



National University Transportation Centers



Laboratory Facilities



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Introduction

The purpose of this document is to provide information on existing or planned university based transportation related research laboratory facilities at National University Transportation Centers. The goal in developing this document was to provide a reference “tool” of available national assets that could be used by federal, state, local, tribal, and private industry transportation professionals; increase awareness and encourage laboratory utilization; and reduce the potential for redundancy in the facilities offered to maximize federal funding utilization.

Under the transportation bill, Congress authorized and funded 10 National University Transportation Centers (UTCs) throughout the United States, which the grants are managed by the United States Department of Transportation, Research Innovation and Technology Administration under the Transportation Centers Program. The laboratories which are highlighted are those under The Safe, Accountable, Flexible, Efficient Transportation Equity Act, enacted on August 10, 2005.

These ten universities include

- Marshall University
- Montana State University
- Missouri University of Science and Technology
- Northwestern University
- Oklahoma State University
- Portland State University
- University of Alaska
- University of Minnesota
- University of Vermont
- University of Wisconsin

Document Overview

Each university has a different theme and research focus in order to address national transportation needs. As shown in the following tables these themes cover the spectrum of transportation. In order to provide for increased usability the document has been organized by research theme and by each university. For each laboratory there is a fact sheet which contains the laboratory title, purpose, capabilities, lab equipment, examples of current and past work, and pertinent contact information. While only 10 universities are featured in this document, it is envisioned that it will be expanded to over 60 universities. It is also envisioned that this information will be entered into a database driven website hosted by USDOT, RITA.

National UTC Partnership Opportunities

Organization	Theme	Research/Focus Areas
Marshall University		
Rahall Transportation Institute	Transportation and economic development in mountain regions	<ul style="list-style-type: none"> -Environmental -Geotechnical -Socio-economical -Public Policy -Geographical Information Systems -High Accuracy Global Positioning Systems -Intermodal "Rail/ Water" -ITS and Information Technology-Data Repository
Montana State University		
Western Transportation Institute	Integrated approaches to rural travel and transportation	<ul style="list-style-type: none"> -Safety & Operations -Winter Maintenance & Effects -Road Ecology -Infrastructure Maintenance & Materials -Systems Engineering Development & Integration -Mobility & Public Transportation -Logistics & Freight Management -Transportation Planning & Economics
Missouri University of Science and Technology		
Center for Infrastructure Engineering Studies	Proposed Theme: UTC-advanced materials and non-destructive testing technologies	
Northwestern University		
Infrastructure Technology Institute	Improving the technology and expertise available to address the problems of the nation's transportation infrastructure	
Oklahoma State University		
Oklahoma Transportation Center	Economic enhancement through infrastructure stewardship	<ul style="list-style-type: none"> -Evaluation, Management, Repair, and Retrofit of Bridges -Efficient Freight Movement and Intermodal Transportation -Improved Materials, Design, and Rehabilitation of Pavements -Traffic and Infrastructure Safety and Security -ITS Deployment
Portland State University		
Oregon Transportation Research and Education Consortium	Advanced technology, integration of land use and transportation and healthy communities	<ul style="list-style-type: none"> -Safety, Traffic Flow, and Transit -Freight and Logistics -Planning
Portland State University Transportation Center		<ul style="list-style-type: none"> -Pedestrians and Bicycles -Economics -Infrastructure -Environmental Stewardship
University of Alaska		
Alaska University Transportation Center	Transportation safety, security and innovation in cold regions	<ul style="list-style-type: none"> -Permafrost -Air Quality -Seismic Design and Retrofit -Materials, Design and Construction in Cold Regions -Resource Development -Winter Transportation -Maintaining Wildlife Habitat in Trans/Corridors
University of Minnesota		
Intelligent Transportation Systems Institute	Human-center technology to enhance safety and mobility	<ul style="list-style-type: none"> -Fatality and Crash Reduction -Traffic Management and Congestion Mitigation -In-Vehicle and Driver-Assistance Technologies -Maintenance and Operations -Transit Applications -Rural Applications -Societal Issues - only when they relate to the above
University of Vermont		
UVM National UTC	Proposed Theme: Sustainable systems and advanced technologies for Northern communities	<ul style="list-style-type: none"> -Land Use/Transportation Modeling - Complex Systems and New -Metrics -Tailpipe Emissions -Sustainable Transportation for Tourism -Bike and Pedestrian Travel -Active Living as Function of Built Environment
University of Wisconsin		
National University Transportation Center	Sustainable freight transportation infrastructure and systems	<ul style="list-style-type: none"> -Design, Materials, and Construction Process for Highway, Harbor, and Rail Infrastructure -Multimodal Systems Planning and Optimization -Traffic Operations and Safety -Energy and Environment

National University Transportation Centers

Institution	Areas of Common Research Themes									
	Bikes & Pedestrians	Cold Region	Economics	Environment	Freight	Human Factors	Infrastructure, Materials & Maintenance	Planning	Public Transportation & Tourism	Safety Operations & Technology
Marshall University			X	X	X					X
Montana State University		X		X	X	X	X	X	X	X
Missouri University of Science and Technology				X			X		X	X
Oklahoma State University					X		X	X		X
Portland State University	X		X	X			X	X		
University of Alaska		X		X			X			
University of Minnesota		X				X	X	X	X	X
University of Vermont	X	X		X				X	X	X
University of Wisconsin				X	X		X	X		X

Lab Listing by Common Research Theme

The following list of laboratories is organized alphabetically by areas of common research themes.

The areas of common research themes are as follows.

- Bikes and Pedestrians
- Cold Region
- Economics
- Environment
- Freight
- Human Factors
- Infrastructure, Materials and Maintenance
- Planning
- Public Transportation and Tourism
- Safety, Operations and Technology

Bikes and Pedestrian

Initiative for Bicycle and Pedestrian Innovation

2. Lab Type:

Bike and Pedestrian

3. Center/Institute Name:

Oregon Transportation Research and Education Consortium (OTREC)

4. University Name:

Center for Transportation Studies, Toulan School of Urban Studies and Planning
Portland State University

5. Center Contact Information:

Oregon Transportation Research and Education Consortium (OTREC)
Director, Dr. Robert Bertini
Portland State University
301A Engineering Building
PO Box 751
Portland, OR 97207
Phone: 503-725-4249
Fax: 503-725-5950

6. Lab Manager Contact Information:

Lynn Weigand, Director
503-725-4042
weigand@pdx.edu

Jennifer Dill
503-725-5173
jdill@pdx.edu

Web site: <http://www.ibpi.usp.pdx.edu/>

7. Lab Mission/Purpose:

The Initiative for Bicycle and Pedestrian Innovation is a new center for research and learning that is focused on bicycle and pedestrian travel. IBPI's aim is to advance bicycling and walking as integral elements of the transportation system in Oregon's communities. IBPI is housed at Portland State University's Center for Transportation Studies, but also draws on the resources of partner institutions at the University of Oregon and Oregon State University. Portland is a national leader in these modes of travel and provides the ideal setting and living laboratory for interactive study, practice, and education.

8. Lab Capabilities:

The Initiative for Bicycle and Pedestrian Innovation is a cross-university and cross-disciplinary program aimed at advancing bicycle and pedestrian transportation as mainstays of Oregon's state, regional and local transportation systems. By mobilizing partnerships across various

sectors, interests and institutions, the Initiative strives to produce outcomes that are comprehensive and innovative in their approach. The Initiative's programs include research, education, and information-sharing across sectors, interests, and institutions that will enhance policies, programs, and projects focused on promoting bicycle and pedestrian transportation. This includes: research that is relevant to practitioners, policy-makers and communities; the translation of that research into a user-friendly and accessible language; and university and continuing education opportunities that foster a new generation of transportation professionals.

9. Lab Equipment:**10. Partners:**

Department of Planning, Public Policy and Management, University of Oregon
College of Engineering at Oregon State University
Bicycle Transportation Alliance
Bike Gallery
State of Oregon Bicycle and Pedestrian Program
City of Portland Office of Transportation
Alta Planning + Design

11. Examples of Current and Past Work:

IBPI's research agenda focuses on work that is relevant to and responds to the demands of practice, industry, and policy development. Research projects will focus on providing evidence that will support full integration of bicycle and pedestrian modes within transportation planning, design, engineering, programs and policy.

Current research includes Dr. Jennifer Dill's "Bike-GPS: Understanding and Measuring Bicycling Behavior" project. This research project is studying how often people bicycle, how far, long, and fast or slow they bicycle, and where they bicycle. The results of this study will be used to understand how various factors influence people's decisions on whether and where to bicycle, including where they live, the presence of bike lanes and paths, and other factors. The first phase of the project included a random phone survey of adults in the Portland, Oregon region. The second phase of the project involves using global positioning system (GPS) devices on people's bicycles to accurately record where and when they ride their bicycle.

12. Notes (other information you'd like included):

Website: <http://www.ibpi.usp.pdx.edu/>

Cold Region

Cold Room Facilities

2. Lab Type:

3. Center/Institute Name:

Alaska University Transportation Center (AUTC) & Arctic Engineering Research Center,
Institute of Northern Engineering

4. University Name:

University of Alaska

5. Center Contact Information:

Alaska University Transportation Center
Director, Billy G. Connor, P.E.
University of Alaska Fairbanks
P.O.Box 755900
Fairbanks, Alaska 99775-5900

907-474-5552

6. Lab Manager Contact Information:

Gary C. Tyndall, P.E.,
907-474-6548
fngct1@uaf.edu

7. Lab Mission/Purpose:

Applied, exploratory, and basic research on transportation safety, security, and innovation in cold regions

8. Lab Capabilities:

9. Lab Equipment:

10. Partners:

11. Examples of Current and Past Work:

12. Notes (other information you'd like included):

Permafrost Tunnel

2. Lab Type:

3. Center/Institute Name:

Alaska University Transportation Center (AUTC) & Arctic Engineering Research Center,
Institute of Northern Engineering

4. University Name:

University of Alaska

5. Center Contact Information:

Alaska University Transportation Center
Director, Billy G. Connor, P.E.
University of Alaska Fairbanks
P.O.Box 755900
Fairbanks, Alaska 99775-5900

907-474-5552

6. Lab Manager Contact Information:

Gary C. Tyndall, P.E.,
907-474-6548
fngct1@uaf.edu

7. Lab Mission/Purpose:

Applied, exploratory, and basic research on transportation safety, security, and innovation in cold regions

8. Lab Capabilities:

9. Lab Equipment:

10. Partners:

11. Examples of Current and Past Work:

12. Notes (other information you'd like included):

Economics

Environment

Environmental Labs

2. Lab Type:

3. Center/Institute Name:

Alaska University Transportation Center (AUTC) & Arctic Engineering Research Center,
Institute of Northern Engineering

4. University Name:

University of Alaska

5. Center Contact Information:

Alaska University Transportation Center
Director, Billy G. Connor, P.E.
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6. Lab Manager Contact Information:

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7. Lab Mission/Purpose:

Applied, exploratory, and basic research on transportation safety, security, and innovation in cold regions

8. Lab Capabilities:

9. Lab Equipment:

10. Partners:

11. Examples of Current and Past Work:

12. Notes (other information you'd like included):

Transportation Air Quality Lab

2. Lab Type:

An on-campus garage and two vehicles with equipment that is used for both real world and lab-based tailpipe emissions data collection.

3. Center/Institute Name:

UVM Transportation Research Center

4. University Name:

University of Vermont

5. Center Contact Information:

Lisa Aultman-Hall
Director, UVM Transportation Research Center
Professor, School of Engineering
University of Vermont
210 Colchester Avenue
Farrell Hall
Burlington, VT 05405

Phone: 802-656-1245

Fax: 802-656-9892

6. Lab Manager Contact Information:

Britt Holmen
Associate Professor
School of Engineering
Room 213B Votey Hall
33 Colchester Ave.
Burlington, VT 05405

Phone: 802-656-8323

Fax: 802-656-8446

7. Lab Mission/Purpose:

To collect unique, second-by-second vehicle emissions data. In addition to the regulated typical exhaust emissions, this includes a focus on ultra-fine and nano-particle number emissions and mobile source air toxics. Researchers seek to connect road type, road grade and individual driver behavior to emissions levels.

8. Lab Capabilities:

Real world and lab-based high temporal resolution tailpipe emissions data collection for gasoline, hybrid and diesel engines.

9. Lab Equipment:

1999 Toyota Sienna minivan
2007 Toyota Prius (convertor to plug-in)
Armfield CM12 Light-duty Diesel Engine Test-bed
SUN RAM 3000 Chassis Dynamometer
MKS 2030-HS High speed Fourier Transform Infrared Spectrometer (measures gas emissions)
Scanning mobility particle sizer
Electrical low-pressure impactor (measures real-time particle size)
12 in-vehicle Global Positioning Systems (Geostats and Trimble)
Crossbow 2 and 3 axis On-board accelerometers
3 Scantools (vehicle-specific) for on-board diagnostics (OBD)
Pitot tube assembly for real-time exhaust flow measurement
Rotating disk minidiluter
Digital video equipment

10. Partners:

College of Engineering and Mathematical Sciences
Vermont Agency of Natural Resources
Vermont Agency of Transportation
Resources Systems Group Inc.

11. Examples of Current and Past Work:

- Modeling particle number emissions as a function of gas emissions
- Comparing emissions from hybrid and non-hybrid vehicles
- Quantifying the emissions benefits of plug-in hybrid vehicles
- Modeling emissions as a function of second-by-second driver velocity and road curvature
- Spatial analysis of emissions using Geographic Information Systems (GIS)
- Analysis of on-board emissions testing of transit buses

12. Notes (other information you'd like included):

Members of this lab also work with social scientists in sociology and communications to study the public understanding of tailpipe emissions and to design effective communication strategies for disseminating these research findings to the public.

Freight

Freight & Logistics Lab

2. Lab Type:

Freight

3. Center/Institute Name:

Oregon Transportation Research and Education Consortium (OTREC)

4. University Name:

Department of Civil & Environmental Engineering
Portland State University

5. Center Contact Information:

Oregon Transportation Research and Education Consortium (OTREC)
Director, Dr. Robert Bertini
Portland State University
301A Engineering Building
PO Box 751
Portland, OR 97207

Phone: 503-725-4249

Fax: 503-725-5950

6. Lab Manager Contact Information:

Miguel Figliozzi
503-725-2836
figliozzi@pdx.edu

7. Lab Mission/Purpose:

The efficient movement of consumer products, industrial supplies and other staples of modern life is critical to the competitiveness and development of modern economies and societies. Freight and logistics play a critical role in meeting these demands.

The purpose of the Freight and Logistics lab is to strengthen the ability of public and private sponsors to move goods and provide services. The lab will focus on the design and development of practical solutions to enhance the efficiency and connections of all freight modes. Research and development include research technology, policy, and operational issues associated with freight and logistics issues.

Given the close linkages between freight and logistics with society and business/economic growth, the Freight and Logistics Lab will be also used to strengthen ties and promote teaching innovation with the School of Urban Studies and Planning and School of Business Administration at PSU.

8. Lab Capabilities:

The Freight and Logistics Lab will utilize computing software to simulate, study, and optimize large scale discrete optimization problems, especially in the area of optimization under uncertainty and applied to freight/logistic planning, distribution, and vehicle routing.

9. Lab Equipment:

The lab will include the latest equipment to collect and store freight movement and traffic data as well as socio-economic-land use data. An upcoming goal for the lab is the integration of real-life traffic and GPS data with the current models and applications in freight and logistics.

10. Partners:

The Freight and Logistics lab interacts with public and private stakeholders interested in research and development of solutions to freight/logistics problems in the Pacific Northwest region. Collaboration and joint research projects dealing with trucking and intermodal freight movements are under way with partners such as the Port of Portland, the City of Portland, and the Oregon Department of Transportation (ODOT).

11. Examples of Current and Past Work:

Current funded projects include the development and evaluation of algorithms for time-varying vehicle routing problems, the study of the impact of time windows and delivery sizes on the vehicle-miletraveled (VMT), and the creation of Oregon's freight data storage.

The Freight and Logistics Lab has a strong relationship with both the Intelligent Transportation Systems Lab and Traffic Signal Lab at PSU. A medium term goal of the lab is the integration of traffic/flow data with economic and land use information in order to improve freight and logistics demand and spatial models.

Additional areas of research include:

- Understanding and measuring the impacts of transport and supply chains disruptions on shippers' costs and operations.
- Development of new congestion measures that integrate socioeconomic and real-time traffic data information for freight movements in urban and intercity areas.
- Development of algorithms for vehicle routing and distribution in congested urban areas.
- The integration of real-time traffic data with GPS and GIS technology to ameliorate freight congestion.
- The impact of toll and lane pricing on freight demand and supply chains.

12. Notes (other information you'd like included):

Human Factors

Driving Simulator Laboratory

2. Lab Type:

Human Factors

3. Center/Institute Name:

Western Transportation Institute

4. University Name:

Montana State University

5. Center Contact Information:

Western Transportation Institute
College of Engineering -Montana State University
PO Box 174250
2310 University Way Blg. 2 Ste 2
Bozeman, MT 59717-4250

406-994-6114 (phone)

406-994-1697 (fax)

6. Lab Manager Contact Information:

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Suzanne Lassacher
(406) 994-6010
suzannel@coe.montana.edu

7. Lab Mission/Purpose:

The high-fidelity driving simulation facility provides an ideal setting to collect data on driver performance and behavior in a variety of customized scenarios

8. Lab Capabilities:

The DriveSafety DS500C Vection driving simulator features five visual channels providing approximately 140-degrees of perspective, rear-view and side mirrors, and speakers that provide a realistic sound environment. Using the HyperDrive software system, driving scenarios are custom-designed to meet the needs of specific research projects. Situated next to the simulator, the operator station allows the researcher to develop and control research scenarios and to collect a broad range of data on driver performance. A separate control room is used for participant reception, test monitoring, and graduate student research.

A new “eye-tracker” system will soon be added to the driving simulator to test participants’ reaction to visual stimuli. This new device will continuously track and record the drivers’ eye position to determine where they are looking in the vehicle and along the road. The driving

simulation facility also contains a large high-bay area designed to accommodate a planned full motion driving simulator that will allow test participants to experience the sensation of bumps, forward and backward acceleration, and other sensory related movements.

Carefully constructed research and laboratory facilities such as this one allow researchers and engineers to test and evaluate road designs and vehicle innovations before they are actually deployed. Potentially, millions of road construction dollars can be saved and many lives spared through a proactive approach to safety.

A new system to be installed in the laboratory in 2008 will consist of more capable driving simulator for research. While a handful of universities nationwide have a simulator of this capability, WTI will be the first to use it strictly for driver safety research. The simulator will have a 6 d.f. (roll, pitch, yaw, heave, surge, and sway) motion platform that provides acceleration cues that more realistically simulate the driving environment than the fixed vehicle cab on the current simulator. For example, the full-motion capability will allow drivers to experience the sensation of bumps, sway, forward and backward acceleration, and other sensory related movements.

9. Lab Equipment:

DriveSafety DS500C Vection driving simulator
HyperDrive software
A new “eye-tracker” system will soon be added

10. Partners:

FHWA
CALTRANS
MDT
State Transportation Departments
Equipment designers and manufacturer

11. Examples of Current and Past Work:

The simulator has been used on projects to:

- Compare the most effective type of animal warning signs
- Evaluate the effectiveness of safety innovations
- Test the use of cellular phones and their impact on driver behavior
- Examine highway improvements in the lab before construction

12. Notes (other information you’d like included):

Laboratories will be available for partnership development. Fees may apply. Contact us for more information.

HumanFIRST Program

2. Lab Type:

Human Factors

3. Center/Institute Name:

Intelligent Transportation Systems Institute

4. University Name:

University of Minnesota

5. Center Contact Information:

Intelligent Transportation Systems Institute
Director, Dr. Max Donath
University of Minnesota
Center for Transportation Studies
200 Transportation and Safety Building
511 Washington Ave., SW
Minneapolis, MN 55455

(612) 626-1077

6. Lab Manager Contact Information:

Michael Manser
612-625-0447
humanfirst@me.umn.edu

7. Lab Mission/Purpose:

The HumanFIRST (Human Factors Interdisciplinary Research in Simulation and Transportation) Program employs the tools and methods of psychology and human factors engineering to improve scientific understanding of driver performance and cognitive functions.

8. Lab Capabilities:

Combining a core staff of cognitive psychologists and a multidisciplinary network of researchers, HumanFIRST supports a wide variety of research activities aimed at producing safer, more efficient transportation systems.

Immersive driving simulation enables HumanFIRST to accurately capture data on driver performance and behavior under virtually any conditions. For real-world testing and validation, the program has access to a variety of test track and operational research settings.

Traffic scenarios of any type can be created, incorporating a variety of simulated road user types (including pedestrians and bicyclists with realistic motion). Simulation behavior can be altered

dynamically in response to traffic conditions and to driver responses such as eye-glance behavior and interaction with vehicle controls.

9. Lab Equipment:

The centerpiece of the HumanFIRST facility is the VESTR (Virtual Environment for Surface Transportation Research) driving simulator, an immersive virtual-reality environment for evaluating driver performance built around a 2002 Saturn SC2 full vehicle cab. The driver compartment features realistic controls and instrumentation including force feedback on the steering and emulated powerassist during braking. VESTR provides high-fidelity simulation for all sensory channels, producing a realistic sense of presence within the simulated environment.

