. Rural transportation routes constantly deal with obstacles to smooth and efficient travel as traffic density continues to grow.

CFIRE deputy director Jason Bittner presented at the National Rural Intelligent Transportation Systems Conference, held October 7-10 at Traverse City, Michigan. Conference sessions focused on technological solutions to improve vehicle-to-vehicle and vehicle-to-infrastructure communication, incident response and winter travel, work zone traffic management and real-time warning systems, power system application, and data base application to overall rural transit safety and efficiency.

The conference was held in conjunction with the Intelligent Transportation Society of America's Commercial Vehicle and Freight Mobility forum that emphasized the commercial vehicle sector of freight transportation. Participants included representatives from motor carriers, railroads, deep water ports, intermodal freight technology services, and other shipping and commercial vehicle operations.

**INDIANA LOGISTICS SUMMIT, INDIANAPOLIS IN, SEPTEMBER
25 - 26, 2007**

The 5th annual Indiana Logistics Summit brought together top officials from industry, government and university research sectors to discuss ways to make Indiana's transportation, distribution, and logistics business more competitive and leaders in the area of logistics. Over 300 people attended the event in Indianapolis.

CFIRE consultant and Mississippi Valley Freight Coalition (MVFC) facilitator Ernie Wittwer attended the two-day summit on behalf of the MVFC. The summit detailed several things that might be of use to both the MVFC and to Wisconsin.

Several large shippers from the manufacturing community took an active role. Honda, Rolls Royce, Cummins and ArcelorMittal Steel were on a single panel. They spoke about their logistics needs and processes. This private sector participation is critical for advancing the initiatives of the MVFC. Several large carriers were also present. UBS, CSX, American Commercial Lines, and JB Hunt participated. Each of these are major players in the movement of freight in our region.



**INTERMODAL FREIGHT TECHNOLOGY WORK GROUP,
OAKBROOK, IL, MAY 2 - 3, 2007**

The Intermodal Freight Technology Workgroup is a public-private partnership focused on the identification and evaluation of technology-based options for improving the efficiency, safety, and security of intermodal freight movement.

Working from this common goal, the IFTWG engages in efforts to marry industry and government priorities in a way that leverages collective experience and shared investment.

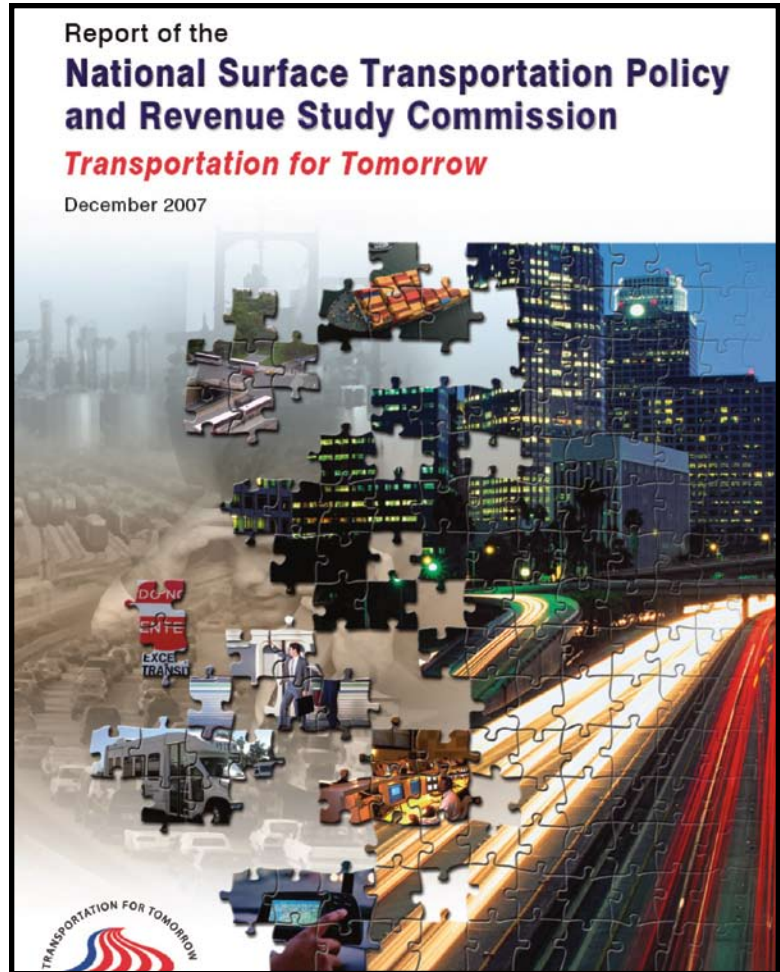
Center Director Dr. Teresa Adams and Researcher Bruce Xiubin Wang participated in the meeting on May 2-3, 2007, in Oakbrook, Illinois, and helped identify future IFTWG projects. The meeting's theme was "Industry and Government Partnering to Promote Freight Efficiency through Technology."