Data gathering and monitoring devices support the design and evaluation of vehicle telematic systems and auditory/visual/haptic interfaces. VESTR is integrated with a 40-channel psychophysical recording unit that supports the measurement of driver brain activity using Evoked Response Potential paradigms. The simulator is also integrated with an eye tracking system capable of determining which objects in the dynamic simulation receive the driver's attention.

10. Partners:

Federal Cooperative Intersection Collision Avoidance System (CICAS) initiative
Local Road Research Board
Center for Transportation Studies, University Of Minnesota
Minnesota Department of Transportation
National Highway Traffic Safety Association
United States Department of Transportation

11. Examples of Current and Past Work:

HumanFirst provides human factors research support for a wide variety of ITS research projects, working with other programs and laboratories within the ITS Institutes as well as with outside research partners. Some of these studies are listed below.

- Rural Intersection Decision Support/Cooperative Intersection Collision Avoidance Systems (CICAS)
- Effects on Driver Performance of Advanced Traveler Information Systems and 511
- Information Retrieval
- Motorcycle Riding Impairment at Different BAC Levels
- Generational Perspectives on Teen and Older Drivers on Traffic
- Safety in Rural and Urban Communities
- The use of Video Feedback in Urban Teen Driving

12. Notes (other information you'd like included):

Infrastructure, Materials and Maintenance

Structural and Materials Lab

2. Lab Type:

Structural, Materials, and Soil Labs

3. Center/Institute Name:

Nick J. Rahall II Appalachian Transportation Institute

4. University Name:

Marshall University

5. Center Contact Information:

Dr. Wael Zatar

6. Lab Manager Contact Information:

Phone: (304) 696-6043

E-mail: zatar@marshall.edu

7. Lab Mission/Purpose:

The lab provides a state-of-the-art testing facility for education and research of modern/.advanced civil engineering materials for application in transportation infrastructures.

8. Lab Capabilities:

Testing capabilities are available to perform tensile and compression testing of metals, sieve analysis of aggregates, specific gravity and absorption of coarse and fine materials, properties of aggregates and cementitious materials, properties of fresh concrete, compression and flexural testing of hardened and aged concrete, testing of soil samples, and non-destructive testing and evaluation of hardened concrete.

9. Lab Equipment:

- 60 kip Capacity Tinius Olsen Super L Universal Testing Machine with Digital and Handheld Controllers
- 300 kip Capacity Forney Compression Testing Machine with Digital Load Readout
- Gilson 8 Inch and 12 Inch Sieve Shakers
- Model TS-1 Gilson Testing Aggregate Screen Coarse Aggregate Shaker
- Gilson Combination Portable Beam Tester
- Ohaus Sensitive Balances –Multiple Capacities
- Portable Concrete Mixer and Curing Tank
- Specific Gravity and Absorption Testing Units
- Portable Concrete Slump Test Sets
- Air Content Testers
- Direct Shear Test Units
- Unconfined Testing Unit
- Soil Hydrometer
- Tri-Axial Testers

- Consolidation Unit
- Large Capacity Electric Ovens
- Non-Destructive Concrete Testing Equipment

10. Partners:

College of Information Technology and Engineering, Marshall University
West Virginia Department of Transportation
Federal Highway Administration

11. Examples of Current and Past Work:

Self-Consolidating Concrete
High-Strength High Performance Concrete
Estimating of Remaining Service Life of Corrosion-Deteriorated Highway Bridges

12. Notes (other information you'd like included):

Facility Use: The labs are available for partnership development. Testing is available on a contractual basis.

Corrosion, Electrochemistry and Analysis Laboratory

2. Lab Type:

Infrastructure, Materials, and Maintenance

3. Center/Institute Name:

Western Transportation Institute

4. University Name:

Montana State University

5. Center Contact Information:

Western Transportation Institute
College of Engineering -Montana State University
PO Box 174250
2310 University Way Bldg. 2 Ste 2
Bozeman, MT 59717-4250

406-994-6114 (phone)

406-994-1697 (fax)

6. Lab Manager Contact Information:

Xianming Shi
(406) 994-6486
Xianming_s@coe.montana.edu

7. Lab Mission/Purpose:

CEAL aims to understand and mitigate deicer/anti-icer effects on civil engineering materials and the environment. The lab creates an environment to foster the growth of team members, to encourage innovative thinking, and to promote problem-driven, inter-disciplinary partnerships

8. Lab Capabilities:

A multi-disciplinary team operates the lab and features a diverse combination of expertise including corrosion science and engineering, electrochemistry, polymer chemistry, environmental science, and civil engineering.

This laboratory has been and will continue to be used on projects to: 1) Conduct accelerated chloride ingress tests, gravimetric and electrochemical corrosion tests, and electrochemical engineering experiments; 2) Study environmentally friendly concretes and cement-based composites; 3) Analyze the behavior and effectiveness of corrosion mitigation measures for highway bridges; 4) Research and develop polymers to mitigate the winter effects on concretes and asphalts.

Research Priorities:

- Deicer impact on concretes, asphalts and plastics
- Deicer impact on the environment
- Accelerated test protocols
- Nanoscience and nanotechnology applied to corrosion and materials integrity in transportation
- Use of recycled materials for civil engineering

Behavior and effectiveness of corrosion mitigation measures for highway systems in cold regions, e.g., electrochemical rehabilitation, coatings, penetrating sealers, and corrosion inhibitors

9. Lab Equipment:

The laboratory is equipped with an environmental chamber, ventilation hoods, a corrosion testing machine, potentiostats, advanced electrochemical systems, and modeling software applications.

10. Partners:

U.S. DOT Research & Innovative Technology Administration
State Departments of Transportation (CA, WA, CO, etc.)
Pacific Northwest Snowfighters Association (BC, WA, ID, MT, OR, CO)
Civil Engineering Department, MSU
Image & Chemical Analysis Laboratory, MSU
Airport Cooperative Research Program (ACRP)
NCHRP IDEA
Transportation Research Board, National Academies
School of Materials Sci. & Eng., Tianjin Univ., China
CC Technologies Laboratories, Inc.
Southwest Research Institute

11. Examples of Current and Past Work:

Corrosion Inhibition Mechanisms at the Steel/Concrete Interface
Effect of Chloride-Based Deicers On Reinforced Concrete Structures: Phase I
Electrochemical Rehabilitation of Salt-Contaminated Concrete: A Laboratory Study

12. Notes (other information you'd like included):

Laboratories will be available for partnership development. Fees may apply. Contact us for more information.

TRANSCEND

2. Lab Type:

Cold Regions Field Laboratory

3. Center/Institute Name:

Western Transportation Institute

4. University Name:

Montana State University

5. Center Contact Information:

Western Transportation Institute
College of Engineering -Montana State University
PO Box 174250
2310 University Way Blg. 2 Ste 2
Bozeman, MT 59717-4250

406-994-6114 (phone)

406-994-1697 (fax)

6. Lab Manager Contact Information:

Eli Cuelho
(406) 994-7886
elic@coe.montana.edu

7. Lab Mission/Purpose:

The vision of this laboratory is to improve transportation maintenance, operations and safety with cold-regions research through the collaboration of academia, industry and government.

8. Lab Capabilities:

The multidimensional research capability that the site offers can greatly enhance researchers' understanding of the many interrelated issues associated with the transportation environment. The site offers a safe environment to test innovative products without creating a nuisance or endangering the traveling public.

This laboratory will be used on projects to:

- Conduct multidimensional rural transportation research in a cold environment
- Test products and their effects on roadway infrastructure, vehicles, and the surrounding environment
- Evaluate de-icing and anti-icing protocols in the field
- Demonstrate and test technologies aimed to reduce animal-vehicle crashes
- Study new and improved materials used to build and maintain infrastructure
- Study the effects of winter driver training for commercial vehicle and passenger car operators

9. Lab Equipment:

The Lewistown Cold Region Rural Transportation Research Testbed will be constructed along portions of old runways at the Lewistown Airport in central Montana. The site will include a backbone of communications, power, and data networking capabilities, all of which are necessary to collect, store, and disseminate data during research.

10. Partners:

Federal Highway Administration (FHWA)
Montana Department of Transportation
Idaho Transportation Department
Oregon Department of Transportation
Washington State Department of Transportation
Fergus County Port Authority
Office of Public Instruction
Pacific Northwest Snowfighters Association

11. Examples of Current and Past Work:

Establishing Best Practices of Removing Snow and Ice from California Roadways
Effects of Defensive Vehicle Handling Training on Novice Driver Safety
Inhibitor Longevity and Deicer Performance Study
Roadside Animal Detection Systems (RADS) Test-Bed

12. Notes (other information you'd like included):

Laboratories will be available for partnership development. Fees may apply. Contact us for more information.

Geosynthetic Materials Laboratory

2. Lab Type:

Infrastructure, Materials, and Maintenance

3. Center/Institute Name:

Western Transportation Institute

4. University Name:

Montana State University

5. Center Contact Information:

Western Transportation Institute
College of Engineering - Montana State University
PO Box 174250
2310 University Way Blg. 2 Ste 2
Bozeman, MT 59717-4250

406-994-6114 (phone)

406-994-1697 (fax)

6. Lab Manager Contact Information:

Eli Cuelho
(406) 994-7886
elic@coe.montana.edu

Steve Perkins
(406) 994-6119
stevep@ce.montana.edu

7. Lab Mission/Purpose:

The aim of this lab is to test the properties and quantify the benefits of geosynthetic materials in relationship to the surrounding pavement structure.

8. Lab Capabilities:

The primary goal of this lab is to meet a growing need for geosynthetic material tests to define mechanical properties pertinent to working load conditions within pavement structures. These new design and analysis solutions are essential for the growth of safe and reliable use of economical reinforcement products for construction and repair of our transportation infrastructure. The research performed in this laboratory will help fulfill this critical need by providing testing equipment and associated test protocols that can be used to determine material properties needed in pavement design and analysis.

The geosynthetic lab is in the process of acquiring a servo-hydraulic system to enhance its existing pullout device and a servo-hydraulic uniaxial tension device. This new equipment will

make it possible to conduct research and evaluate the benefit of geosynthetics in new and rehabilitated highway structures.

9. Lab Equipment:

The geosynthetic lab is in the process of acquiring a servo-hydraulic system to enhance its existing pullout device and a servo-hydraulic uniaxial tension device.

10. Partners:

American Society of Testing and Materials (ASTM)
Ryan Berg and Associates (Consultant)
Barry Christopher (Consultant)
Departments of Transportation (DOTs)
Drexel University
Federal Highway Administration (FHWA)
Mirafi Construction Products
Naue Fasertechnik
Norwegian University of Science and Technology
Tensar Earth Technologies, Inc.
University of Illinois
University of Maryland

11. Examples of Current and Past Work:

This laboratory will be used on projects to:

- Develop test methods to determine material properties for mechanistic-empirical reinforced pavement design
- Investigate the properties of new and unique geosynthetic products
- Support projects involving the modeling and design of reinforced pavements

12. Notes (other information you'd like included):

Laboratories will be available for partnership development. Fees may apply. Contact us for more information.

Asphalt Binders Laboratory

2. Lab Type:

Infrastructure, Materials, and Maintenance

3. Center/Institute Name:

Oklahoma Transportation Center (OTC)

4. University Name:

University of Oklahoma

5. Center Contact Information:

Oklahoma Transportation Center (OTC)
Director, David Alan Tree
Oklahoma State University
School of Civil & Environmental Engineering
201 Advanced Technology Research Center
Stillwater, OK 74078

Phone: (405) 744-5957

Fax: (405) 744-3189

6. Lab Manager Contact Information:

Musharraf Zaman
(405) 325-2626
zaman@ou.edu

7. Lab Mission/Purpose:

Measure rheological properties of asphalt binders in accordance with the Superpave methodology. Advanced characterization of binders and mastic using mechanistic approaches.

8. Lab Capabilities:

Facilities are available for a wide range of material characterization tests: classification of asphalt binders based on the Superpave methodology, fundamental surface science studies of HMA materials (e.g., surface free energy measurements of binders and aggregates) and nano-scale measurement of binder surface properties.

9. Lab Equipment:

The available facilities include a Rolling Thin Film Oven (RTFO), a Pressure Aging Vessel (PAV), a Dynamic Shear Rheometer (DSR) and a Rotational Viscometer (RV). A Bending Beam Rheometer (BBR) is also available. Vapor sorption method using a Universal Sorption Device (USD) can be used for surface free energy measurements of aggregates. The USD can also be used for the surface free energy and moisture diffusion coefficient measurements of asphalt binders. The USD available in this laboratory is a SGA-100 Water Sorption Analyzer. The water vapor as well as organic vapors can be used in this equipment. A high temperature option is also

available (5°C– 60°C). The relative humidity range is between 2% and 98%. Other equipment available includes a gravity oven, a force oven, a glass cleaning oven, a regular scale and an analytical scale. Most recently, an aggregate imaging system (AIMS) and a dynamic mechanical analyzer (DMA) have been procured.

10. Partners:

Oklahoma Department of Transportation
Oklahoma Asphalt Pavement Association
Haskell-Lemon, Inc., Oklahoma City, Oklahoma
Engineering Services and Testing, Inc., Norman, Oklahoma

11. Examples of Current and Past Work:

- Effect of Anti-Stripping Additives on Performance Graded Binders in Oklahoma, funded by Oklahoma Transportation Center
- Investigate the Use of Warm Mix Asphalt as a Viable Paving Material in the United States, Oklahoma Transportation through Federal Highway Administration, Turner-Fairbank Research Center
- Evaluation of Surface Free Energy Characteristics of Aggregates and Binders in Hot Mix Asphalt, funded by Oklahoma Transportation Center

12. Notes (other information you'd like included):

The facilities available in this laboratory can be used by others including those affiliated with a University Transportation Center. For details on the financial arrangement and time schedule, please contact Musharraf Zaman.

Donald G. Fears Structural Engineering Laboratory

2. Lab Type:

Infrastructure, Materials, and Maintenance

3. Center/Institute Name:

Oklahoma Transportation Center (OTC)

4. University Name:

University of Oklahoma

5. Center Contact Information:

Oklahoma Transportation Center (OTC)
Director, David Alan Tree
Oklahoma State University
School of Civil & Environmental Engineering
201 Advanced Technology Research Center
Stillwater, OK 74078

Phone: (405) 744-5957

Fax: (405) 744-3189

6. Lab Manager Contact Information:

Dr. Kyran Mish, Lab Director
(405) 325-1010
kdmish@ou.edu

7. Lab Mission/Purpose:

The Donald G. Fears Structural Engineering Laboratory has two primary purposes: Education and Research. The Education foci for Fears Lab range from undergraduate course-related labs and internships to doctoral research programs. The Research foci for Fears Lab range from: 1) large-scale testing and computational predictive modeling of structural systems, such as full-scale bridge beams and decks, 2) testing and monitoring bridges in the field at remote sites, and 3) the testing of structural engineering materials such as concrete, steel and wood.

8. Lab Capabilities:

The Donald G. Fears Structural Engineering Laboratory consists of 12,600 sq feet of high bay laboratory space and 3,500 sq feet of office space. The Laboratory grounds include 0.7 acres of exterior storage.

The office space houses the ODOT bridge squad internship program; this program includes four full time ODOT personnel including a senior engineering manager, two registered engineers and a drafter. The office space also houses OU structural engineering faculty and staff offices, a computational structural systems predictive modeling lab, and a conference room with high resolution, high fidelity presentation equipment and videoconferencing support.

A 1,200 foot room within the high bay laboratory is dedicated for the use of the ASCE student chapter for their competition teams. These include a nationally ranked concrete canoe group and steel bridge team.

9. Lab Equipment:

The high bay laboratory space includes a 2,400 sq ft strong floor that is four feet thick. This strong floor provides an adaptable foundation for large-scale structural testing. A 5-ton bridge crane services the strong floor building and three twenty-foot-long, 3-ton jib cranes are available in the expanded lab area. Fears lab can achieve an axial load of 6,000,000 lbs., a bending load of 8,000,000 lb-ft and internal pressures of 6,000 psil. The laboratory also includes a 4 ft by 6 ft, 20 Hz shake table and data acquisition equipment that can collect data at 100,000 Hz simultaneously from all channels. Various hydraulic cylinders, pumps and data acquisition systems are available to perform static, pseudo dynamic and dynamic loading of structural systems. Approximately 1,600 sq ft of the high bay is dedicated to concrete materials research. This area includes an environmental chamber, a 1 cu yd mixer, a 400 k concrete testing machine and the following testing equipment: RCIP, corrosion cells, unrestrained shrinkage, restrained ring tests, shrinkage from time zero, impulse-echo and GPR imaging.

10. Partners:

Federal Highway Administration
 Oklahoma Department of Transportation
 Dynamic Structure Sensing & Control Center (DySSC) - Vehicle Vibration Test Lab
 National Science Foundation

11. Examples of Current and Past Work:

- Active on site Bridge monitoring of dynamic and static strains & accelerations
- Testing of a composite steel and polymer sandwich plate deck system for bridges, on site and in lab
- Development of crack free bridge decks – using shrinkage control and Shilstone gradation theory
- Development of Very Early Strength portland cement concrete for patching and repair of bridge decks
- Development of overlays for bridge decks and roadways using latex modified and CSA cements
- Testing of fiber reinforced polymer repairs to pre-stressed concrete AASHTO bridge beam girders
- Developed the state Specification for bridge decks and overlays for ODOT
- Developing a State wide program for Truck Weight enforcement for ODOT
- Development of high-fidelity finite element analyses for blast and other bridge dynamic loads
- Develop wireless sensor technology for monitoring bridges and roadways
- Developed a method for improving the performance of Fly Ash in portland cement concrete
- Investigate corrosion in pre-stressed concrete AASHTO bridge beam girders

12. Notes (other information you'd like included):

Laboratory facilities are available to collaborators under standard university agreements.

Pavement Materials Research Laboratories

2. Lab Type:

Infrastructure, Materials, and Maintenance

3. Center/Institute Name:

Oklahoma Transportation Center (OTC)

4. University Name:

Oklahoma State University

5. Center Contact Information:

Oklahoma Transportation Center (OTC)
Director, David Alan Tree
Oklahoma State University
School of Civil & Environmental Engineering
201 Advanced Technology Research Center
Stillwater, OK 74078

Phone: (405) 744-5957

Fax: (405) 744-3189

6. Lab Manager Contact Information:

Rifat Bulut
(405) 744 7436
rifat.bulut@okstate.edu

Stephen A. Cross, PE
(405) 744-7200
steve.cross@okstate.edu

7. Lab Mission/Purpose:

The pavement materials research laboratories consist of three labs; the mixture design lab, the mixture performance lab and the surface energy lab. The objectives of these laboratories are to characterize materials, perform performance testing and investigate surface energy properties.

8. Lab Capabilities:

The Cummins Asphalt Laboratories houses facilities for aggregate testing, Superpave mix designs and cold mix (emulsion) mix designs. Mixture performance testing includes a servo-hydraulic testing machine for resilient modulus and dynamic modulus testing (AASHTO TP 62), resilient modulus of soil and aggregates, indirect tension creep compliance (AASHTO T 322), and the simple performance testing recommended in NCHRP 9-29 of static creep (flow time) and triaxial repeated load permanent deformation (flow number). Rutting performance can be measured using the Hamburg device. Liquid asphalt and emulsified asphalt testing capabilities

include ductility testing; kinematic, absolute and Saybolt viscosity; ring and ball softening point; penetration; distillation and recovery; specific gravity; and flash and fire points.

The newly constructed surface energy laboratory contains a new, robust and fully automated drop shape analysis device for contact angle measurements on asphalt binder and aggregate materials. The device makes use of pendant or sessile drop analyses methods to calculate surface energies on pavement materials. The lab also contains a temperature controlled testing setup for measuring diffusion coefficient in asphalt concrete materials. The setup involves a computer controlled 40 channel datalogger equipped with thermocouple psychrometers and a water bath.

9. Lab Equipment:

(See Lab Capabilities, above)

10. Partners:

Oklahoma Department of Transportation
Oklahoma Asphalt Pavement Association
Kansas Asphalt Pavement Association
New York State Department of Transportation
Central Federal Lands – Highway Division, FHWA
Chesner Engineering
Brown & Brown Contractors, Inc.
SemMaterials
Terracon Consultants

11. Examples of Current and Past Work:

The laboratory equipment is used for:

Measuring contact angles and thus surface energies of pavement materials for moisture damage studies of these materials.

Measuring diffusion coefficient and rate of moisture diffusion in asphalt concrete materials in relation to moisture damage study of these materials.

Other studies:

Evaluation of dynamic modulus of Oklahoma HMA mixtures

Evaluation of dynamic modulus of cold in-place recycled mixtures

Evaluation of aggregate specific gravity test methods

12. Notes (other information you'd like included):

Ray Broce Asphalt Laboratory

2. Lab Type:

Infrastructure, Materials, and Maintenance

3. Center/Institute Name:

Oklahoma Transportation Center (OTC)

4. University Name:

University of Oklahoma

5. Center Contact Information:

Oklahoma Transportation Center (OTC)
Director, David Alan Tree
Oklahoma State University
School of Civil & Environmental Engineering
201 Advanced Technology Research Center
Stillwater, OK 74078

Phone: (405) 744-5957

Fax: (405) 744-3189

6. Lab Manager Contact Information:

Musharraf Zaman
(405) 325-2626
zaman@ou.edu

7. Lab Mission/Purpose:

Mechanical characterization of engineering materials such as aggregate, asphalt mixes and soils under static and cyclic loading. Performance related tests such as rut, fatigue and flow can be conducted under simulated field conditions.

8. Lab Capabilities:

Ray Broce Asphalt Laboratory houses facilities for aggregate testing, and asphalt mix design and mix performance testing. Moreover, facilities are available for rut testing and fatigue testing, and resilient modulus and dynamic modulus testing.

9. Lab Equipment:

Standard aggregate testing facilities include Gilson shaker with full-height sieves, Los Angeles Abrasion machine, fine aggregate specific gravity, coarse aggregate specific gravity, aggregate durability and insoluble residue apparatus. Also, facilities are available for consensus aggregate tests namely, fine aggregate angularity, coarse aggregate angularity, sand equivalent, and flat and elongated particles. Mixing, compaction and density measurement facilities include large size force and gravity ovens, ignition ovens, weighing scales, Superpave gyratory compactor, Texas gyratory compactor, asphalt vibratory compactor, and bulk specific gravity and Corelock™

apparatus. A humidity controlled room and a large freeze-thaw cabinet with humidity and temperature controller are also available at OU Broce Laboratory.

10. Partners:

Oklahoma Department of Transportation
Oklahoma Asphalt Pavement Association
Haskell-Lemon, Inc., Oklahoma City, Oklahoma
Engineering Services and Testing, Inc., Norman, Oklahoma

11. Examples of Current and Past Work:

- Effect of Suction and Moisture on Subgrade Soils in Oklahoma, funded by Oklahoma Department of Transportation, in collaboration with Federal Highway Administration
- Permeability and Resilient Modulus of Different Aggregate Bases Commonly Used in Oklahoma, funded by Oklahoma Transportation Center
- Field Performance Monitoring and Modeling of Instrumented Pavement on I-35 in McLain County, funded by Oklahoma Department of Transportation in cooperation with Federal Highway Administration
- Maximizing the Use of Raw Chat in Paving at the Tar Creek Superfund Site – Test Road, funded by U.S. Corps of Engineers, through Oklahoma Department of Environmental Quality

12. Notes (other information you'd like included):

The facilities available in this laboratory can be used by others including those affiliated with a University Transportation Center. For details on the financial arrangement and time schedule, please contact Musharraf Zaman.

Thin Film Laboratory

2. Lab Type:

Infrastructure, Materials, and Maintenance

3. Center/Institute Name:

Oklahoma Transportation Center (OTC)

4. University Name:

University of Oklahoma

5. Center Contact Information:

Oklahoma Transportation Center (OTC)
Director, David Alan Tree
Oklahoma State University
School of Civil & Environmental Engineering
201 Advanced Technology Research Center
Stillwater, OK 74078

Phone: (405) 744-5957

Fax: (405) 744-3189

6. Lab Manager Contact Information:

Edgar O'Rear
(405) 325-4379
eorear@ou.edu

7. Lab Mission/Purpose:

Use of the Thin Film Laboratory centers on application of admicellar polymerization to modify solid substrates. In addition, the laboratory has facilities to help characterize the original and modified material.

8. Lab Capabilities:

A wet chemical technique involving the utilization of aqueous media containing surfactant, monomer and initiator can be employed to deposit thin films on to a variety of materials. Films on the order of 10-100 nm thickness have been applied to a number of different substrates with wide variability in chemical and physical nature. The materials can be organic (e.g. cotton fabrics) and inorganic(e.g. silica). They can be flat (e.g. aluminum metal alloys) and porous (aluminum oxide powder).

9. Lab Equipment:

Basic wet laboratory equipment including analytical balances, incubation shaker baths, and drying oven are in the laboratory to support the synthesis. Analytical equipment is located in the Laboratory or nearby which enable the determination of surfactant adsorption isotherms, partitioning of monomeric species into admicelles, and extent of polymerization. These include

UV-Vis spectrophotometer, FTIR and HPLC. In addition, the Laboratory has facilities to characterize the original and modified substrates. The laboratory contains a dynamic contact angle unit (Wilhelmy plate) which can be used for the measurement of surface tension, surfactant critical micelle concentration, and advancing/receding contact angles.

10. Partners:

Oklahoma Transportation Center
Oklahoma Department of Transportation
Federal Highway Administration

11. Examples of Current and Past Work:

Investigate the Use of Warm Mix Asphalt as a Viable Paving Material in the United States, Oklahoma Transportation through Federal Highway Administration, Turner-Fairbank Research Center

Evaluation of Surface Free Energy Characteristics of Aggregates and Binders in Hot Mix Asphalt, funded by Oklahoma Transportation Center

12. Notes (other information you'd like included):

Unsaturated Soil Mechanics

2. Lab Type:

Infrastructure, Materials, and Maintenance

3. Center/Institute Name:

Oklahoma Transportation Center (OTC)

4. University Name:

University of Oklahoma

5. Center Contact Information:

Oklahoma Transportation Center (OTC)
Director, David Alan Tree
Oklahoma State University
School of Civil & Environmental Engineering
201 Advanced Technology Research Center
Stillwater, OK 74078

Phone: (405) 744-5957

Fax: (405) 744-3189

6. Lab Manager Contact Information:

Amy Cerato
(405) 325-5625
acerato@ou.edu

7. Lab Mission/Purpose:

The Unsaturated Soil Mechanics laboratory at the University of Oklahoma is used to perform high quality research. Faculty, graduate students, post-doctoral researchers and undergraduate research assistants utilize these state-of-the-art facilities to work on interesting geotechnical, geoenvironmental and geomechanics issues.

8. Lab Capabilities:

The laboratory includes equipment to measure consistency, permeability, gradation and compaction. Strength testing equipment consists of unconfined compression, motorized direct shear and one cylindrical triaxial device, and the lab contains numerous consolidometers for determining compressibility. The lab also houses a model to simulate seepage through earth dams.

The laboratory contains equipment for determining soil-water characteristic curves and permeability of unsaturated soils. It also houses an HP Vector Impedance meter for measuring electrical properties of soil.

Most recently, this laboratory has seen the addition of several clay mineralogy index testing devices, such as the Chittick Apparatus to measure carbonate content, a BET Monosorb machine to measure external surface area and an EGME total surface area setup, along with equipment to measure shrinkage limit and linear shrinkage.

9. Lab Equipment:

(See Lab Capabilities, above)

10. Partners:

OCAST, OTC, ODOT, NSF, DOE, DOD

11. Examples of Current and Past Work:

- Causes and remedies of bridge approach settlement
- Laboratory testing and constitutive modeling of cohesionless soil with emphasis on modeling of dilatant behavior
- Resilient modulus of base and subgrade material
- Soil liquefaction including soil-structure interaction effects
- Pore collapse in unconsolidated and poorly consolidated reservoir rocks
- Use of fly ash in soil stabilization
- Soil stabilization with cement kiln dust
- Soft railroad subgrade soil behavior under repeated load applications
- Electrical properties of soil in the radio frequency domain
- Behavior of piles in overconsolidated and unsaturated clay
- Use of in-situ tests for foundation design
- Centrifuge and finite element modeling of dynamic behavior of rock dike retaining structures
- Centrifuge modeling of pollution transport processes through soil
- Centrifuge modeling of unsaturated soil embankments
- Constitutive and numerical modeling of unsaturated soils under static and dynamic loading
- Prediction of strength properties of partially saturated soils using cone penetration tests
- Static and seismic analysis and design of reinforced soil structures (e.g. MSE walls and embankments) and foundations
- Airport pavement management
- Use of helical anchors for anchoring small wind turbines in high plasticity clay subject to a fluctuating water table
- Surface area and fine-grained soil behavior
- Carbonate content of fine-grained soils (equipment and procedure)

12. Notes (other information you'd like included):

InfraStructure Testing and Applied Research (iSTAR) Lab

2. Lab Type:

Infrastructure, Materials, and Maintenance

3. Center/Institute Name:

Oregon Transportation Research and Education Consortium (OTREC)

4. University Name:

Department of Civil & Environmental Engineering
Portland State University

5. Center Contact Information:

Oregon Transportation Research and Education Consortium (OTREC)
Director, Dr. Robert Bertini
Portland State University
301A Engineering Building
PO Box 751
Portland, OR 97207
Phone: 503-725-4249
Fax: 503-725-5950

6. Lab Manager Contact Information:

Peter Dusicka
(503) 725-9558
dusicka@pdx.edu

7. Lab Mission/Purpose:

The *iSTAR* Laboratory is located on the campus of Portland State University. The mission of the *iSTAR* lab is to enhance durability and improve functionality of our infrastructure by conducting applied research and disseminating the gained knowledge to all sectors of the engineering community as well as the general public. Research and testing conducted at the laboratory is in the area of earthquake engineering, application of innovative materials and numerical simulation in an effort to meet our mission. Large scale experiments are used to study the structural elements, assemblies or non-structural equipment using our shake table and hydraulic actuators. Detailed numerical models and analyses are also conducted.

Outreach and technology transfer are also an important function of the laboratory through tours that highlight the laboratory's efforts and seminars for the practicing industry.

8. Lab Capabilities:

Facilities include a strong floor laboratory equipped with dynamic hydraulic actuators and the largest shake table in the Pacific Northwest. Physical tests and numerical modeling are combined to thoroughly investigate a wide range of issues including:

- Seismic testing and earthquake simulation to failure or to specific test protocol;

- Evaluation of fatigue and dynamic impact load effects;
- Non-linear numerical modeling of structural systems and critical components.

The laboratory is 3600 sq. ft space and includes 1600 sq. ft of strong floor with 100,000 lb tie downs at approximately 4-foot centers, a machine shop and meeting area. The laboratory is serviced by a 25-ton overhead crane and has truck access for material and specimen delivery.

9. Lab Equipment:

Shake Tables for Seismic and Impact Load Simulation

Horizontal Shake Table:

- platform of 10 ft x10 ft with tie downs
- payload capacity of 20,000 lb
- max. acceleration of 3g

Vertical Shake Table:

- platform of 2 ft x 2 ft with tie downs
- payload capacity of 5,000 lb
- max. acceleration of 5g

Hydraulic Actuators and Load Frames

Cyclic and Fatigue Loading:

- Tension-compression actuator capable of dynamic loads up to 220,000 lb and 20" stroke
- Tension-compression actuator of 110,000 lb cyclic load capacity and 6" stroke
- Self reacting load frame with hydraulic grips and capacity of 110,000 lb and 6" stroke

Monotonic Loading:

- Custom load frames with hydraulic jack for up to 700,000 lb capacity and 10" stroke.
- Numerous 120,000 lb capacity hydraulic jacks ranging from 3" to 6" stroke

Data Acquisition & Instrumentation

- portable 24 channels for field and additional 32 channels of in-laboratory high sample rate data acquisition
- instrumentation includes accelerometers, displacement transducers, strain gauges
- digital video of tests also available

10. Partners:

Bonneville Power Association
Oregon Department of Transportation
Multnomah County
Gunderson
Underwriters Laboratories
Masonry and Ceramic Institute of Oregon

11. Examples of Current and Past Work:

Evaluation of Glass FRP Bridge Deck for Broadway Bridge Renovation

Vibrations Measurements on I-5 Columbia River Crossing
Shake Table Qualification of High Voltage Insulators
Seismic Evaluation of Telecommunication Equipment
Double Action Ringfeders
Strength Test of Composite Panels for Rail Cars

12. Notes (other information you'd like included):

Kiewit Center for Infrastructure and Transportation

2. Lab Type:

Infrastructure, Materials, and Maintenance

3. Center/Institute Name:

Oregon Transportation Research and Education Consortium (OTREC)

4. University Name:

School of Civil, Construction and Environmental Engineering
Oregon State University

5. Center Contact Information:

Oregon Transportation Research and Education Consortium (OTREC)
Director, Dr. Robert Bertini
Portland State University
301A Engineering Building
PO Box 751
Portland, OR 97207

Phone: 503-725-4249

Fax: 503-725-5950

6. Lab Manager Contact Information:

Christopher Higgins
(541) 737-8869
chris.higgins@oregonstate.edu

7. Lab Mission/Purpose:

The Kiewit Center for Infrastructure and Transportation serves as the umbrella organization for almost all research within the School of Civil and Construction Engineering at OSU and coordinates multi- and inter-disciplinary transportation research projects across campus. In addition to conducting funded and unfunded research, the Center provides a variety of outreach activities to support practicing professionals throughout the Pacific Northwest.

8. Lab Capabilities:

Facilities

- Geotechnical Testing Laboratory
 - Testing in support of both practice-oriented investigations and state-of-the-art research
 - Advanced geo-mechanical modeling of soil-structure interaction
 - Full-scale, well-instrumented testing of field geo-systems
- Highway Materials Laboratory
 - Investigation of innovative highway construction materials
 - Evaluation of recycled materials for use in construction

- O.H. Hinsdale Wave Research Laboratory
 - Physical modeling of tsunami and ocean wave-structure interaction studies
 - Analysis of off-shore structures
- Large-Scale Structural Testing Laboratory
 - Structural evaluation of full-size beams, columns, and assemblies
 - Development of earthquake resistant and energy dissipating systems
- Combined environmental and structural testing of full-scale structural members including freeze-thaw, controlled temperature, and humidity

Research Centers

- National Center for Accessible Transportation
 - Investigation of advanced technologies for accessible transportation systems

9. Lab Equipment:

10. Partners:

Oregon Department of Transportation

11. Examples of Current and Past Work:

- Health Monitoring and Advanced Technologies Backbone for Bridge Evaluation and Maintenance Applications
- Wave and Storm Surge Forces on Bridges
- Direct Reliability Assessment of Reinforced Concrete Bridges
- Environmental Durability of CFRP for Shear Strengthening
- Pricing and Capacity Competition on Large Mixed-Ownership Networks
- Investigating Premature Pavement Failure Due to Moisture
- Mechanistic Pavement Design Input Parameters
- Bridge Deck Design Criteria & Testing
- Acoustic Emission Testing and Modeling for Applications to Concrete
- Enhanced Software Development for the Finite Element Analysis and Reliability-Based Assessment of Highway Bridges
- Seismic Performance of Stair Assemblies
- Methodologies for Establishing Advisory Curve Speeds on Oregon Highways
- Evaluate Safety Investment Program
- Oregon Interstate 5 Free Corridor Project
- Socio-Economic Effects of Fees

12. Notes (other information you'd like included):

Web site: <http://kiewit.oregonstate.edu/>

Structures Laboratory

2. Lab Type:

3. Center/Institute Name:

Alaska University Transportation Center (AUTC) & Arctic Engineering Research Center,
Institute of Northern Engineering

4. University Name:

University of Alaska

5. Center Contact Information:

Alaska University Transportation Center
Director, Billy G. Connor, P.E.
University of Alaska Fairbanks
P.O.Box 755900
Fairbanks, Alaska 99775-5900

907-474-5552

6. Lab Manager Contact Information:

Gary C. Tyndall, P.E.,
907-474-6548
fngct1@uaf.edu

7. Lab Mission/Purpose:

Applied, exploratory, and basic research on transportation safety, security, and innovation in cold regions

8. Lab Capabilities:

9. Lab Equipment:

10. Partners:

11. Examples of Current and Past Work:

12. Notes (other information you'd like included):

Geotechnical Laboratory

2. Lab Type:

3. Center/Institute Name:

Alaska University Transportation Center (AUTC) & Arctic Engineering Research Center,
Institute of Northern Engineering

4. University Name:

University of Alaska

5. Center Contact Information:

Alaska University Transportation Center
Director, Billy G. Connor, P.E.
University of Alaska Fairbanks
P.O.Box 755900
Fairbanks, Alaska 99775-5900

907-474-5552

6. Lab Manager Contact Information:

Gary C. Tyndall, P.E.,
907-474-6548
fngct1@uaf.edu

7. Lab Mission/Purpose:

Applied, exploratory, and basic research on transportation safety, security, and innovation in cold regions

8. Lab Capabilities:

9. Lab Equipment:

10. Partners:

11. Examples of Current and Past Work:

12. Notes (other information you'd like included):

Advanced Materials Testing Lab

2. Lab Type:

3. Center/Institute Name:

Alaska University Transportation Center (AUTC) & Arctic Engineering Research Center,
Institute of Northern Engineering

4. University Name:

University of Alaska

5. Center Contact Information:

Alaska University Transportation Center
Director, Billy G. Connor, P.E.
University of Alaska Fairbanks
P.O.Box 755900
Fairbanks, Alaska 99775-5900

907-474-5552

6. Lab Manager Contact Information:

Gary C. Tyndall, P.E.,
907-474-6548
fngct1@uaf.edu

7. Lab Mission/Purpose:

Applied, exploratory, and basic research on transportation safety, security, and innovation in cold regions

8. Lab Capabilities:

9. Lab Equipment:

10. Partners:

11. Examples of Current and Past Work:

12. Notes (other information you'd like included):

Asphalt Mix and Cement Testing Labs

2. Lab Type:

3. Center/Institute Name:

Alaska University Transportation Center (AUTC) & Arctic Engineering Research Center,
Institute of Northern Engineering

4. University Name:

University of Alaska

5. Center Contact Information:

Alaska University Transportation Center
Director, Billy G. Connor, P.E.
University of Alaska Fairbanks
P.O.Box 755900
Fairbanks, Alaska 99775-5900

907-474-5552

6. Lab Manager Contact Information:

Gary C. Tyndall, P.E.,
907-474-6548
fngct1@uaf.edu

7. Lab Mission/Purpose:

Applied, exploratory, and basic research on transportation safety, security, and innovation in cold regions

8. Lab Capabilities:

9. Lab Equipment:

10. Partners:

11. Examples of Current and Past Work:

12. Notes (other information you'd like included):

Superpave Lab

2. Lab Type:

3. Center/Institute Name:

Alaska University Transportation Center (AUTC) & Arctic Engineering Research Center,
Institute of Northern Engineering

4. University Name:

University of Alaska

5. Center Contact Information:

Alaska University Transportation Center
Director, Billy G. Connor, P.E.
University of Alaska Fairbanks
P.O.Box 755900
Fairbanks, Alaska 99775-5900

907-474-5552

6. Lab Manager Contact Information:

Gary C. Tyndall, P.E.,
907-474-6548
fngct1@uaf.edu

7. Lab Mission/Purpose:

Applied, exploratory, and basic research on transportation safety, security, and innovation in cold regions

8. Lab Capabilities:

9. Lab Equipment:

10. Partners:

11. Examples of Current and Past Work:

12. Notes (other information you'd like included):

Asphalt Engineering Laboratory

2. Lab Type:

Infrastructure, Materials, and Maintenance

3. Center/Institute Name:

Wisconsin Transportation Institute

4. University Name:

University of Wisconsin – Madison College of Engineering

5. Center Contact Information:

National Center for Freight & Infrastructure Research and Education

Director, Dr. Teresa M. Adams

University of Wisconsin

Department of Civil and Environmental Engineering

2205 Engineering Hall

1415 Engineering Drive, Room 272

Madison, WI 53706

Phone: (608) 263-3175

Fax: (608) 263-2512

6. Lab Manager Contact Information:

Hussain U. Bahia

(608) 265-4481

bahia@engr.wisc.edu

7. Lab Mission/Purpose:

This laboratory is part of the Wisconsin Structures and Materials Testing Laboratory (WSMTL) and is fully equipped to perform Superpave binder and mixture tests.

8. Lab Capabilities:

- Rheological properties, failure properties, and thermal properties of asphalt binders
- are measure using specialized rheometers, direct tension, and glass transition devices.
- Includes a full set of asphalt mixture volumetric design equipment and equipment for
- measuring mixture performance using tri-axial loading cells under controlled temperature conditions.
- Advanced instrumentation capabilities of standard Superpave equipment allows special studies in asphalt binder and mixture research.

9. Lab Equipment:

Dynamic Shear Rheometer (DSR)

Bending Beam Rheometer (BBR)

Rolling Thin Film Oven (RTFO)

Direct Tension Tester (DTT)

Pressure Aging Vessel (PAV)
Rotational Viscometer
Gyratory Compactor

10. Partners:

Wisconsin Structures and Materials Testing Laboratory (WSMTL)
Wisconsin Department of Transportation (WisDOT)
Wisconsin Asphalt Pavement Association (WAPA)
Federal Highway Administration

11. Examples of Current and Past Work:

"Using the Gyratory Compactor to Measure the Mechanical Stability of Asphalt Mixtures" by:
Ahmed Fatin Faheem Mahmoud and Professor Hussain Bahia

“Evaluation of the Roles of Adhesion & Cohesion Properties of Asphalt Binders in Moisture
Damage of Hot Mix Asphalt” by: Kunnawee Kanitpong and Professor Hussain Bahia

“Test Method to Determine Aggregate/Asphalt Adhesion Properties and Potential Moisture
Damage” by: Hussain Bahia, Andrew Hanz, Dr. Kunnawee Kanitpong, Dr. Haifang Wen, Bloom
Consultants

12. Notes (other information you'd like included):

Facility Use: The facility can be used by research staff, graduate students, and student hourly
undergraduates to work on funded research projects or work related to their theses.