PROFESSIONAL OUTREACH

**CFIRE TESTIMONY ON SURFACE TRANSPORTATION
COMMISSION REPORT**

CFIRE Director Dr. Teresa M. Adams was quoted directly in the Report of the National Surface Transportation Policy and Revenue Study Commission. CFIRE helped prepare testimony on behalf of the ten states of the Mississippi Valley Freight Coalition in February and April, 2007. Adam's remarks appeared as follows:

*"The actions of individual States and regional coalitions are not enough to solve the Nation's freight problems. We need strong leadership from the Federal government in the form of strategies, tools, and revenue, and we must make changes to our institutional arrangements."
—Teresa M. Adams, Ph.D., Director of the National Center for Freight and Infrastructure Research and Education at the University of Wisconsin—Madison, at the Commission's Minneapolis field hearing.*



This section of the report focused on the development of a National Freight Policy. The full report is available online at transportationfortomorrow.org.

TRUCKER'S GUIDE TO WISCONSIN

CFIRE researchers and educators recognize the connection between traffic safety and commercial movement, further noting that large truck safety directly affects freight logistics as well. To assist the trucking community, CFIRE Researcher Bruce Wang recently led an effort to develop the Wisconsin Truckers Guide. The guide is a reference of commonly requested information for dispatch operators and owner operators. The online version is available at

<http://wistrans.org/cfire/Research/CFIRE/CFIRE01-01/TruckersGuideFinal.pdf>.

More information about the Truckers Guide is available in this report on page 10.

COMMUNITY MAPS PILOT SITE

The click of a link is providing vital travel information in five southwestern Wisconsin counties, thanks in large part to the efforts of CFIRE, the Midwest Regional University Transportation Center (MRUTC), the Wisconsin Traffic Operations and Safety Laboratory (TOPS) and the Southwestern Wisconsin Regional Planning Commission (SWWRPC).

The Community Maps Pilot Site, covering Grant, Green, Iowa, Lafayette and Richland counties in Wisconsin - employs a Google map interface to identify roadwork areas and locations where motor vehicle collisions have occurred involving fatalities, injuries, or property damage. Users get valuable information about individual highways and streets or to plan trips and avoid delays.

MRUTC secured NHTSA funding for the project through the Wisconsin Traffic Records Coordinating Committee. To complete the project, CFIRE is working with Graves and TOPS Lab's Steven Parker.

In 2007, the Community Maps Pilot Site was honored with an Excellence in Regional Transportation Award by the National Association of Development Organizations (NADO) Research Foundation and RPO America, a program affiliate of NADO serving as the national professional association for rural transportation planning professionals.

"The MRUTC deserves all the credit in the world, because they provided support when this promising project could easily have been dropped for lack of resources" Graves said. The Community Maps Pilot link is <http://transportal.cee.wisc.edu/partners/community-maps/>

COMMUNITY OUTREACH

FUTURE CITIES COMPETITION

CFIRE Research and Education Programs Coordinator, Greg Waidley, represented the Center in its participation at the 2008 Future Cities Competition.