Financial Arrangements: The Asphalt Engineering Laboratory receives an annual grant for
general upkeep of the lab, as well as funding for projects through the Wisconsin Structures and
Materials Testing Laboratory.

Composite Structures Laboratory

2. Lab Type:

Infrastructure, Materials, and Maintenance

3. Center/Institute Name:

Wisconsin Transportation Institute

4. University Name:

University of Wisconsin – Madison College of Engineering

5. Center Contact Information:

National Center for Freight & Infrastructure Research and Education

Director, Dr. Teresa M. Adams

University of Wisconsin

Department of Civil and Environmental Engineering

2205 Engineering Hall

1415 Engineering Drive, Room 272

Madison, WI 53706

Phone: (608) 263-3175

Fax: (608) 263-2512

6. Lab Manager Contact Information:

Lawrence C. Bank

(608) 262-1604

bank@engr.wisc.edu

7. Lab Mission/Purpose:

To conduct experimental and analytical investigations of fiber composite materials for constructing durable structures and rehabilitating existing transportation structures.

8. Lab Capabilities:

Specific manufacturing technologies include:

- Vacuum bagging, Molding, and Hand lay up

Specific structural applications include:

- FRP strengthening of concrete highway structures (concrete slabs, piers, columns)
- FRP strengthening of timber railroad structures (piles, cap beams, stringers)
- FRP reinforcement for concrete structures (bridge decks)
- FRP pultruded structural systems for highway structures (guardrails, sign supports)
- FRP stay-in-place formwork (structural and non-structural)

Specific ASTM testing and analysis tools include:

- Tension, compression, and shear tests

- Volume fraction and fiber architecture tests
- Differential Scanning Calorimetry (DSC) and optical microscopy
- Durability testing
- Flexural and shear tests for bridge decks

Specific Analysis tools include:

- CompositePro, Abaqus, and Ansys

9. Lab Equipment:

The laboratory has facilities to fabricate, test, analyze and characterize fiber reinforced polymer (FRP) glass and carbon composite materials for structural applications.

10. Partners:

Wisconsin Department of Transportation
Wisconsin Structures and Materials Testing Laboratory
Wisconsin Highway Research Program
Wisconsin Construction Materials Service Center

11. Examples of Current and Past Work:

- Experimental and Analytical Study of Concrete Bridge Decks Constructed with FRP Stay-in-Place Forms and FRP Grid Reinforcing
- Longitudinal Tensile and Transverse Crushing Behavior of a Prototype Multi-cellular FRP Composite Materials Highway Guardrail System
- Rapid Strengthening of Reinforced Concrete Bridge with Mechanically Fastened FRP Strips
- Durability and Service Life Prediction of Concrete Reinforcing Materials
- Analysis of a Bridge Deck Built with FRP Stay-In-Place Forms, FRP Grids, and FRP Rebars
- Experimental and Analytical Study of Fiber Reinforced Polymer (FRP) Grid Reinforced Concrete Bridge Decking, noted as Popular Science “Best of What’s New 2005” Selection.
- Modular 3-D FRP Reinforcing System for a Bridge Deck in Fond du Lac, Wisconsin
- Modular FRP Grid Reinforcing Systems with Integral Stay-in-place Form for Concrete Structures
- Investigation of a Deployable Military Bridge System with a Fiber Reinforced Concrete Deck
- Development of a Specification for Thin Stay-in-Place Forms for Bridge Deck Construction
- LRFD Factors for Pultruded Structural Members

12. Notes (other information you’d like included):

Construction and Materials Support Center (CMSC)

2. Lab Type:

Infrastructure, Materials, and Maintenance

3. Center/Institute Name:

Wisconsin Transportation Institute

4. University Name:

University of Wisconsin – Madison College of Engineering

5. Center Contact Information:

National Center for Freight & Infrastructure Research and Education
Director, Dr. Teresa M. Adams
University of Wisconsin
Department of Civil and Environmental Engineering
2205 Engineering Hall
1415 Engineering Drive, Room 272
Madison, WI 53706

Phone: (608) 263-3175

Fax: (608) 263-2512

6. Lab Manager Contact Information:

Dr. Awad S. Hanna – Director
(608) 263-8903
ashanna@wisc.edu

Gary C. Whited – Program Manager
(608) 262-7243
whited@engr.wisc.edu

7. Lab Mission/Purpose:

The Construction and Materials Support Center (CMSC) is an academic based engineering facility housed at the University of Wisconsin-Madison. The Center was formed in partnership with the Wisconsin Department of Transportation and focuses on implementing research findings and new technologies within the department and other local, state, and federal transportation agencies. It provides support services, investigations, and applied research to deliver timely solutions to problems encountered in all phases of the project delivery systems of public agencies by forming partnerships with local, state, and federal governmental organizations, industry, and academic research institutions.

8. Lab Capabilities:

Applied Research: Researching new construction management techniques, construction and materials engineering processes and procedures, and other innovative project development

practices and technologies that can improve the efficiency and cost effectiveness of the owner agencies.

Special Studies: Short-term investigative studies with a rapid turnaround time, on specific problems or issues of concern to the sponsoring agency or group.

Project Delivery Assistance: Direct project support in all phases of the project delivery process for construction projects.

Materials Testing: Specialized testing of construction materials, evaluating the suitability of materials for the intended function, investigating materials performance or production problems, and assessing suitability of new materials.

Education: Training to agency project staff and others on new techniques and processes, developing application guidance tools for inclusion in manuals, conducting seminars and workshops, and incorporating project results in undergraduate and graduate level courses for engineering students.

9. Lab Equipment:

10. Partners:

Wisconsin Department of Transportation
Wisconsin Highway Research Program
UW-Madison Composite Structures Laboratory
Wisconsin Structures and Materials Laboratory
Recycled Materials Resource Center
USDOT Federal Highway Administration

11. Examples of Current and Past Work:

Current Projects:

- Improved Construction Cost Estimating Procedures for Developing the Engineer's Estimate at WisDOT
- Construction Management Services for the Marquette Interchange Reconstruction Project
- Implementation of GPS Controlled Highway Construction Equipment
- Improving Communications on WisDOT Construction Projects Evaluation of Owner Controlled Insurance Programs (OCIP's) for WisDOT Mega-Corridor Projects
- Methods for Implementing Innovative Transportation Project Delivery Systems
- Strategies for Appropriately Allocating Risk on Transportation Projects
- Rapid Repair and Replacement Techniques for Transportation Structures Damaged by Disasters

12. Notes (other information you'd like included):

Project delivery support, investigative studies and applied research services are available to local, state and federal governmental organizations, industry, and academic research institutions.

Geo-Engineering Laboratories

2. Lab Type:

Infrastructure, Materials, and Maintenance

3. Center/Institute Name:

Wisconsin Transportation Institute

4. University Name:

University of Wisconsin – Madison College of Engineering

5. Center Contact Information:

National Center for Freight & Infrastructure Research and Education

Director, Dr. Teresa M. Adams

University of Wisconsin

Department of Civil and Environmental Engineering

2205 Engineering Hall

1415 Engineering Drive, Room 272

Madison, WI 53706

Phone: (608) 263-3175

Fax: (608) 263-2512

6. Lab Manager Contact Information:

Tuncer B. Edil

(608) 262-3225

edil@engr.wisc.edu

7. Lab Mission/Purpose:

This laboratory provides a comprehensive testing and instrumentation capability to assess geo-material behavior.

8. Lab Capabilities:

Soil and Aggregate Characterization

The Laboratories are supervised by a full-time engineer and equipped to perform most geotechnical tests. Tests determine physical properties such as grain size, shape and compaction and mechanical properties such as stiffness, resilient modulus, and plastic strain. Capabilities also exist for soil suction testing.

Geosynthetics Laboratory

Testing capabilities are available to perform geosynthetics tests to determine physical, mechanical, survivability, hydraulic, and durability properties of all geosynthetics. Other specialized equipment includes large-size direct shear device for interface properties, pullout test, permittivity, transmissivity, axisymmetric tension test devices.

Geoenvironmental Laboratory

Testing capabilities are available for batch and column tests for leachate characterization and the necessary chemical analysis equipment for both organics and metals.

Test Pit

A fully equipped hydraulic test pit, 3x3x3m, is available for subgrade/pavement structural model tests. Several MTS structural actuators provide a range of cyclic loading capacity and the associated data acquisition system measures and records forces and displacements. The test pit has been developed as a pavement testing facility complete with a loading frame, sensors for measuring the response of layers, and material handling and placement capabilities. A backhoe is available to handle large quantities of materials for constructing pavement sections. Compaction control devices (soil stiffness gauge, nuclear density gauge, dynamic cone penetrometer and a vibratory tamper) are available.

Field Instrumentation, Dynamic Testing, and Material Characterization

The Geo-Engineering Laboratories are fully equipped with specialized instruments and transducers for the evaluation of the saturated and unsaturated geomaterial response under low-amplitude elastic waves. A brief list of instrumentation includes: Stokoe-type resonant column, P and S-wave ultrasonic sensors, and 10 Hz-10 kHz PCB miniature piezocrystal accelerometers. These sets of instruments are complemented with peripheral electronics, including data acquisition systems, digital storage oscilloscopes, charge amplifiers, power amplifiers, filter/amplifier, electronic multimeters, and signal generators. A soil stiffness gauge, dynamic cone penetrometer, nuclear density gauge, and moisture-density gauge for in situ monitoring of density, moisture, stiffness, and strength are present.

Geophysical Testing

The Geo-Engineering Laboratories also includes geophysical data acquisition systems: a 24 channel Geometrics StrataView seismograph with both vertical and horizontal geophones and a 96 channel roll-along box. This system allows for high resolution seismic imaging and mapping of near surface structures of both man-made and geologic origin. Also equipped with borehole geophones for cross-hole tomographic imaging.

9. Lab Equipment:

(See Lab Capabilities, above)

10. Partners:

Federal Highway Administration
 Wisconsin and Minnesota Departments of Transportation
 Wisconsin Highway Research Program; Recycled Materials Resource Center
 Midwest Regional University Transportation Center
 Wisconsin Department of Natural Resources
 Alliant Energy, Xcel Energy
 LaFarge North America

11. Examples of Current and Past Work:

- Prototype evaluation of working platforms constructed of granular byproducts, fly ash stabilized materials, and geosynthetic reinforced aggregates.
- Long-term field evaluation of working platforms constructed of alternative materials and fly stabilized pavement layers.
- Long-term leachate quality evaluation of industrial byproducts in the field.

12. Notes (other information you'd like included):

Laboratories are primarily for support of research activities. However, testing is available on a contractual basis especially for specialized tests and materials.

Wisconsin Structures and Materials Laboratory (WSML)

2. Lab Type:

Infrastructure, Materials, and Maintenance

3. Center/Institute Name:

Wisconsin Transportation Institute

4. University Name:

University of Wisconsin – Madison College of Engineering

5. Center Contact Information:

National Center for Freight & Infrastructure Research and Education
Director, Dr. Teresa M. Adams
University of Wisconsin
Department of Civil and Environmental Engineering
2205 Engineering Hall
1415 Engineering Drive, Room 272
Madison, WI 53706

Phone: (608) 263-3175

Fax: (608) 263-2512

6. Lab Manager Contact Information:

Steven M. Cramer
(608) 262-7711
cramer@engr.wisc.edu

7. Lab Mission/Purpose:

This series of laboratories is administered by the College of Engineering (COE) and heavily used by Civil and Environmental Engineering (CEE) staff and students. These interdisciplinary laboratories are for testing materials and structures, including bituminous, concrete, wood, and fiber-reinforced polymer materials.

8. Lab Capabilities:

- Includes 1400 square feet of high-strength test floor with 100 kip tie-down points and over 200 square feet of high-strength reaction wall for structural testing.
- A variety of hydraulic, closed-loop system actuators are available, both movable and fixed-frame.

9. Lab Equipment:

Southwark Emery Testing Machine (1,000,000 lbs Tension & Compression, 18 ft test specimens)
BLH Testing Machine (60,000 & 200,000 lbs Tension & Compression)
SATEC MII-400AD (400,000 lbs Compression only)

MTS 810 (22,000 lbs Tension & Compression with Hydraulic Grips)
Structural Floor Actuators (Ranging from 2,000-200,000 lbs.)
MTS Test Frame (12,500 lbs with Hydraulic Grips)
MTS 812 (22,000 & 100,000 with Hydraulic Grips)
MTS Fracture System (20,000 lbs.)

10. Partners:

Wisconsin Department of Transportation
Wisconsin Structures and Materials Testing Laboratory
Wisconsin Highway Research Program
Wisconsin Construction Materials Service Center

11. Examples of Current and Past Work:

“Innovative Bridge Design and Construction IV Bridge B-13-570 over IH39-90 With Wisconsin Precast "W" Girders Utilizing Steel-Free Decks”

By: Han-Ug Bae, Professor Michael Oliva, Professor Lawrence Bank, and Professor Jeff Russell

“Effectiveness and Life Performance of Concrete Bridge Deck and Crack Sealers” By:

Melissa Dorshorst, Professor Jose Pincheira

“Failure Prediction of Gypsum Board Exposed to Elevated Temperatures”

By: Gumpon Sriprutkiat, Onesty Friday, and Professor Steve Cramer

12. Notes (other information you’d like included):

The laboratory provides physical testing facilities and technical assistance to students, and faculty engaged in instruction and research. Service testing is also provided to the public and private firms on a cost-reimbursable basis. All laboratory activity and requests for testing assistance are registered and processed through the WSMTL Office in Room 1314 Engineering Hall. Advanced reservations are essential to ensure space and equipment will be available. Reservations are encouraged at the time of course planning or proposal submission.

Planning

Transportation & Livability Research Group

2. Lab Type:

Planning

3. Center/Institute Name:

Oregon Transportation Research and Education Consortium (OTREC)

4. University Name:

Planning, Public Policy and Management (PPPM)
University of Oregon

5. Center Contact Information:

Oregon Transportation Research and Education Consortium (OTREC)
Director, Dr. Robert Bertini
Portland State University
301A Engineering Building
PO Box 751
Portland, OR 97207

Phone: 503-725-4249

Fax: 503-725-5950

6. Lab Manager Contact Information:

Marc Schlossberg
(541) 346-2046
schlossb@uoregon.edu

7. Lab Mission/Purpose:

The Transportation & Livability Research Group at UO focuses on city design that facilitates sustainable human settlements, with a special emphasis on transportation's key role in shaping sustainable urban form. This research group recognizes that well conceived solutions and thinking on transportation and livability cannot happen fully within any single discipline and that cross-discipline dialogue and investigation are keys in addressing issues of sustainability within our communities. Therefore, this research group is comprised of faculty in Community and Regional Planning, Public Administration, Architecture, and Landscape Architecture.

8. Lab Capabilities:

This research group's five core members and areas of expertise are:

Marc Schlossberg (PPPM). Area of work: pedestrian-scaled urban form and community empowerment

- Nico Larco (Architecture). Area of work: medium to high density suburban development and mobility
- Mark Gillem (Architecture and Landscape Architecture). Area of work: street-scaled design and multi-way boulevards

- Yizhao Yang (PPPM). Area of work: community quality of life, housing, and pedestrian accessibility
- Jessica Greene (PPPM). Area of work: health policy with an emphasis on the health status of low-income populations, including transportation's role

9. Lab Equipment:

10. Partners:

City of Eugene
National Center for Walking and Biking
National Multi Housing Council
Center for Health Care Strategies, etc.

11. Examples of Current and Past Work:

- The Influence of Community Walkability and Safety on Active Transportation Among Low Income Children
- Active Transportation, Neighborhood Planning and Participatory GIS
- From Arterial to Asset: Examining the Role of the Multi-Way Boulevard in Coordinated Transportation and Land Use Planning
- Increasing Capacity In Rural Communities: Planning for Alternative Transportation
- Overlooked Density: Re-Thinking Transportation Options in Suburbia
- Healthy Communities, the Transportation-Land Use Connection and Children's Travel

12. Notes (other information you'd like included):

Transportation Modeling Lab

2. Lab Type:

Planning

3. Center/Institute Name:

Oregon Transportation Research and Education Consortium (OTREC)

4. University Name:

Toulan School of Urban Studies and Planning
Portland State University

5. Center Contact Information:

Oregon Transportation Research and Education Consortium (OTREC)
Director, Dr. Robert Bertini
Portland State University
301A Engineering Building
PO Box 751
Portland, OR 97207

Phone: 503-725-4249

Fax: 503-725-5950

6. Lab Manager Contact Information:

John Gliebe
(503) 725-4016
gliebej@pdx.edu

7. Lab Mission/Purpose:

The Transportation Modeling Lab, located on the fifth floor of the Urban Studies Building at Portland State University, was developed by Professor John Gliebe to support research in areas related to analysis, modeling and simulation of transportation systems and traveler behavior.

Dr. Gliebe's research interests are focused on the development of advanced travel demand modeling methods, such as activity-based models and integrated land use and transportation models. Drawing on interests in econometrics and simulation, his objective is to improve the behavioral realism of modeling practices, with the underlying goal being better tools for policy analysis.

8. Lab Capabilities:

The lab includes five high-end Windows-based workstations and one Sun workstation, running a Linux operating system, for use by students in research and class projects. The lab has academic licenses for three major commercial travel demand modeling software programs as well as GIS and statistical programs.

9. Lab Equipment:

10. Partners:

Metro

Oregon Department of Transportation (ODOT)

11. Examples of Current and Past Work:

The lab sees extensive use as Professor Gliebe leads the development of an activity-based dynamic travel demand modeling system for Portland Metro and directs land use modeling research projects for Metro and Oregon DOT. In addition, a project led by Professor Jennifer Dill is using the lab computers to process GPS data collected from bicycle riders and GIS mapping capabilities to better understand how route attributes affect rider path choices.

12. Notes (other information you'd like included):

Center for Urban Studies/Center for Transportation Studies

2. Lab Type:

Planning

3. Center/Institute Name:

Oregon Transportation Research and Education Consortium (OTREC)

4. University Name:

Toulan School of Urban Studies and Planning
Portland State University

5. Center Contact Information:

Oregon Transportation Research and Education Consortium (OTREC)
Director, Dr. Robert Bertini
Portland State University
301A Engineering Building
PO Box 751
Portland, OR 97207

Phone: 503-725-4249

Fax: 503-725-5950

6. Lab Manager Contact Information:

Jim Strathman, Director, CUS
(503) 725-4069
strathmanj@pdx.edu

Jennifer Dill, Director, CTS
(503) 725-5173
jdill@pdx.edu

John Gliebe
(503) 725-4016
gliebej@@pdx.edu

Anthony Rufolo
(503) 725-4049
rufoloa@pdx.edu

7. Lab Mission/Purpose:

The mission of the Center for Urban Studies (CUS) is to promote and facilitate the conduct of research and community service for faculty and students on urban issues relevant to the metropolitan area, including transportation. The Center for Transportation Studies, housed within CUS, strives to stimulate and conduct multidisciplinary research on transportation issues,

facilitating the dissemination of information and encouraging the implementation of research results.

8. Lab Capabilities:

Several faculty members from the Toulon School of Urban Studies and Planning are affiliated with CUS and CTS. Dr. Jim Strathman directs CUS. His research interests include transportation and transit planning. He has worked with regional and state agencies to evaluate program effectiveness, including transit performance, driver cessation, and comprehensive plan amendments. Dr. Jennifer Dill directs CTS, with research interests in transportation policy, travel behavior, and interactions between transportation, land use, and the environment. She has worked on several projects evaluating the effects of local and regional transportation and land use policies, often involving original survey research. Dr. Tony Rufolo is an economist who has conducted research on transportation finance, including road user fees and fuel tax evasion. Dr. John Gliebe focuses on advanced travel demand modeling. At any one time, there are up to a half dozen Urban Studies Ph.D. students working on research projects within the Center, and several more master's degree students.

9. Lab Equipment:

10. Partners:

Metro
 Oregon Department of Transportation (ODOT)
 TriMet
 Robert Wood Johnson Foundation

11. Examples of Current and Past Work:

- Evaluation of transit operations: Data applications of Tri-Met's automated Bus Dispatch System
- The Impacts of Transit-Oriented Developments on Travel and Transit Use in Portland
- Understanding and measuring bicycling behavior: Implications for urban planning, health, and research
- Transforming Land Use Regulations to Create Livable Communities that Support Physical Activity in Everyday Life
- Evaluation of the Regional Travel Options Program
- Comprehensive plan amendment impacts on interchanges in Oregon
- Alternatives to the motor fuel tax

12. Notes (other information you'd like included):

Websites: <http://www.upa.pdx.edu/CUS/about/index.html>; <http://www.cts.pdx.edu/>

Interdisciplinary Transportation Analysis and Modeling (iTram) Lab

2. Lab Type:

Planning

3. Center/Institute Name:

Oregon Transportation Research and Education Consortium (OTREC)

4. University Name:

School of Civil, Construction and Environmental Engineering
Oregon State University

5. Center Contact Information:

Oregon Transportation Research and Education Consortium (OTREC)
Director, Dr. Robert Bertini
Portland State University
301A Engineering Building
PO Box 751
Portland, OR 97207

Phone: 503-725-4249

Fax: 503-725-5950

6. Lab Manager Contact Information:

Lei Zhang
(541) 737-2072
lei.zhang@oregonstate.edu

7. Lab Mission/Purpose:

This lab conducts both advanced and applied research on the dynamics of transportation and urban systems, as well as their implications on management and policy decisions. The impacts of transportation and land use policies are often multidimensional. In addition to the traditional mobility and accessibility measures, iTram strives to understand the full ramifications of these policies including their influences on reliability, equity, welfare, finance, economic growth, and sustainability.

Mission: iTram promotes and employs interdisciplinary approaches to conduct research on the relationships between transportation, land use, and natural resources, modeling urban/regional system dynamics and analyzing the full impact of engineering/planning decisions to ensure efficient resource allocation and sustainable development in the broad domain of transportation.

8. Lab Capabilities:

The interdisciplinary team at the iTram lab includes faculty, graduate, and undergraduate students from Transportation, Economics, Agriculture and Resource Economics, Operations Research, and Statistics. The research conducted by iTram uses a variety of techniques, including

optimization, statistics and econometrics, simulation, agent-based methods, artificial intelligence, Geographic Information Systems, and advanced survey techniques. These methods can be applied to analyze systems ranging from a single facility to a large region, and assess the consequences of policies ranging from short-term operations and pricing decisions to long-term investment and ownership choices.

In previous research, the iTram lab has studied freeway operations strategies, incidence management policies, advanced traveler information systems, road pricing and distance-based use fees, vehicle ownership choices, freeway capacity expansion, private roads, alternative urban growth scenarios, and multimodal investment criteria.

9. Lab Equipment:

10. Partners:

Oregon Department of Transportation (ODOT)
 U.S. Department of Transportation (USDOT)
 Portland Metro
 Oregon State University (OSU)
 Portland State University (PSU)
 University of Oregon (UO)
 Oregon Transportation Research and Education Consortium (OTREC)
 Oregon Survey Research Center (SRC)
 University of Minnesota Network, Economics, and Urban Systems Research Group (NEXUS)

11. Examples of Current and Past Work:

- Co-Evolution of Land Use and Transportation in Urban and Regional Systems (OTREC)
- Welfare and Financial Impact of Unleashing Private Sector Investment in Transportation Systems (Oregon State University)
- Socio-Economic Impact of a Distance-Based Road User Fee (Oregon Department of Transportation)
- Freight Performance Measures: Approach Analysis (ODOT and OTREC)
- Economics Analysis of Price Competition and Capacity Choice on Large Mixed-Ownership Networks (Kiewit Center for Transportation and Infrastructure)
- Benefits of Removing Institutional Barriers to Incident Management Programs (ODOT and OTREC)
- No More Freeways: Urban Land Use-Transportation Dynamics without Freeway Capacity Expansion (OTREC)
- Multimodal Investment Criteria and the Economic Importance of Freight Transportation (ODOT)
- User Responses to the Trip-Check Statewide Traveler Information System (ODOT)

12. Notes (other information you'd like included):

The laboratory, its staff, facilities and its data streams are available for research and evaluation projects, training and education functions and consulting on projects of all kinds. Please contact the faculty listed above for further information. Website:

<http://web.engr.oregonstate.edu/~zhangle/wiki/>

Transportation and Urban Systems Analysis Laboratory (TUSAL)

2. Lab Type:

Planning

3. Center/Institute Name:

Wisconsin Transportation Institute

4. University Name:

College of Engineering

University of Wisconsin – Madison

5. Center Contact Information:

National Center for Freight & Infrastructure Research and Education

Director, Dr. Teresa M. Adams

University of Wisconsin

Department of Civil and Environmental Engineering

2205 Engineering Hall

1415 Engineering Drive, Room 272

Madison, WI 53706

Phone: (608) 263-3175

Fax: (608) 263-2512

6. Lab Manager Contact Information:

Jessica Y. Guo

(608) 890-1064

jyguo@wisc.edu

7. Lab Mission/Purpose:

The Transportation and Urban Systems Analysis Laboratory (TUSAL) is a laboratory for supporting computationally intensive, simulation-based research on transportation and other urban sub-systems.

8. Lab Capabilities:

TUSAL is equipped with advanced computing facilities and state-of-the-art software to conduct research in the following areas:

- Travel behavior analysis
- Multimodal passenger and freight transportation demand forecasting
- Integrated urban systems simulation
- Transportation policy testing
- Transportation data mining and integration
- GIS/GPS-based application development

9. Lab Equipment:

10. Partners:

Wisconsin Department of Transportation
Mississippi Valley Freight Coalition
Midwest Regional University Transportation Center
National Center for Freight and Infrastructure Research and Education

11. Examples of Current and Past Work:

Successful practices in Freight Planning

By: Jessica Guo, Ph.D.
Start Date: February 1, 2007
End Date: April 30 2008

Activity-Based Travel-Demand Analysis for Metropolitan Areas (CEMDAP)

By: Jessica Guo, Ph.D.
Start Date: January 1, 2006
Ending Date: December 31, 2006

12. Notes (other information you'd like included):

The facility can be used by research staff, graduate students, and student hourly undergraduates to work on funded research projects or work related to their theses. The laboratory is supported by research project funds.

Public Transportation and Tourism

National Center for Accessible Transportation (NCAT)

2. Lab Type:

Planning

3. Center/Institute Name:

Oregon Transportation Research and Education Consortium (OTREC)

4. University Name:

College of Engineering
Oregon State University

5. Center Contact Information:

Oregon Transportation Research and Education Consortium (OTREC)
Director, Dr. Robert Bertini
Portland State University
301A Engineering Building
PO Box 751
Portland, OR 97207

Phone: 503-725-4249

Fax: 503-725-5950

6. Lab Manager Contact Information:

Katharine Hunter-Zaworski
(541) 737-9906
katharine.hunter-zaworski@oregonstate.edu

7. Lab Mission/Purpose:

The National Center for Accessible Transportation (NCAT) at OSU addresses the need for research and development for improving access to public transportation for all. Travel is an important part of the American way of life, and although great strides have been made in the last twenty years to improve access for people with disabilities, travel by public transportation is still difficult. NCAT conducts basic research on accessibility issues and develops practical, cost-effective improvements in transportation technologies, with the goal of making transportation more accessible for everyone.

8. Lab Capabilities:

Supported by research and development funds, NCAT's most recent success was its selection to serve as host for the Rehabilitation Engineering Research Center (RERC) on Accessible Public Transportation. All primary modes of public transportation are included – intra-city and over-the-roadbuses, trains, and air travel. There are common features to all modes and an important element of the center activities is the goal of identifying means to bring consistency to the accessibility features of all modes of transportation. The current focus of the center is air travel and accessibility for the new Bus-Rapid Transit (BRT) system being developed. The approach

relies on specific types of expertise within the center and strong collaboration with entities external to the center.

9. Lab Equipment:

10. Partners:

Alaska Airlines / Horizon Airlines
American Association of Retired Persons (AARP)
American Public Transportation Association (APTA)
Amtrak
Association of Flight Attendants (AFA)
Boeing Aircraft
Bombardier Aircraft
Continental Airlines
Delta Airlines
Federal Aviation Administration (FAA)
Lane Transit District, Eugene, Oregon
Mahlon Sweet Field, Eugene Airport (EUG)
National Center for Accessible Media (NCAM)
National Multiple Sclerosis Society
Northwest Airlines
Open Doors Organization
Oregon State University (OSU)
OSU College of Engineering
OSU College of Health and Human Sciences
OSU Survey Research Center
Oregon Health & Science University (OHSU)
Oregon Institute on Disability and Development
Paralyzed Veterans of America (PVA)
Portland International Airport (PDX)
Project ACTION
Reagan International Airport
Southwest Airlines
Trace Center at University of Wisconsin-Madison
Transportation Security Administration (TSA)
United Cerebral Palsy
United States Access Board
United States Department of Transportation
The Velocity Group
Wireless RERC at Georgia Tech

11. Examples of Current and Past Work:

Current Research Activities:

- The biomechanics of boarding and travel in confined spaces such as aircraft.
- The psychology of existing and proposed accessibility solutions

- Rear Facing Securement for Bus Rapid Transit Vehicles

Current Development Activities:

- Vehicle boarding technologies
- Open-caption communications systems
- Single-aisle-vehicle accessible lavatories
- Passenger assistance training tools and techniques

12. Notes (other information you'd like included):

Website: <http://ncat.oregonstate.edu/>

Safety, Operations and Technology (10)

Multimodal Transportation Research and Operations Lab

2. Lab Type:

Intelligent Transportation Systems and Traffic Monitoring Laboratory, and Training Center

3. Center/Institute Name:

Nick J. Rahall II Appalachian Transportation Institute

4. University Name:

Marshall University

5. Center Contact Information:

Dr. Andrew P. Nichols

6. Lab Manager Contact Information:

304-696-3203

andrew.nichols@marshall.edu

7. Lab Mission/Purpose:

This lab will support the West Virginia Department of Transportation in its goal to create a statewide Intelligent Transportation System to monitor and improve traffic flow along key corridors within the state. The lab will also be used to conduct traffic operations and safety research to provide useful information to the WVDOT for day-to-day decision-making purposes. This lab will also incorporate real-time information from other modes of transportation, including maritime, rail, and air.

8. Lab Capabilities:

9. Lab Equipment:

30 terabyte database and server, two operations consoles, connectivity to video cameras, dynamic message signs, roadway sensors, two plasma televisions, training facilities.

10. Partners:

West Virginia Department of Transportation

Federal Highway Administration

Marshall University College of Information Technology and Engineering

11. Examples of Current and Past Work:

WVDOT Intelligent Transportation System Statewide Deployment (current)

WVDOT Intelligent Transportation System Evaluation (current)

Monitoring of Huntington, WV City Signal System (planned)

This center is capable of functioning as a real-time traffic monitoring facility for incident response and congestion management.

12. Notes (other information you'd like included):

This laboratory is currently being constructed and is scheduled for completion in August 2008. It is being funded by the West Virginia Department of Transportation ITS Deployment project to serve as a disaster recovery and training center. It will be a mirror of the primary traffic management center, located in the WVDOT building in Charleston, WV. This lab will also house the ITS data archive to facilitate the evaluation of the project and other future research. Researchers with the Rahall Transportation Institute will have full access to this facility for operations and research purposes.

Roadside Animal Detection Systems (RADS) Test-Bed

2. Lab Type:

Environmental

3. Center/Institute Name:

Western Transportation Institute

4. University Name:

Montana State University

5. Center Contact Information:

Western Transportation Institute
College of Engineering - Montana State University
PO Box 174250
2310 University Way Blg. 2 Ste 2
Bozeman, MT 59717-4250

406-994-6114 (phone)

406-994-1697 (fax)

6. Lab Manager Contact Information:

Marcel Huijser
(406) 543-2377
mhuijser@coe.montana.edu

Matt Blank

(406) 994-7120

mblank@coe.montana.edu

7. Lab Mission/Purpose:

The “Roadside Animal Detection Systems” (RADS) Test-Bed will provide a controlled environment to evaluate different animal detection systems under similar test conditions and assess relative performance of these technologies.

8. Lab Capabilities:

Transportation agencies need to be able to select the most reliable animal detection system and have insight into the cost-benefit ratios of different systems from different vendors. However, field data related to the reliability, operations and maintenance of off-the-shelf animal detection systems remain anecdotal at best. Furthermore, past studies evaluated these systems using different study parameters and research methods under different road and weather conditions, making it difficult to compare the data that was collected.

Research focuses on evaluating various types of animal detection systems from multiple vendors at the same site and under similar test conditions, thus creating a more comparable database with which to assess the relative performance of these technologies. Several commercially available

roadside animal detection systems are being installed at the airport facility in Lewistown during the first phase of this project. Based on long-term performance data and the cost-benefit of such systems, a permanent installation of the most appropriate system will be proposed for one or more locations on Montana highways.

9. Lab Equipment:

10. Partners:

Federal Highway Administration
Montana Department of Transportation
Port Authority of Lewistown, Montana
Fergus County, Montana

11. Examples of Current and Past Work:

- Evaluation of an Animal Warning System Effectiveness
- The Comparison of Animal Detection Systems in a Test-Bed: A Quantitative Comparison of System Reliability and Experiences with Operation and Maintenance
- Animal Vehicle Crash Mitigation Using Advanced Technology Pooled Fund: Phase II

12. Notes (other information you'd like included):

Laboratories will be available for partnership development. Fees may apply. Contact us for more information.

Systems Engineering and Integration Laboratory

2. Lab Type:

Technology

3. Center/Institute Name:

Western Transportation Institute

4. University Name:

Montana State University

5. Center Contact Information:

Western Transportation Institute
College of Engineering - Montana State University
PO Box 174250
2310 University Way Blg. 2 Ste 2
Bozeman, MT 59717-4250

406-994-6114 (phone)

406-994-1697 (fax)

6. Lab Manager Contact Information:

Doug Galarus
(406) 994-5268
dgalarus@coe.montana.edu

7. Lab Mission/Purpose:

The goal of this lab is to facilitate the application of systems engineering best practices to the engineering, development, and integration of intelligent transportation systems, information technology, and communications systems.

8. Lab Capabilities:

This laboratory consists of sophisticated, state-of-the-art equipment, and infrastructure enabling the Systems Group staff to test and develop hardware and software. Within the lab there is sufficient space for the assembly and testing of prototype systems as well as systems-related demonstrations and educational trainings for small groups. A flexible cabling system facilitates the testing and demonstration of various wired and wireless communication technologies. Servers and workstations are equipped with “virtualization” and development software that allows staff to rapidly configure, develop, and test diverse software applications using multiple operating systems. GIS and mathematical analysis software are used by staff to model, analyze, and visualize systems and their characteristics. Multimedia gear such as digital cameras, camcorders, and a projection system assist staff in the development of demonstrations and training tools.

This laboratory has been used on projects to:

- Integrate satellite and cellular communication equipment with mobile computing devices
- Aggregate and disseminate sensor readings into a database to indicate weather changes
- Test systems and algorithms for triggering warnings to drivers in work zones via variable message signs
- Visualize and compare the coverage of communication systems in rugged terrain
- Process input from hand-held field devices regarding animal-vehicle collisions, rock slides, and other incidents that impact travelers and roadways

9. Lab Equipment:

- Servers and workstations equipped with “virtualization” and development software
- GIS and mathematical analysis software
- Multimedia gear such as digital cameras, camcorders, and a projection system
- A flexible cabling system facilitates

10. Partners:

CALTRANS

State Transportation Departments

Local and regional agencies

Department of Homeland Security

11. Examples of Current and Past Work:

- WeatherShare
- Development of Prototype Integrated PDA/GPS System to Collect Roadkill Data
- Redding Responder
- Improve Communications Between TMC & TMS Elements in a Rural Environment through a System that is Deployable Statewide
- Automated Safety Warning System Controller
- Advanced Changeable Message Signs

12. Notes (other information you’d like included):

Laboratories will be available for partnership development. Fees may apply. Contact us for more information.

Transportation Research Application and Instrumentation Laboratory (TRAIL)

2. Lab Type:

Planning

3. Center/Institute Name:

Western Transportation Institute

4. University Name:

Montana State University

5. Center Contact Information:

Western Transportation Institute
College of Engineering - Montana State University
PO Box 174250
2310 University Way Blg. 2 Ste 2
Bozeman, MT 59717-4250

406-994-6114 (phone)

406-994-1697 (fax)

6. Lab Manager Contact Information:

Suzanne Lassacher
(406) 994-6010
suzannel@coe.montana.edu

David Veneziano

(406) 994-6320

david.veneziano@coe.montana.edu

7. Lab Mission/Purpose:

The purpose of this lab is to simulate a small urban and rural Traffic Management Center (TMC) and to serve as a comprehensive work force development and research center for Intelligent Transportation Systems (ITS) technologies.

8. Lab Capabilities:

The TRAIL laboratory serves as a test bed for ITS technologies, Traffic Management Systems communications, traffic management, traveler information, and incident response. Currently, the lab is deploying ITS technologies such as sensors and video surveillance cameras in heavily traveled corridors to gather data with the intention of enhancing safety. The laboratory provides an environment for ITS evaluation and workforce development, as well as a setting for local and state government agencies and transportation departments to observe the benefits of a Traffic Management Center.

The physical lab is equipped with two fifty inch high-definition plasma monitors that display various types of data currently collected by sensors and video cameras. This laboratory assists communities with future growth plans by collecting and sharing data that can be used by various agencies to determine community needs and provide solutions to ongoing problems.

This laboratory will be used on projects to:

- Identify problematic winter road conditions
- Collect and analyze data pertaining to vehicle speeds, counts, classifications, and pavement conditions
- Evaluate ITS technologies and communications schemes
- Traffic management center for special events (e.g. MSU Football, etc)
- Enhance workforce development

9. Lab Equipment:

The physical lab is equipped with two fifty inch high-definition plasma monitors that display various types of data currently collected by sensors and video cameras.

10. Partners:

State Transportation Departments
NorthWest Energy
Local governments

11. Examples of Current and Past Work:

MSU Football Special Event Traffic Management

12. Notes (other information you'd like included):

Laboratories will be available for partnership development. Fees may apply. Contact us for more information.

Vehicle Vibration Test Lab of the Dynamic Structure Sensing & Control Center (DySSC)

2. Lab Type:

Infrastructure, Materials, and Maintenance

3. Center/Institute Name:

Oklahoma Transportation Center (OTC)

4. University Name:

University of Oklahoma

5. Center Contact Information:

Oklahoma Transportation Center (OTC)
Director, David Alan Tree
Oklahoma State University
School of Civil & Environmental Engineering
201 Advanced Technology Research Center
Stillwater, OK 74078

Phone: (405) 744-5957

Fax: (405) 744-3189

6. Lab Manager Contact Information:

Dr. David Baldwin
(405) 325-1090
baldwin@ou.edu

7. Lab Mission/Purpose:

Provides the ability to conduct full-scale vibration testing of large vehicles up to 80,000 lbs. The lab also has a 2,000 lb. electrodynamic shaker for unit vibration testing.

8. Lab Capabilities:

The centerpiece of the Vehicle Vibration Test Lab (VVTL) is a MTS four-poster road simulator capable of providing 20,000 lbs. of lift on each wheel actuator. Standard laboratory displacement profiles can be used as vibration inputs to vehicles up to the size of Class 8 tractor-trailer combinations; the actuators are adjustable to fit wheel bases up to 90 inches by 90 inches. The lab owns a Class 8 tractor and a flatbed trailer (adjustable spread axle) that can be loaded to approximately 89,000 lbs. GVW. In addition, a 2,000 lb. electrodynamic shaker is installed in the lab to conduct vibration testing on units and smaller structures. Instrumentation available in the lab includes National Instruments data acquisition systems running the LabVIEW software, and a variety of acceleration, displacement and strain measuring sensors. These data acquisition systems are capable of stationary as well as mobile application.

9. Lab Equipment:

(See Lab Capabilities, above)

10. Partners:

Federal Highway Administration
Oklahoma Department of Transportation
Fears Structural Engineering Laboratory

11. Examples of Current and Past Work:

Laboratory vibration testing of a heavy truck equipped with Smart Shock Absorbers
On-road vibration testing of a heavy truck equipped with Smart Shock Absorbers

12. Notes (other information you'd like included):

Intelligent Transportation Systems Laboratory

2. Lab Type:

Technology

3. Center/Institute Name:

Oklahoma Transportation Center (OTC)

4. University Name:

University of Oklahoma

5. Center Contact Information:

Oklahoma Transportation Center (OTC)
Director, David Alan Tree
Oklahoma State University
School of Civil & Environmental Engineering
201 Advanced Technology Research Center
Stillwater, OK 74078

Phone: (405) 744-5957

Fax: (405) 744-3189

6. Lab Manager Contact Information:

Monte Tull
(405) 325-4278
tull@ou.edu

7. Lab Mission/Purpose:

The OU ITS Lab provides system engineering and integration services for the ODOT ITS Network. This work includes roadway cameras, dynamic message signs, speed sensors and vehicle classifiers, roadway condition sensors, and smart work zones. Both public internet and private network information are supported. In addition, related activities are provided for the Department of Public Safety and the Oklahoma Highway Patrol, Oklahoma Highway Safety Office.

8. Lab Capabilities:

The ITS Network is a private fiber-based network developed and supported by the ITS Laboratory for the Oklahoma Department of Transportation (ODOT). This unique network is decentralized/distributed and provides a fault tolerant capability, with no single point of failure, so that the various ITS consoles can operate independently. The Lab provides full testing and integration services of both hardware and software in support of the various sensors, message signs, and consoles. Current developments include Smart Work Zones, Advanced Traveler Information System (ATIS), inter-console and interagency communication, and remote network asset monitoring.

9. Lab Equipment:

10. Partners:

Oklahoma Transportation Center
Oklahoma Department of Transportation
Oklahoma Highway Safety Office
Oklahoma Highway Patrol
Federal Motor Carrier

11. Examples of Current and Past Work:

Additional Lab activities include:

- Safe-T that provides a database of vehicle incident and crash data available to city planners, Highway Patrol (OHP) command staff, Highway Safety Office, etc.
- Traffic and Criminal Software (TraCS): Provides OHP forms automation on in-vehicle laptops, including wireless forms transmission, over the-air queries, etc.
- Computerized Driver License Testing and records keeping.