A CFIRE special award was given during the competition, which uses virtual reality software to plan and build future cities. The special award, "Best Freight Transportation Network," went to a team from the Stone Bank School in Stone Bank, Wisconsin, that participated in the Milwaukee regional of the

2008 competition, held January 19 during National Engineers Week. The winning team's city was called Diamond Bank.

The Future City Competition, now in its second decade, helps students discover and foster interests in math, science, and engineering. Students use SimCity 3000 software, complete with a handbook of rules, instructions, tips, and techniques for designing and building their city of the future. In addition to an introduction to engineering, students learn writing, public speaking, teamwork, time management, problem solving and new computer skills.

TERRACE TOWN - BOX CITIES

CFIRE graduate assistant Michael Rodriguez participated as a planning mentor for first graders as they constructed a city in the 2008 Terrace Town program.

Terrace Town is hosted at Monona Terrace in Madison, Wisconsin. As part of the "Box Cities" curriculum, students from all grades participate in building a city out of household materials like milk cartons and shoe boxes.

Michael's first grade class at Sandburg Elementary School in Madison, Wisconsin learned how to place homes and business along transportation corridors. Their box city was unique in that they incorporated a rail transportation system linking the neighborhoods in their city.

Monona Terrace, the sponsor of this event, builds upon its linkage to Frank Lloyd Wright. The intent of this program is to expose children to the concepts of architecture, planning, and infrastructure. Children learn about design and the components of the build environment around them.

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Wisconsin Transportation Center

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Collaborating Partners



National Center for Freight & Infrastructure Research & Education

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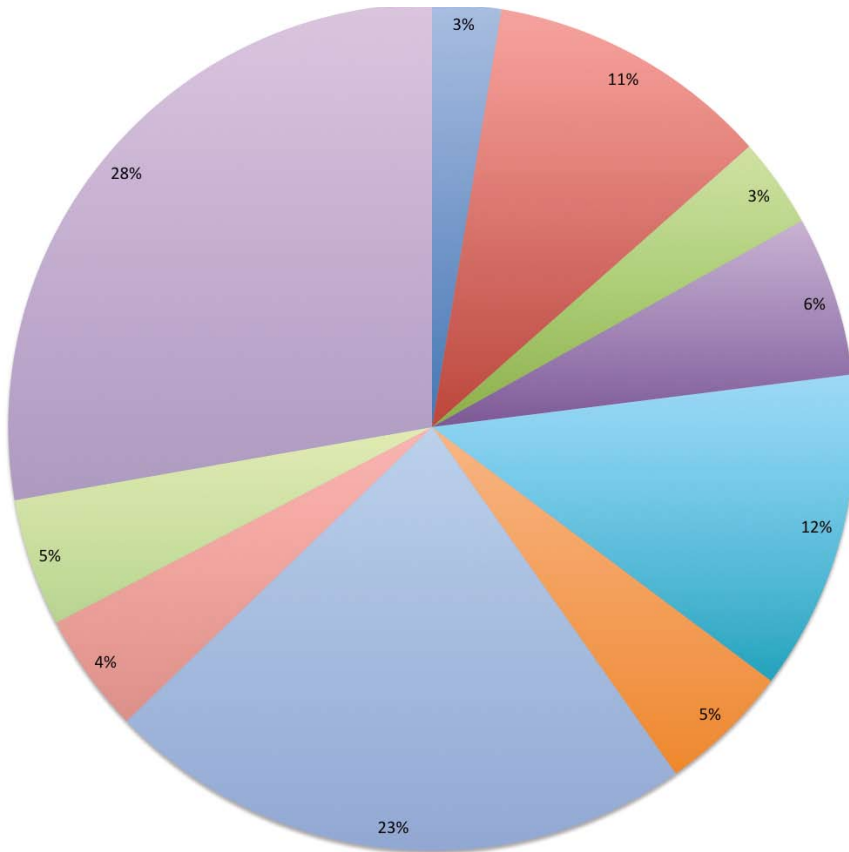
Signature Technical Areas of Research (STARs)