12. Notes (other information you'd like included):

Principal faculty: Joe Havlicek, Jim Sluss, Monte Tull

Intelligent Transportation Systems (ITS) Laboratory

2. Lab Type:

Technology

3. Center/Institute Name:

Oregon Transportation Research and Education Consortium (OTREC)

4. University Name:

Department of Civil & Environmental Engineering
Portland State University

5. Center Contact Information:

Oregon Transportation Research and Education Consortium (OTREC)
Director, Dr. Robert Bertini
Portland State University
301A Engineering Building
PO Box 751
Portland, OR 97207

Phone: 503-725-4249

Fax: 503-725-5950

6. Lab Manager Contact Information:

Robert Bertini
(503) 725-4249
bertini@pdx.edu

Christopher Monsere
(503) 725-9746
monsere@pdx.edu

Miguel Figliozzi
(503) 725-2836
figliozzi@pdx.edu

7. Lab Mission/Purpose:

This lab conducts research on how intelligent transportation systems (ITS) can most effectively be deployed in the Portland Metro area and throughout the nation. Intelligent transportation systems are the application of information technologies - computers, sensors, and telecommunications - to improve highway management and vehicle performance and safety, including, for example, electronic toll collection, truck and transit fleet control systems, and electronic variable message signs.

Mission: The Intelligent Transportation Systems Laboratory strives to stimulate and conduct multidisciplinary research on transportation issues, facilitating the dissemination of information and encouraging the implementation of research results to ensure resource preservation and economic productivity.

8. Lab Capabilities:

Intelligent Transportation Systems (ITS) are existing and new technologies, including information processing, sensors, communications, control, and electronics, combined in innovative ways, integrated into the management of our multimodal transportation system aimed at saving lives, time, and resources.

Transportation is the backbone of our society—the movement of people and goods provides the foundation of our quality of life and economic prosperity. Fulfilling the need for a transportation system that is both economically sound and environmentally efficient requires a new way of looking at—and solving—our transportation problems. The strategy of adding more and more highway capacity neither solves our transportation problems, nor meets the broad national vision of an efficient, integrated transportation system. We focus on the integration and improvement of all modes—highway, transit, bicycle, pedestrian and freight.

Traffic crashes and congestion take heavy tolls in lives, lost productivity, and wasted energy. ITS enables people and goods to move more safely and efficiently through a state-of-the-art, intermodal transportation system.

9. Lab Equipment:

10. Partners:

National Science Foundation (NSF)
Oregon Department of Transportation (ODOT)
City of Portland
TriMet
U.S. Department of Transportation
Federal Transit Administration
BMW
Metro
Clackamas County
Foundation for Air Medical Research and Education
Oregon Museum of Science and Industry (OMSI)
Northwest Transportation and Education Alliance (NWTTEA)
Oregon State University (OSU)
Oregon Institute of Technology (OIT)
Oregon Health and Sciences University (OHSU)
Oregon Transportation Research and Education Consortium (OTREC)
Technical University Dresden, Germany
TransNow
University of Calabria, Italy

11. Examples of Current and Past Work:

- Mining Archived Intelligent Transportation Systems Data: A Validation Framework for Improved Performance Assessment and Modeling (National Science Foundation)
- Using Archived Data to Measure Operational Benefits of ITS Investments (Oregon Department of Transportation and TransNow)
- Empirical Comparison of German and U.S. Traffic Sensor Data and Impact on Driver Assistance Systems (BMW Group)
- Frontier Evaluation of Video Recognition Travel Time System (ODOT)
- Great Cities Prototype for Advanced Public Transit Systems in Multimodal Corridors (Federal Transit Administration)
- Measuring the Impacts of Speed Reduction Technologies on Highway Safety (ODOT)
- Update and Enhancement of Oregon's Crash Reduction Factors (ODOT)
- Development of Custom Data Collection Software for Palm-Based Handheld Computers (PSU)
- Changes in Travel Behavior/Demand Associated with Managed-Lanes Facility System Expansion (NCHRP)
- Transit Buses as Traffic Probes for Arterial Performance Measurement (PSU)
- Using Existing ITS Commercial Vehicle Operation (ITS/CVO) Data to Develop Truck Travel Time Estimates and Other Freight Measures (ODOT)
- Community and School Traffic Safety Partnership: Research and Evaluation (City of Portland)

12. Notes (other information you'd like included):

The laboratory, its staff, facilities and its data streams are available for research and evaluation projects, training and education functions and consulting on projects of all kinds. Please contact faculty listed above for further information.

Website: www.its.pdx.edu

Traffic Signal Lab

2. Lab Type:

Planning

3. Center/Institute Name:

Oregon Transportation Research and Education Consortium (OTREC)

4. University Name:

Department of Civil & Environmental Engineering
Portland State University

5. Center Contact Information:

Oregon Transportation Research and Education Consortium (OTREC)
Director, Dr. Robert Bertini
Portland State University
301A Engineering Building
PO Box 751
Portland, OR 97207

Phone: 503-725-4249

Fax: 503-725-5950

6. Lab Manager Contact Information:

Christopher Monsere
(503) 725-9746
monsere@pdx.edu

7. Lab Mission/Purpose:

The theme of the Traffic Signal Lab is to integrate traffic signal hardware and systems with a strong focus on data processing of traffic signal information. The Department of Civil and Environmental Engineering at Portland State University has dedicated approximately 400 square feet of lab space in the new Engineering Building for this lab, and it will be the first of its kind in Oregon. In traffic operations, the traffic signal is a key component in the transportation system which strives to deliver efficient, safe, and reliable movement of traffic. Using advanced simulation software and other tools, this lab will help relate the physical and simulation environments to foster a greater student understanding of transportation concepts. The Traffic Signal Lab will be used in a teaching environment, as well as for a wide variety of research activities.

8. Lab Capabilities:

The Traffic Signal Lab will include a teaching workstation with six student training workstations. Each workstation will have a computer, monitor, and traffic signal controller (either virtual software or an actual physical controller), and connections to the central teaching workstation. The teaching workstation will function as the central computer and can control and

connect with all workstations. This workstation will also serve as the point of connection to the regional ITS network and the City of Portland's central system signal software. This will allow the lab to function as a virtual traffic signal system that can be configured to any real-world condition. Research can be conducted using the Traffic Signal Lab to transform available data into useful outputs such as real-time traveler information, measurement of historical performance, the identification of poorly performing signals, etc.

Goals for the lab include working the City of Portland and other partners to include a "remote field lab" concept intersection where PSU researchers could access video, signal timing, and detector information in the lab. Many research questions could be explored with the application of the appropriate theoretical models, some which still need to be proven and applied to real-world empirical data.

9. Lab Equipment:

Ultralyte Lidar Gun
Controller Interface Devices (CID)
Autoscope Rackvision
170 Type Controllers
Suitcase Tester
PCs with monitors
Synchro Software (6 licenses)
VISSIM Software (2 licenses)

10. Partners:

City of Portland
Oregon Department of Transportation (ODOT)
City of Beaverton
City of Vancouver
Transport ITS group

11. Examples of Current and Past Work:

The Traffic Signal Lab has a strong relationship to projects planned, underway or completed in the Intelligent Transportation Systems Lab at PSU. Dr. Chris Monsere and Dr. Robert Bertini are currently conducting research in a number of traffic operation related areas such as arterial performance, freight truck priority, and system-wide area ramp metering.

A current funded project for Dr. Monsere is to study the operational impacts of identifying trucks in the traffic stream and then providing additional green time to allow the trucks to make it through intersections. Loaded trucks use significant amounts of capacity at intersections during the start up period, greatly increasing delay and environmental impacts. The current research approach requires substantial field work and will be enhanced by the lab's remote access to intersections via fiber feed. The amount of data that could be collected and number of evaluations conducted would be greatly increased.

Evaluation of Transit Signal Priority
Evaluating Traffic Signal Operational Improvements for Freight Mobility

Combined Arterial Performance
Using Archived ITS Data to Measure Operational Benefits of a System-wide Adaptive Ramp
Metering
System

12. Notes (other information you'd like included):

Traffic Engineering Laboratory and Pavement Engineering Laboratory

2. Lab Type:

Infrastructure, Materials, and Maintenance

3. Center/Institute Name:

Oregon Transportation Research and Education Consortium (OTREC)

4. University Name:

Civil Engineering, Oregon Institute of Technology

5. Center Contact Information:

Oregon Transportation Research and Education Consortium (OTREC)

Director, Dr. Robert Bertini

Portland State University

301A Engineering Building

PO Box 751

Portland, OR 97207

Phone: 503-725-4249

Fax: 503-725-5950

6. Lab Manager Contact Information:

Roger Lindgren

(541) 885.1947

roger.lindgren@oit.edu

7. Lab Mission/Purpose:

The OIT Traffic Engineering Laboratory is housed in Cornett Hall at OIT, and was initiated in 2007. Traffic simulation and other traffic engineering activities previously accomplished in a mixed-use Civil Engineering student computer lab now have their own designated space. The primary users of the Traffic Lab are students enrolled in a senior elective traffic engineering course.

The OIT Pavement Engineering Laboratory, also housed in Cornett Hall, has been significantly enhanced over the past five years with the support of both on-campus and off-campus groups. The lab is used primarily for a junior level comprehensive pavement design course (which includes both pavement material and structural designs). The Lab is also used by senior students as part of a 3-term senior project sequence in which students perform pavement designs for large scale projects modeled closely on “real world” conditions.

8. Lab Capabilities:

The Pavement Lab is fully equipped for the mix design of asphalt pavement structures using the Superpave® methodology, and the centerpiece is a Superpave compatible gyratory compactor.

The Traffic Lab currently consists of five new computer workstations equipped with state-of-the-practice traffic simulation and evaluation software (VISSIM, PARAMICS, PETRA, HCS etc.). A new “hardware in the loop” traffic simulator (NIATT/McCain CID II) will be commissioned in Fall 2007.

9. Lab Equipment:

(See Lab Capabilities, above)

10. Partners:

Portland State University

Oregon Department of Transportation

Associated General Contractors of America – Oregon-Columbia Section

Asphalt Pavement Association of Oregon

11. Examples of Current and Past Work:

Faculty and students in the Traffic Engineering Lab have conducted a small number of traffic projects including the simulation of suburban Oregon interchanges and the evaluation of different traffic simulation tools for the Oregon Department of Transportation (ODOT). Together with partners at Portland State University and the ODOT, OIT researchers are currently evaluating a rural highway ice detection and warning system in the mountains of southern Oregon .

Due to the current program focus on undergraduate education at OIT, there has been no funded lab research to date in the Pavement Lab. Undergraduate students have worked on some interesting projects in the senior project class, including the design of a permeable pavement in association with a “sustainable construction” project.

It is anticipated that both the Traffic Engineering Lab and the Pavement Lab will support graduate student research projects when the proposed MSCE degree is fully operational.

12. Notes (other information you’d like included):

Intelligent Vehicles Laboratory

2. Lab Type:

Technology

3. Center/Institute Name:

Intelligent Transportation Systems Institute

4. University Name:

University of Minnesota

5. Center Contact Information:

Intelligent Transportation Systems Institute
Director, Dr. Max Donath
University of Minnesota
Center for Transportation Studies
200 Transportation and Safety Building
511 Washington Ave., SW
Minneapolis, MN 55455

(612) 626-1077

6. Lab Manager Contact Information:

Craig Shankwitz
(612) 625-0323
shank004@umn.edu

7. Lab Mission/Purpose:

The Intelligent Vehicles Laboratory's mission is to develop and test innovative technologies that improve traffic safety by reducing driver error—the cause of most crashes and traffic-related fatalities.

8. Lab Capabilities:

IV Laboratory research focuses on increasing driver safety in difficult driving conditions through the use of vehicle-guidance and collision-avoidance technologies. Several vehicles serve as experimental testbeds, including the SAFETRUCK (an International 9400 tractor-trailer), the SAFELOW (an International 2540 crew-cab snowplow), a state highway patrol car, and a Minnesota Valley Transit Authority bus used for transit research. Using these vehicles, IV Laboratory researchers are developing, testing, and integrating advanced technologies including:

- Centimeter-level differential global-positioning systems (DGPS)
- High-accuracy digital-mapping systems
- Range sensors, including radar and laser-based sensors
- A windshield head-up display (HUD), a virtual mirror, and other graphical displays
- Haptic and tactile feedback

Other current research topics include:

- Design and testing of custom human interfaces
- Collision-avoidance sensors and algorithms
- Intersection-surveillance systems
- Wireless communication among vehicles and with the infrastructure

9. Lab Equipment:

Several vehicles serve as experimental testbeds, including the SAFETRUCK (an International 9400 tractor-trailer), the SAFELOW (an International 2540 crew-cab snowplow), a state highway patrol car, and a Minnesota Valley Transit Authority bus used for transit research.

10. Partners:

Minnesota Department of Transportation
U.S. Department of Transportation's Research and Special Programs Administration
Federal Highway Administration
Federal Transit Administration
Twin Cities' Metro Transit
Minnesota Valley Transit Authority
Minnesota's Local Road Research Board
Hennepin County

11. Examples of Current and Past Work:

- Advanced Bus Rapid Transit: Innovative Technologies for Dedicated Roadways
- Infrared Sensing for Driver Assistive Systems
- Multiuse, High Accuracy, High Density Geospatial Databases
- Study to Determine Motorcycle Impairment at Different BAC Levels
- Guidance Augmentation for Transit Applications
- GPS Augmentation for Robust Lane Assistance
- Analysis of Highway Design and Geometric Effects on Crashes

12. Notes (other information you'd like included):

Minnesota Traffic Observatory

2. Lab Type:

Planning

3. Center/Institute Name:

Intelligent Transportation Systems Institute

4. University Name:

University of Minnesota

5. Center Contact Information:

Intelligent Transportation Systems Institute
Director, Dr. Max Donath
University of Minnesota
Center for Transportation Studies
200 Transportation and Safety Building
511 Washington Ave., SW
Minneapolis, MN 55455

(612) 626-1077

6. Lab Manager Contact Information:

John Hourdos, Director
(612) 626-5492
Hourdos@umn.edu

7. Lab Mission/Purpose:

The primary research mission of the Minnesota Traffic Observatory is to support research in monitoring, management, and simulation of traffic systems.

8. Lab Capabilities:

Data Acquisition and Sensing

The Minnesota Traffic Observatory (MTO) has developed several generations of data-gathering systems to meet the needs of researchers working on traffic flow issues. The most recent of these is the Beholder system, a fully independent network of video detectors providing space- and time-continuous coverage of the I-35W/I-94 Commons freeway area in Minneapolis.

Beholder expands on the pioneering Autoscope™ system, originally developed at the University of Minnesota and now in widespread commercial use. Beholder's portable monitoring stations are currently deployed on the roofs of several high-rise buildings overlooking the freeway, and transmit data back to the lab via a high-speed wireless network.

The Minnesota Department of Transportation (Mn/DOT) supplies sixteen switchable uncompressed video feeds to the MTO, enabling researchers to switch between more than 300 Mn/DOT cameras monitoring the metropolitan freeway network.

Simulation and Modeling

Several traffic simulation packages are used in the Minnesota Traffic Observatory, primarily AIMSUNNG for “microscopic” simulation based on individual vehicles, and the KRONOS 9 package—developed at the University of Minnesota—for macroscopic or platoon-based simulations. Other packages are used as needed.

Planning Support Systems

The GIS/Map planning table (at right) is a recent development of the MTO. Designed to facilitate collaborative processes, it has been the centerpiece of research in participatory process methodologies and planning support systems design and evaluation. MTO engineers are closely collaborating with local and national planning experts in the development of new planning support tools.

Advanced Visualization Systems

The DEN (Digital Immersive ENvironment) is a high-fidelity 3D interactive immersive display system which serves as a general resource to observe and explore traffic flow scenarios within any environmental context, and from any fixed or moving perspective. MTO engineers are working with civil engineering researchers to use the DEN to evaluate infrastructure-based driver warning systems.

9. Lab Equipment:

(See Lab Capabilities, above)

10. Partners:

FHWA
Mn/DOT
Local and regional agencies
University of Vermont
National Park Service
NGSIM Community

11. Examples of Current and Past Work:

- A Predictive Study of Use Impacts on the Denali Park Road
- Bus Signal Priority Based on GPS and Wireless Communications
- Enhanced Micro-Simulation Models for Accurate Safety Assessment
- Identification and Simulation of Common Freeway Accident Mechanisms
- Accident Prevention Based on Automatic Detection of Accident Prone Traffic Conditions
- Evaluation and Improvement of the Stratified Ramp Metering Algorithm through Microscopic Simulation

12. Notes (other information you'd like included):

Wisconsin Traffic Operations and Safety (TOPS) Laboratory

2. Lab Type:

Safety and Operations

3. Center/Institute Name:

Wisconsin Transportation Institute

4. University Name:

College of Engineering

University of Wisconsin – Madison

5. Center Contact Information:

National Center for Freight & Infrastructure Research and Education

Director, Dr. Teresa M. Adams

University of Wisconsin

Department of Civil and Environmental Engineering

2205 Engineering Hall

1415 Engineering Drive, Room 272

Madison, WI 53706

Phone: (608) 263-3175

Fax: (608) 263-2512

6. Lab Manager Contact Information:

David Noyce

(608) 265-1882

noyce@engr.wisc.edu

Todd D. Szymkowski, P.E., PTOE

(608) 263-2684

szymkowski@engr.wisc.edu

7. Lab Mission/Purpose:

The Wisconsin Traffic Operations and Safety (TOPS) Laboratory is an organization developed with a mission to improve traffic operations and safety in Wisconsin and across the Midwest through a diverse balance of service partnerships, research and training.

8. Lab Capabilities:

TOPS Laboratory service areas include:

- Traditional Traffic Operations and Safety Engineering and Technology / Services Development.
- Traffic Operations Support Services and Knowledge Management.
- Transportation Operations Data Management.
- Traffic Operations Program Review
- Transportation Operations Data Management

9. Lab Equipment:

10. Partners:

• **Wisconsin Department of Transportation (WisDOT)**

<http://www.dot.state.wi.us/>

• **Federal Highway Administration (FHWA)**

<http://www.fhwa.dot.gov>

11. Examples of Current and Past Work:

- Evaluation of the Flashing Yellow Arrow Permissive Left-Turn Indication Field
- Implementation
- Archived Data Management System (*WisTransPortal*)
- The Cost Effectiveness of Approach Guardrail on County State-Aid Bridges
- Road Weather Safety Audit Plan and Initial Implementation
- Work Zone Queue Analysis Calibration/Validation Support
- Preventative Maintenance Strategies for WisDOT

12. Notes (other information you'd like included):

Laboratories are primarily for support of research and education activities. Contact Mr. Szymkowski for additional details.

Lab Listing by University

The following list of laboratories is organized alphabetically by university.

The Universities are as follows:

- Marshall University
- Montana State University
- Missouri University of Science and Technology
- Northwestern University
- Oklahoma State University
- Portland State University
- University of Alaska
- University of Minnesota
- University of Vermont
- University of Wisconsin

Marshall University

Multimodal Transportation Research and Operations Lab

2. Lab Type:

Intelligent Transportation Systems and Traffic Monitoring Laboratory, and Training Center

3. Center/Institute Name:

Nick J. Rahall II Appalachian Transportation Institute

4. University Name:

Marshall University

5. Center Contact Information:

Dr. Andrew P. Nichols

6. Lab Manager Contact Information:

304-696-3203

andrew.nichols@marshall.edu

7. Lab Mission/Purpose:

This lab will support the West Virginia Department of Transportation in its goal to create a statewide Intelligent Transportation System to monitor and improve traffic flow along key corridors within the state. The lab will also be used to conduct traffic operations and safety research to provide useful information to the WVDOT for day-to-day decision-making purposes. This lab will also incorporate real-time information from other modes of transportation, including maritime, rail, and air.

8. Lab Capabilities:

9. Lab Equipment:

30 terabyte database and server, two operations consoles, connectivity to video cameras, dynamic message signs, roadway sensors, two plasma televisions, training facilities.

10. Partners:

West Virginia Department of Transportation

Federal Highway Administration

Marshall University College of Information Technology and Engineering

11. Examples of Current and Past Work:

WVDOT Intelligent Transportation System Statewide Deployment (current)

WVDOT Intelligent Transportation System Evaluation (current)

Monitoring of Huntington, WV City Signal System (planned)

This center is capable of functioning as a real-time traffic monitoring facility for incident response and congestion management.

12. Notes (other information you'd like included):

This laboratory is currently being constructed and is scheduled for completion in August 2008. It is being funded by the West Virginia Department of Transportation ITS Deployment project to serve as a disaster recovery and training center. It will be a mirror of the primary traffic management center, located in the WVDOT building in Charleston, WV. This lab will also house the ITS data archive to facilitate the evaluation of the project and other future research. Researchers with the Rahall Transportation Institute will have full access to this facility for operations and research purposes.

Structural and Materials Lab

2. Lab Type:

Structural, Materials, and Soil Labs

3. Center/Institute Name:

Nick J. Rahall II Appalachian Transportation Institute

4. University Name:

Marshall University

5. Center Contact Information:

Dr. Wael Zatar

6. Lab Manager Contact Information:

Phone: (304) 696-6043

E-mail: zatar@marshall.edu

7. Lab Mission/Purpose:

The lab provides a state-of-the-art testing facility for education and research of modern/.advanced civil engineering materials for application in transportation infrastructures.

8. Lab Capabilities:

Testing capabilities are available to perform tensile and compression testing of metals, sieve analysis of aggregates, specific gravity and absorption of coarse and fine materials, properties of aggregates and cementitious materials, properties of fresh concrete, compression and flexural testing of hardened and aged concrete, testing of soil samples, and non-destructive testing and evaluation of hardened concrete.

9. Lab Equipment:

- 60 kip Capacity Tinius Olsen Super L Universal Testing Machine with Digital and Handheld Controllers
- 300 kip Capacity Forney Compression Testing Machine with Digital Load Readout
- Gilson 8 Inch and 12 Inch Sieve Shakers
- Model TS-1 Gilson Testing Aggregate Screen Coarse Aggregate Shaker
- Gilson Combination Portable Beam Tester
- Ohaus Sensitive Balances –Multiple Capacities
- Portable Concrete Mixer and Curing Tank
- Specific Gravity and Absorption Testing Units
- Portable Concrete Slump Test Sets
- Air Content Testers
- Direct Shear Test Units
- Unconfined Testing Unit
- Soil Hydrometer

- Tri-Axial Testers
- Consolidation Unit
- Large Capacity Electric Ovens
- Non-Destructive Concrete Testing Equipment

10. Partners:

College of Information Technology and Engineering, Marshall University
West Virginia Department of Transportation
Federal Highway Administration

11. Examples of Current and Past Work:

Self-Consolidating Concrete
High-Strength High Performance Concrete
Estimating of Remaining Service Life of Corrosion-Deteriorated Highway Bridges

12. Notes (other information you'd like included):

Facility Use: The labs are available for partnership development. Testing is available on a contractual basis.

Montana State University

Corrosion, Electrochemistry and Analysis Laboratory

2. Lab Type:

Infrastructure, Materials, and Maintenance

3. Center/Institute Name:

Western Transportation Institute

4. University Name:

Montana State University

5. Center Contact Information:

Western Transportation Institute
College of Engineering -Montana State University
PO Box 174250
2310 University Way Blg. 2 Ste 2
Bozeman, MT 59717-4250

406-994-6114 (phone)

406-994-1697 (fax)

6. Lab Manager Contact Information:

Xianming Shi
(406) 994-6486
Xianming_s@coe.montana.edu

7. Lab Mission/Purpose:

CEAL aims to understand and mitigate deicer/anti-icer effects on civil engineering materials and the environment. The lab creates an environment to foster the growth of team members, to encourage innovative thinking, and to promote problem-driven, inter-disciplinary partnerships

8. Lab Capabilities:

A multi-disciplinary team operates the lab and features a diverse combination of expertise including corrosion science and engineering, electrochemistry, polymer chemistry, environmental science, and civil engineering.

This laboratory has been and will continue to be used on projects to: 1) Conduct accelerated chloride ingress tests, gravimetric and electrochemical corrosion tests, and electrochemical engineering experiments; 2) Study environmentally friendly concretes and cement-based composites; 3) Analyze the behavior and effectiveness of corrosion mitigation measures for highway bridges; 4) Research and develop polymers to mitigate the winter effects on concretes and asphalts.

Research Priorities:

- Deicer impact on concretes, asphalts and plastics
- Deicer impact on the environment
- Accelerated test protocols
- Nanoscience and nanotechnology applied to corrosion and materials integrity in transportation
- Use of recycled materials for civil engineering

Behavior and effectiveness of corrosion mitigation measures for highway systems in cold regions, e.g., electrochemical rehabilitation, coatings, penetrating sealers, and corrosion inhibitors

9. Lab Equipment:

The laboratory is equipped with an environmental chamber, ventilation hoods, a corrosion testing machine, potentiostats, advanced electrochemical systems, and modeling software applications.

10. Partners:

U.S. DOT Research & Innovative Technology Administration
State Departments of Transportation (CA, WA, CO, etc.)
Pacific Northwest Snowfighters Association (BC, WA, ID, MT, OR, CO)
Civil Engineering Department, MSU
Image & Chemical Analysis Laboratory, MSU
Airport Cooperative Research Program (ACRP)
NCHRP IDEA
Transportation Research Board, National Academies
School of Materials Sci. & Eng., Tianjin Univ., China
CC Technologies Laboratories, Inc.
Southwest Research Institute

11. Examples of Current and Past Work:

Corrosion Inhibition Mechanisms at the Steel/Concrete Interface
Effect of Chloride-Based Deicers On Reinforced Concrete Structures: Phase I
Electrochemical Rehabilitation of Salt-Contaminated Concrete: A Laboratory Study

12. Notes (other information you'd like included):

Laboratories will be available for partnership development. Fees may apply. Contact us for more information.

TRANSCEND

2. Lab Type:

Cold Regions Field Laboratory

3. Center/Institute Name:

Western Transportation Institute

4. University Name:

Montana State University

5. Center Contact Information:

Western Transportation Institute
College of Engineering -Montana State University
PO Box 174250
2310 University Way Blg. 2 Ste 2
Bozeman, MT 59717-4250

406-994-6114 (phone)

406-994-1697 (fax)

6. Lab Manager Contact Information:

Eli Cuelho
(406) 994-7886
elic@coe.montana.edu

7. Lab Mission/Purpose:

The vision of this laboratory is to improve transportation maintenance, operations and safety with cold-regions research through the collaboration of academia, industry and government.

8. Lab Capabilities:

The multidimensional research capability that the site offers can greatly enhance researchers' understanding of the many interrelated issues associated with the transportation environment. The site offers a safe environment to test innovative products without creating a nuisance or endangering the traveling public.

This laboratory will be used on projects to:

- Conduct multidimensional rural transportation research in a cold environment
- Test products and their effects on roadway infrastructure, vehicles, and the surrounding environment
- Evaluate de-icing and anti-icing protocols in the field
- Demonstrate and test technologies aimed to reduce animal-vehicle crashes
- Study new and improved materials used to build and maintain infrastructure
- Study the effects of winter driver training for commercial vehicle and passenger car operators

9. Lab Equipment:

The Lewistown Cold Region Rural Transportation Research Testbed will be constructed along portions of old runways at the Lewistown Airport in central Montana. The site will include a backbone of communications, power, and data networking capabilities, all of which are necessary to collect, store, and disseminate data during research.

10. Partners:

Federal Highway Administration (FHWA)
Montana Department of Transportation
Idaho Transportation Department
Oregon Department of Transportation
Washington State Department of Transportation
Fergus County Port Authority
Office of Public Instruction
Pacific Northwest Snowfighters Association

11. Examples of Current and Past Work:

Establishing Best Practices of Removing Snow and Ice from California Roadways
Effects of Defensive Vehicle Handling Training on Novice Driver Safety
Inhibitor Longevity and Deicer Performance Study
Roadside Animal Detection Systems (RADS) Test-Bed

12. Notes (other information you'd like included):

Laboratories will be available for partnership development. Fees may apply. Contact us for more information.

Driving Simulator Laboratory

2. Lab Type:

Human Factors

3. Center/Institute Name:

Western Transportation Institute

4. University Name:

Montana State University

5. Center Contact Information:

Western Transportation Institute
College of Engineering -Montana State University
PO Box 174250
2310 University Way Blg. 2 Ste 2
Bozeman, MT 59717-4250

406-994-6114 (phone)

406-994-1697 (fax)

6. Lab Manager Contact Information:

Mike Kelly
(406) 994-7377
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Suzanne Lassacher
(406) 994-6010
suzannel@coe.montana.edu

7. Lab Mission/Purpose:

The high-fidelity driving simulation facility provides an ideal setting to collect data on driver performance and behavior in a variety of customized scenarios

8. Lab Capabilities:

The DriveSafety DS500C Vection driving simulator features five visual channels providing approximately 140-degrees of perspective, rear-view and side mirrors, and speakers that provide a realistic sound environment. Using the HyperDrive software system, driving scenarios are custom-designed to meet the needs of specific research projects. Situated next to the simulator, the operator station allows the researcher to develop and control research scenarios and to collect a broad range of data on driver performance. A separate control room is used for participant reception, test monitoring, and graduate student research.

A new “eye-tracker” system will soon be added to the driving simulator to test participants’ reaction to visual stimuli. This new device will continuously track and record the drivers’ eye position to determine where they are looking in the vehicle and along the road. The driving

simulation facility also contains a large high-bay area designed to accommodate a planned full motion driving simulator that will allow test participants to experience the sensation of bumps, forward and backward acceleration, and other sensory related movements.

Carefully constructed research and laboratory facilities such as this one allow researchers and engineers to test and evaluate road designs and vehicle innovations before they are actually deployed. Potentially, millions of road construction dollars can be saved and many lives spared through a proactive approach to safety.

A new system to be installed in the laboratory in 2008 will consist of more capable driving simulator for research. While a handful of universities nationwide have a simulator of this capability, WTI will be the first to use it strictly for driver safety research. The simulator will have a 6 d.f. (roll, pitch, yaw, heave, surge, and sway) motion platform that provides acceleration cues that more realistically simulate the driving environment than the fixed vehicle cab on the current simulator. For example, the full-motion capability will allow drivers to experience the sensation of bumps, sway, forward and backward acceleration, and other sensory related movements.

9. Lab Equipment:

DriveSafety DS500C Vection driving simulator
HyperDrive software
A new “eye-tracker” system will soon be added

10. Partners:

FHWA
CALTRANS
MDT
State Transportation Departments
Equipment designers and manufacturer

11. Examples of Current and Past Work:

The simulator has been used on projects to:

- Compare the most effective type of animal warning signs
- Evaluate the effectiveness of safety innovations
- Test the use of cellular phones and their impact on driver behavior
- Examine highway improvements in the lab before construction

12. Notes (other information you’d like included):

Laboratories will be available for partnership development. Fees may apply. Contact us for more information.

Geosynthetic Materials Laboratory

2. Lab Type:

Infrastructure, Materials, and Maintenance

3. Center/Institute Name:

Western Transportation Institute

4. University Name:

Montana State University

5. Center Contact Information:

Western Transportation Institute
College of Engineering - Montana State University
PO Box 174250
2310 University Way Blg. 2 Ste 2
Bozeman, MT 59717-4250

406-994-6114 (phone)

406-994-1697 (fax)

6. Lab Manager Contact Information:

Eli Cuelho
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elic@coe.montana.edu

Steve Perkins
(406) 994-6119
stevep@ce.montana.edu

7. Lab Mission/Purpose:

The aim of this lab is to test the properties and quantify the benefits of geosynthetic materials in relationship to the surrounding pavement structure.

8. Lab Capabilities:

The primary goal of this lab is to meet a growing need for geosynthetic material tests to define mechanical properties pertinent to working load conditions within pavement structures. These new design and analysis solutions are essential for the growth of safe and reliable use of economical reinforcement products for construction and repair of our transportation infrastructure. The research performed in this laboratory will help fulfill this critical need by providing testing equipment and associated test protocols that can be used to determine material properties needed in pavement design and analysis.

The geosynthetic lab is in the process of acquiring a servo-hydraulic system to enhance its existing pullout device and a servo-hydraulic uniaxial tension device. This new equipment will

make it possible to conduct research and evaluate the benefit of geosynthetics in new and rehabilitated highway structures.

9. Lab Equipment:

The geosynthetic lab is in the process of acquiring a servo-hydraulic system to enhance its existing pullout device and a servo-hydraulic uniaxial tension device.

10. Partners:

American Society of Testing and Materials (ASTM)
Ryan Berg and Associates (Consultant)
Barry Christopher (Consultant)
Departments of Transportation (DOTs)
Drexel University
Federal Highway Administration (FHWA)
Mirafi Construction Products
Naue Fasertechnik
Norwegian University of Science and Technology
Tensar Earth Technologies, Inc.
University of Illinois
University of Maryland

11. Examples of Current and Past Work:

This laboratory will be used on projects to:

- Develop test methods to determine material properties for mechanistic-empirical reinforced pavement design
- Investigate the properties of new and unique geosynthetic products
- Support projects involving the modeling and design of reinforced pavements

12. Notes (other information you'd like included):

Laboratories will be available for partnership development. Fees may apply. Contact us for more information.

Roadside Animal Detection Systems (RADS) Test-Bed

2. Lab Type:

Environmental

3. Center/Institute Name:

Western Transportation Institute

4. University Name:

Montana State University

5. Center Contact Information:

Western Transportation Institute
College of Engineering - Montana State University
PO Box 174250
2310 University Way Blg. 2 Ste 2
Bozeman, MT 59717-4250

406-994-6114 (phone)

406-994-1697 (fax)

6. Lab Manager Contact Information:

Marcel Huijser
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mhuijser@coe.montana.edu

Matt Blank

(406) 994-7120

mblank@coe.montana.edu

7. Lab Mission/Purpose:

The “Roadside Animal Detection Systems” (RADS) Test-Bed will provide a controlled environment to evaluate different animal detection systems under similar test conditions and assess relative performance of these technologies.

8. Lab Capabilities:

Transportation agencies need to be able to select the most reliable animal detection system and have insight into the cost-benefit ratios of different systems from different vendors. However, field data related to the reliability, operations and maintenance of off-the-shelf animal detection systems remain anecdotal at best. Furthermore, past studies evaluated these systems using different study parameters and research methods under different road and weather conditions, making it difficult to compare the data that was collected.

Research focuses on evaluating various types of animal detection systems from multiple vendors at the same site and under similar test conditions, thus creating a more comparable database with which to assess the relative performance of these technologies. Several commercially available

roadside animal detection systems are being installed at the airport facility in Lewistown during the first phase of this project. Based on long-term performance data and the cost-benefit of such systems, a permanent installation of the most appropriate system will be proposed for one or more locations on Montana highways.

9. Lab Equipment:

10. Partners:

Federal Highway Administration
Montana Department of Transportation
Port Authority of Lewistown, Montana
Fergus County, Montana

11. Examples of Current and Past Work:

- Evaluation of an Animal Warning System Effectiveness
- The Comparison of Animal Detection Systems in a Test-Bed: A Quantitative Comparison of System Reliability and Experiences with Operation and Maintenance
- Animal Vehicle Crash Mitigation Using Advanced Technology Pooled Fund: Phase II

12. Notes (other information you'd like included):

Laboratories will be available for partnership development. Fees may apply. Contact us for more information.

Systems Engineering and Integration Laboratory

2. Lab Type:

Technology

3. Center/Institute Name:

Western Transportation Institute

4. University Name:

Montana State University

5. Center Contact Information:

Western Transportation Institute
College of Engineering - Montana State University
PO Box 174250
2310 University Way Blg. 2 Ste 2
Bozeman, MT 59717-4250

406-994-6114 (phone)

406-994-1697 (fax)

6. Lab Manager Contact Information:

Doug Galarus
(406) 994-5268
dgalarus@coe.montana.edu

7. Lab Mission/Purpose:

The goal of this lab is to facilitate the application of systems engineering best practices to the engineering, development, and integration of intelligent transportation systems, information technology, and communications systems.

8. Lab Capabilities:

This laboratory consists of sophisticated, state-of-the-art equipment, and infrastructure enabling the Systems Group staff to test and develop hardware and software. Within the lab there is sufficient space for the assembly and testing of prototype systems as well as systems-related demonstrations and educational trainings for small groups. A flexible cabling system facilitates the testing and demonstration of various wired and wireless communication technologies. Servers and workstations are equipped with “virtualization” and development software that allows staff to rapidly configure, develop, and test diverse software applications using multiple operating systems. GIS and mathematical analysis software are used by staff to model, analyze, and visualize systems and their characteristics. Multimedia gear such as digital cameras, camcorders, and a projection system assist staff in the development of demonstrations and training tools.

This laboratory has been used on projects to:

- Integrate satellite and cellular communication equipment with mobile computing devices
- Aggregate and disseminate sensor readings into a database to indicate weather changes
- Test systems and algorithms for triggering warnings to drivers in work zones via variable message signs
- Visualize and compare the coverage of communication systems in rugged terrain
- Process input from hand-held field devices regarding animal-vehicle collisions, rock slides, and other incidents that impact travelers and roadways

9. Lab Equipment:

- Servers and workstations equipped with “virtualization” and development software
- GIS and mathematical analysis software
- Multimedia gear such as digital cameras, camcorders, and a projection system
- A flexible cabling system facilitates

10. Partners:

CALTRANS

State Transportation Departments

Local and regional agencies

Department of Homeland Security

11. Examples of Current and Past Work:

- WeatherShare
- Development of Prototype Integrated PDA/GPS System to Collect Roadkill Data
- Redding Responder
- Improve Communications Between TMC & TMS Elements in a Rural Environment through a System that is Deployable Statewide
- Automated Safety Warning System Controller
- Advanced Changeable Message Signs

12. Notes (other information you’d like included):

Laboratories will be available for partnership development. Fees may apply. Contact us for more information.

Transportation Research Application and Instrumentation Laboratory (TRAIL)

2. Lab Type:

Planning

3. Center/Institute Name:

Western Transportation Institute

4. University Name:

Montana State University

5. Center Contact Information:

Western Transportation Institute
College of Engineering - Montana State University
PO Box 174250
2310 University Way Blg. 2 Ste 2
Bozeman, MT 59717-4250

406-994-6114 (phone)

406-994-1697 (fax)

6. Lab Manager Contact Information:

Suzanne Lassacher
(406) 994-6010
suzannel@coe.montana.edu

David Veneziano

(406) 994-6320

david.veneziano@coe.montana.edu

7. Lab Mission/Purpose:

The purpose of this lab is to simulate a small urban and rural Traffic Management Center (TMC) and to serve as a comprehensive work force development and research center for Intelligent Transportation Systems (ITS) technologies.

8. Lab Capabilities:

The TRAIL laboratory serves as a test bed for ITS technologies, Traffic Management Systems communications, traffic management, traveler information, and incident response. Currently, the lab is deploying ITS technologies such as sensors and video surveillance cameras in heavily traveled corridors to gather data with the intention of enhancing safety. The laboratory provides an environment for ITS evaluation and workforce development, as well as a setting for local and state government agencies and transportation departments to observe the benefits of a Traffic Management Center.

The physical lab is equipped with two fifty inch high-definition plasma monitors that display various types of data currently collected by sensors and video cameras. This laboratory assists communities with future growth plans by collecting and sharing data that can be used by various agencies to determine community needs and provide solutions to ongoing problems.

This laboratory will be used on projects to:

- Identify problematic winter road conditions
- Collect and analyze data pertaining to vehicle speeds, counts, classifications, and pavement conditions
- Evaluate ITS technologies and communications schemes
- Traffic management center for special events (e.g. MSU Football, etc)
- Enhance workforce development

9. Lab Equipment:

The physical lab is equipped with two fifty inch high-definition plasma monitors that display various types of data currently collected by sensors and video cameras.

10. Partners:

State Transportation Departments
NorthWest Energy
Local governments

11. Examples of Current and Past Work:

MSU Football Special Event Traffic Management

12. Notes (other information you'd like included):

Laboratories will be available for partnership development. Fees may apply. Contact us for more information.

Missouri University of Science and Technology (Rolla)

Northwestern University

Oklahoma State University

Asphalt Binders Laboratory

2. Lab Type:

Infrastructure, Materials, and Maintenance

3. Center/Institute Name:

Oklahoma Transportation Center (OTC)

4. University Name:

University of Oklahoma

5. Center Contact Information:

Oklahoma Transportation Center (OTC)
Director, David Alan Tree
Oklahoma State University
School of Civil & Environmental Engineering
201 Advanced Technology Research Center
Stillwater, OK 74078

Phone: (405) 744-5957

Fax: (405) 744-3189

6. Lab Manager Contact Information:

Musharraf Zaman
(405) 325-2626
zaman@ou.edu

7. Lab Mission/Purpose:

Measure rheological properties of asphalt binders in accordance with the Superpave methodology. Advanced characterization of binders and mastic using mechanistic approaches.

8. Lab Capabilities:

Facilities are available for a wide range of material characterization tests: classification of asphalt binders based on the Superpave methodology, fundamental surface science studies of HMA materials (e.g., surface free energy measurements of binders and aggregates) and nano-scale measurement of binder surface properties.

9. Lab Equipment:

The available facilities include a Rolling Thin Film Oven (RTFO), a Pressure Aging Vessel (PAV), a Dynamic Shear Rheometer (DSR) and a Rotational Viscometer (RV). A Bending Beam Rheometer (BBR) is also available. Vapor sorption method using a Universal Sorption Device (USD) can be used for surface free energy measurements of aggregates. The USD can also be used for the surface free energy and moisture diffusion coefficient measurements of asphalt binders. The USD available in this laboratory is a SGA-100 Water Sorption Analyzer. The water vapor as well as organic vapors can be used in this equipment. A high temperature option is also

available (5°C– 60°C). The relative humidity range is between 2% and 98%. Other equipment available includes a gravity oven, a force oven, a glass cleaning oven, a regular scale and an analytical scale. Most recently, an aggregate imaging system (AIMS) and a dynamic mechanical analyzer (DMA) have been procured.