Design, Materials
Construction Pro
for Highway, Harbo
Rail Infrastru



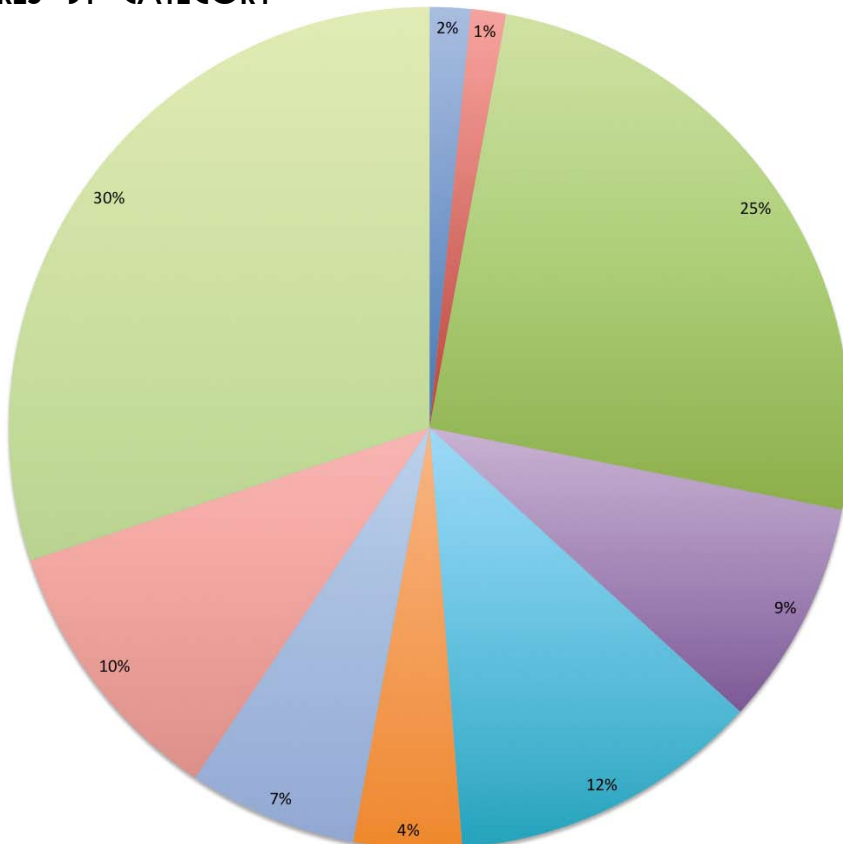
FINANCIAL STATEMENTS

SOURCES OF MATCHING FUNDS



- Construction and Materials Support Center
- Mississippi Valley Freight Coalition
- Other
- Recycled Materials Resource Center
- University of Illinois - Chicago
- University of Toledo
- UW-Madison
- UW-Milwaukee
- UW-Superior
- Wisconsin DOT

EXPENDITURES BY CATEGORY



- Director Salary
- Administrative Staff
- Other Salary
- Student Salary
- Benefits
- Scholarships/ Tuition
- Activities & Expendables
- Travel
- Facilities and Administrative

ACKNOWLEDGEMENTS

The staff of CFIRE wishes to thank its academic partners at the University of Illinois-Chicago, The University of Wisconsin - Milwaukee, The University of Wisconsin-Superior, and The University of Toledo for their contributions to this report.

Uncredited photos are from the Center's, Wisconsin DOT's, and the UW-Madison Department of Civil and Environmental Engineering collections. CFIRE staff members Teresa Adams, Jason Bittner, Greg Waidley, and Susan Karcher contributed to the content and editing of this report.

Michael Rodriguez was responsible for the compilation of the performance measures of CFIRE as well as editing, layout and design of this report.



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