10. Partners:

Oklahoma Department of Transportation
Oklahoma Asphalt Pavement Association
Haskell-Lemon, Inc., Oklahoma City, Oklahoma
Engineering Services and Testing, Inc., Norman, Oklahoma

11. Examples of Current and Past Work:

- Effect of Anti-Stripping Additives on Performance Graded Binders in Oklahoma, funded by Oklahoma Transportation Center
- Investigate the Use of Warm Mix Asphalt as a Viable Paving Material in the United States, Oklahoma Transportation through Federal Highway Administration, Turner-Fairbank Research Center
- Evaluation of Surface Free Energy Characteristics of Aggregates and Binders in Hot Mix Asphalt, funded by Oklahoma Transportation Center

12. Notes (other information you'd like included):

The facilities available in this laboratory can be used by others including those affiliated with a University Transportation Center. For details on the financial arrangement and time schedule, please contact Musharraf Zaman.

Donald G. Fears Structural Engineering Laboratory

2. Lab Type:

Infrastructure, Materials, and Maintenance

3. Center/Institute Name:

Oklahoma Transportation Center (OTC)

4. University Name:

University of Oklahoma

5. Center Contact Information:

Oklahoma Transportation Center (OTC)
Director, David Alan Tree
Oklahoma State University
School of Civil & Environmental Engineering
201 Advanced Technology Research Center
Stillwater, OK 74078

Phone: (405) 744-5957

Fax: (405) 744-3189

6. Lab Manager Contact Information:

Dr. Kyran Mish, Lab Director
(405) 325-1010
kdmish@ou.edu

7. Lab Mission/Purpose:

The Donald G. Fears Structural Engineering Laboratory has two primary purposes: Education and Research. The Education foci for Fears Lab range from undergraduate course-related labs and internships to doctoral research programs. The Research foci for Fears Lab range from: 1) large-scale testing and computational predictive modeling of structural systems, such as full-scale bridge beams and decks, 2) testing and monitoring bridges in the field at remote sites, and 3) the testing of structural engineering materials such as concrete, steel and wood.

8. Lab Capabilities:

The Donald G. Fears Structural Engineering Laboratory consists of 12,600 sq feet of high bay laboratory space and 3,500 sq feet of office space. The Laboratory grounds include 0.7 acres of exterior storage.

The office space houses the ODOT bridge squad internship program; this program includes four full time ODOT personnel including a senior engineering manager, two registered engineers and a drafter. The office space also houses OU structural engineering faculty and staff offices, a computational structural systems predictive modeling lab, and a conference room with high resolution, high fidelity presentation equipment and videoconferencing support.

A 1,200 foot room within the high bay laboratory is dedicated for the use of the ASCE student chapter for their competition teams. These include a nationally ranked concrete canoe group and steel bridge team.

9. Lab Equipment:

The high bay laboratory space includes a 2,400 sq ft strong floor that is four feet thick. This strong floor provides an adaptable foundation for large-scale structural testing. A 5-ton bridge crane services the strong floor building and three twenty-foot-long, 3-ton jib cranes are available in the expanded lab area. Fears lab can achieve an axial load of 6,000,000 lbs., a bending load of 8,000,000 lb-ft and internal pressures of 6,000 psil. The laboratory also includes a 4 ft by 6 ft, 20 Hz shake table and data acquisition equipment that can collect data at 100,000 Hz simultaneously from all channels. Various hydraulic cylinders, pumps and data acquisition systems are available to perform static, pseudo dynamic and dynamic loading of structural systems. Approximately 1,600 sq ft of the high bay is dedicated to concrete materials research. This area includes an environmental chamber, a 1 cu yd mixer, a 400 k concrete testing machine and the following testing equipment: RCIP, corrosion cells, unrestrained shrinkage, restrained ring tests, shrinkage from time zero, impulse-echo and GPR imaging.

10. Partners:

Federal Highway Administration
Oklahoma Department of Transportation
Dynamic Structure Sensing & Control Center (DySSC) - Vehicle Vibration Test Lab
National Science Foundation

11. Examples of Current and Past Work:

- Active on site Bridge monitoring of dynamic and static strains & accelerations
- Testing of a composite steel and polymer sandwich plate deck system for bridges, on site and in lab
- Development of crack free bridge decks – using shrinkage control and Shilstone gradation theory
- Development of Very Early Strength portland cement concrete for patching and repair of bridge decks
- Development of overlays for bridge decks and roadways using latex modified and CSA cements
- Testing of fiber reinforced polymer repairs to pre-stressed concrete AASHTO bridge beam girders
- Developed the state Specification for bridge decks and overlays for ODOT
- Developing a State wide program for Truck Weight enforcement for ODOT
- Development of high-fidelity finite element analyses for blast and other bridge dynamic loads
- Develop wireless sensor technology for monitoring bridges and roadways
- Developed a method for improving the performance of Fly Ash in portland cement concrete
- Investigate corrosion in pre-stressed concrete AASHTO bridge beam girders

12. Notes (other information you'd like included):

Laboratory facilities are available to collaborators under standard university agreements.

Vehicle Vibration Test Lab of the Dynamic Structure Sensing & Control Center (DySSC)

2. Lab Type:

Infrastructure, Materials, and Maintenance

3. Center/Institute Name:

Oklahoma Transportation Center (OTC)

4. University Name:

University of Oklahoma

5. Center Contact Information:

Oklahoma Transportation Center (OTC)
Director, David Alan Tree
Oklahoma State University
School of Civil & Environmental Engineering
201 Advanced Technology Research Center
Stillwater, OK 74078

Phone: (405) 744-5957

Fax: (405) 744-3189

6. Lab Manager Contact Information:

Dr. David Baldwin
(405) 325-1090
baldwin@ou.edu

7. Lab Mission/Purpose:

Provides the ability to conduct full-scale vibration testing of large vehicles up to 80,000 lbs. The lab also has a 2,000 lb. electrodynamic shaker for unit vibration testing.

8. Lab Capabilities:

The centerpiece of the Vehicle Vibration Test Lab (VVTL) is a MTS four-poster road simulator capable of providing 20,000 lbs. of lift on each wheel actuator. Standard laboratory displacement profiles can be used as vibration inputs to vehicles up to the size of Class 8 tractor-trailer combinations; the actuators are adjustable to fit wheel bases up to 90 inches by 90 inches. The lab owns a Class 8 tractor and a flatbed trailer (adjustable spread axle) that can be loaded to approximately 89,000 lbs. GVW. In addition, a 2,000 lb. electrodynamic shaker is installed in the lab to conduct vibration testing on units and smaller structures. Instrumentation available in the lab includes National Instruments data acquisition systems running the LabVIEW software, and a variety of acceleration, displacement and strain measuring sensors. These data acquisition systems are capable of stationary as well as mobile application.

9. Lab Equipment:

(See Lab Capabilities, above)

10. Partners:

Federal Highway Administration
Oklahoma Department of Transportation
Fears Structural Engineering Laboratory

11. Examples of Current and Past Work:

Laboratory vibration testing of a heavy truck equipped with Smart Shock Absorbers
On-road vibration testing of a heavy truck equipped with Smart Shock Absorbers

12. Notes (other information you'd like included):

Pavement Materials Research Laboratories

2. Lab Type:

Infrastructure, Materials, and Maintenance

3. Center/Institute Name:

Oklahoma Transportation Center (OTC)

4. University Name:

Oklahoma State University

5. Center Contact Information:

Oklahoma Transportation Center (OTC)
Director, David Alan Tree
Oklahoma State University
School of Civil & Environmental Engineering
201 Advanced Technology Research Center
Stillwater, OK 74078

Phone: (405) 744-5957

Fax: (405) 744-3189

6. Lab Manager Contact Information:

Rifat Bulut
(405) 744 7436
rifat.bulut@okstate.edu

Stephen A. Cross, PE
(405) 744-7200
steve.cross@okstate.edu

7. Lab Mission/Purpose:

The pavement materials research laboratories consist of three labs; the mixture design lab, the mixture performance lab and the surface energy lab. The objectives of these laboratories are to characterize materials, perform performance testing and investigate surface energy properties.

8. Lab Capabilities:

The Cummins Asphalt Laboratories houses facilities for aggregate testing, Superpave mix designs and cold mix (emulsion) mix designs. Mixture performance testing includes a servo-hydraulic testing machine for resilient modulus and dynamic modulus testing (AASHTO TP 62), resilient modulus of soil and aggregates, indirect tension creep compliance (AASHTO T 322), and the simple performance testing recommended in NCHRP 9-29 of static creep (flow time) and triaxial repeated load permanent deformation (flow number). Rutting performance can be measured using the Hamburg device. Liquid asphalt and emulsified asphalt testing capabilities

include ductility testing; kinematic, absolute and Saybolt viscosity; ring and ball softening point; penetration; distillation and recovery; specific gravity; and flash and fire points.

The newly constructed surface energy laboratory contains a new, robust and fully automated drop shape analysis device for contact angle measurements on asphalt binder and aggregate materials. The device makes use of pendant or sessile drop analyses methods to calculate surface energies on pavement materials. The lab also contains a temperature controlled testing setup for measuring diffusion coefficient in asphalt concrete materials. The setup involves a computer controlled 40 channel datalogger equipped with thermocouple psychrometers and a water bath.

9. Lab Equipment:

(See Lab Capabilities, above)

10. Partners:

Oklahoma Department of Transportation
Oklahoma Asphalt Pavement Association
Kansas Asphalt Pavement Association
New York State Department of Transportation
Central Federal Lands – Highway Division, FHWA
Chesner Engineering
Brown & Brown Contractors, Inc.
SemMaterials
Terracon Consultants

11. Examples of Current and Past Work:

The laboratory equipment is used for:

Measuring contact angles and thus surface energies of pavement materials for moisture damage studies of these materials.

Measuring diffusion coefficient and rate of moisture diffusion in asphalt concrete materials in relation to moisture damage study of these materials.

Other studies:

Evaluation of dynamic modulus of Oklahoma HMA mixtures

Evaluation of dynamic modulus of cold in-place recycled mixtures

Evaluation of aggregate specific gravity test methods

12. Notes (other information you'd like included):

Ray Broce Asphalt Laboratory

2. Lab Type:

Infrastructure, Materials, and Maintenance

3. Center/Institute Name:

Oklahoma Transportation Center (OTC)

4. University Name:

University of Oklahoma

5. Center Contact Information:

Oklahoma Transportation Center (OTC)
Director, David Alan Tree
Oklahoma State University
School of Civil & Environmental Engineering
201 Advanced Technology Research Center
Stillwater, OK 74078

Phone: (405) 744-5957

Fax: (405) 744-3189

6. Lab Manager Contact Information:

Musharraf Zaman
(405) 325-2626
zaman@ou.edu

7. Lab Mission/Purpose:

Mechanical characterization of engineering materials such as aggregate, asphalt mixes and soils under static and cyclic loading. Performance related tests such as rut, fatigue and flow can be conducted under simulated field conditions.

8. Lab Capabilities:

Ray Broce Asphalt Laboratory houses facilities for aggregate testing, and asphalt mix design and mix performance testing. Moreover, facilities are available for rut testing and fatigue testing, and resilient modulus and dynamic modulus testing.

9. Lab Equipment:

Standard aggregate testing facilities include Gilson shaker with full-height sieves, Los Angeles Abrasion machine, fine aggregate specific gravity, coarse aggregate specific gravity, aggregate durability and insoluble residue apparatus. Also, facilities are available for consensus aggregate tests namely, fine aggregate angularity, coarse aggregate angularity, sand equivalent, and flat and elongated particles. Mixing, compaction and density measurement facilities include large size force and gravity ovens, ignition ovens, weighing scales, Superpave gyratory compactor, Texas gyratory compactor, asphalt vibratory compactor, and bulk specific gravity and Corelock™

apparatus. A humidity controlled room and a large freeze-thaw cabinet with humidity and temperature controller are also available at OU Broce Laboratory.

10. Partners:

Oklahoma Department of Transportation
Oklahoma Asphalt Pavement Association
Haskell-Lemon, Inc., Oklahoma City, Oklahoma
Engineering Services and Testing, Inc., Norman, Oklahoma

11. Examples of Current and Past Work:

- Effect of Suction and Moisture on Subgrade Soils in Oklahoma, funded by Oklahoma Department of Transportation, in collaboration with Federal Highway Administration
- Permeability and Resilient Modulus of Different Aggregate Bases Commonly Used in Oklahoma, funded by Oklahoma Transportation Center
- Field Performance Monitoring and Modeling of Instrumented Pavement on I-35 in McLain County, funded by Oklahoma Department of Transportation in cooperation with Federal Highway Administration
- Maximizing the Use of Raw Chat in Paving at the Tar Creek Superfund Site – Test Road, funded by U.S. Corps of Engineers, through Oklahoma Department of Environmental Quality

12. Notes (other information you'd like included):

The facilities available in this laboratory can be used by others including those affiliated with a University Transportation Center. For details on the financial arrangement and time schedule, please contact Musharraf Zaman.

Thin Film Laboratory

2. Lab Type:

Infrastructure, Materials, and Maintenance

3. Center/Institute Name:

Oklahoma Transportation Center (OTC)

4. University Name:

University of Oklahoma

5. Center Contact Information:

Oklahoma Transportation Center (OTC)
Director, David Alan Tree
Oklahoma State University
School of Civil & Environmental Engineering
201 Advanced Technology Research Center
Stillwater, OK 74078

Phone: (405) 744-5957

Fax: (405) 744-3189

6. Lab Manager Contact Information:

Edgar O'Rear
(405) 325-4379
eorear@ou.edu

7. Lab Mission/Purpose:

Use of the Thin Film Laboratory centers on application of admicellar polymerization to modify solid substrates. In addition, the laboratory has facilities to help characterize the original and modified material.

8. Lab Capabilities:

A wet chemical technique involving the utilization of aqueous media containing surfactant, monomer and initiator can be employed to deposit thin films on to a variety of materials. Films on the order of 10-100 nm thickness have been applied to a number of different substrates with wide variability in chemical and physical nature. The materials can be organic (e.g. cotton fabrics) and inorganic(e.g. silica). They can be flat (e.g. aluminum metal alloys) and porous (aluminum oxide powder).

9. Lab Equipment:

Basic wet laboratory equipment including analytical balances, incubation shaker baths, and drying oven are in the laboratory to support the synthesis. Analytical equipment is located in the Laboratory or nearby which enable the determination of surfactant adsorption isotherms, partitioning of monomeric species into admicelles, and extent of polymerization. These include

UV-Vis spectrophotometer, FTIR and HPLC. In addition, the Laboratory has facilities to characterize the original and modified substrates. The laboratory contains a dynamic contact angle unit (Wilhelmy plate) which can be used for the measurement of surface tension, surfactant critical micelle concentration, and advancing/receding contact angles.

10. Partners:

Oklahoma Transportation Center
Oklahoma Department of Transportation
Federal Highway Administration

11. Examples of Current and Past Work:

Investigate the Use of Warm Mix Asphalt as a Viable Paving Material in the United States, Oklahoma Transportation through Federal Highway Administration, Turner-Fairbank Research Center

Evaluation of Surface Free Energy Characteristics of Aggregates and Binders in Hot Mix Asphalt, funded by Oklahoma Transportation Center

12. Notes (other information you'd like included):

Intelligent Transportation Systems Laboratory

2. Lab Type:

Technology

3. Center/Institute Name:

Oklahoma Transportation Center (OTC)

4. University Name:

University of Oklahoma

5. Center Contact Information:

Oklahoma Transportation Center (OTC)
Director, David Alan Tree
Oklahoma State University
School of Civil & Environmental Engineering
201 Advanced Technology Research Center
Stillwater, OK 74078

Phone: (405) 744-5957

Fax: (405) 744-3189

6. Lab Manager Contact Information:

Monte Tull
(405) 325-4278
tull@ou.edu

7. Lab Mission/Purpose:

The OU ITS Lab provides system engineering and integration services for the ODOT ITS Network. This work includes roadway cameras, dynamic message signs, speed sensors and vehicle classifiers, roadway condition sensors, and smart work zones. Both public internet and private network information are supported. In addition, related activities are provided for the Department of Public Safety and the Oklahoma Highway Patrol, Oklahoma Highway Safety Office.

8. Lab Capabilities:

The ITS Network is a private fiber-based network developed and supported by the ITS Laboratory for the Oklahoma Department of Transportation (ODOT). This unique network is decentralized/distributed and provides a fault tolerant capability, with no single point of failure, so that the various ITS consoles can operate independently. The Lab provides full testing and integration services of both hardware and software in support of the various sensors, message signs, and consoles. Current developments include Smart Work Zones, Advanced Traveler Information System (ATIS), inter-console and interagency communication, and remote network asset monitoring.

9. Lab Equipment:

10. Partners:

Oklahoma Transportation Center
Oklahoma Department of Transportation
Oklahoma Highway Safety Office
Oklahoma Highway Patrol
Federal Motor Carrier

11. Examples of Current and Past Work:

Additional Lab activities include:

- Safe-T that provides a database of vehicle incident and crash data available to city planners, Highway Patrol (OHP) command staff, Highway Safety Office, etc.
- Traffic and Criminal Software (TraCS): Provides OHP forms automation on in-vehicle laptops, including wireless forms transmission, over the-air queries, etc.
- Computerized Driver License Testing and records keeping.

12. Notes (other information you'd like included):

Principal faculty: Joe Havlicek, Jim Sluss, Monte Tull

Unsaturated Soil Mechanics

2. Lab Type:

Infrastructure, Materials, and Maintenance

3. Center/Institute Name:

Oklahoma Transportation Center (OTC)

4. University Name:

University of Oklahoma

5. Center Contact Information:

Oklahoma Transportation Center (OTC)
Director, David Alan Tree
Oklahoma State University
School of Civil & Environmental Engineering
201 Advanced Technology Research Center
Stillwater, OK 74078

Phone: (405) 744-5957

Fax: (405) 744-3189

6. Lab Manager Contact Information:

Amy Cerato
(405) 325-5625
acerato@ou.edu

7. Lab Mission/Purpose:

The Unsaturated Soil Mechanics laboratory at the University of Oklahoma is used to perform high quality research. Faculty, graduate students, post-doctoral researchers and undergraduate research assistants utilize these state-of-the-art facilities to work on interesting geotechnical, geoenvironmental and geomechanics issues.

8. Lab Capabilities:

The laboratory includes equipment to measure consistency, permeability, gradation and compaction. Strength testing equipment consists of unconfined compression, motorized direct shear and one cylindrical triaxial device, and the lab contains numerous consolidometers for determining compressibility. The lab also houses a model to simulate seepage through earth dams.

The laboratory contains equipment for determining soil-water characteristic curves and permeability of unsaturated soils. It also houses an HP Vector Impedance meter for measuring electrical properties of soil.

Most recently, this laboratory has seen the addition of several clay mineralogy index testing devices, such as the Chittick Apparatus to measure carbonate content, a BET Monosorb machine to measure external surface area and an EGME total surface area setup, along with equipment to measure shrinkage limit and linear shrinkage.

9. Lab Equipment:

(See Lab Capabilities, above)

10. Partners:

OCAST, OTC, ODOT, NSF, DOE, DOD

11. Examples of Current and Past Work:

- Causes and remedies of bridge approach settlement
- Laboratory testing and constitutive modeling of cohesionless soil with emphasis on modeling of dilatant behavior
- Resilient modulus of base and subgrade material
- Soil liquefaction including soil-structure interaction effects
- Pore collapse in unconsolidated and poorly consolidated reservoir rocks
- Use of fly ash in soil stabilization
- Soil stabilization with cement kiln dust
- Soft railroad subgrade soil behavior under repeated load applications
- Electrical properties of soil in the radio frequency domain
- Behavior of piles in overconsolidated and unsaturated clay
- Use of in-situ tests for foundation design
- Centrifuge and finite element modeling of dynamic behavior of rock dike retaining structures
- Centrifuge modeling of pollution transport processes through soil
- Centrifuge modeling of unsaturated soil embankments
- Constitutive and numerical modeling of unsaturated soils under static and dynamic loading
- Prediction of strength properties of partially saturated soils using cone penetration tests
- Static and seismic analysis and design of reinforced soil structures (e.g. MSE walls and embankments) and foundations
- Airport pavement management
- Use of helical anchors for anchoring small wind turbines in high plasticity clay subject to a fluctuating water table
- Surface area and fine-grained soil behavior
- Carbonate content of fine-grained soils (equipment and procedure)

12. Notes (other information you'd like included):

Portland State University

Initiative for Bicycle and Pedestrian Innovation

2. Lab Type:

Bike and Pedestrian

3. Center/Institute Name:

Oregon Transportation Research and Education Consortium (OTREC)

4. University Name:

Center for Transportation Studies, Toulan School of Urban Studies and Planning
Portland State University

5. Center Contact Information:

Oregon Transportation Research and Education Consortium (OTREC)
Director, Dr. Robert Bertini
Portland State University
301A Engineering Building
PO Box 751
Portland, OR 97207
Phone: 503-725-4249
Fax: 503-725-5950

6. Lab Manager Contact Information:

Lynn Weigand, Director
503-725-4042
weigand@pdx.edu

Jennifer Dill
503-725-5173
jdill@pdx.edu

Web site: <http://www.ibpi.usp.pdx.edu/>

7. Lab Mission/Purpose:

The Initiative for Bicycle and Pedestrian Innovation is a new center for research and learning that is focused on bicycle and pedestrian travel. IBPI's aim is to advance bicycling and walking as integral elements of the transportation system in Oregon's communities. IBPI is housed at Portland State University's Center for Transportation Studies, but also draws on the resources of partner institutions at the University of Oregon and Oregon State University. Portland is a national leader in these modes of travel and provides the ideal setting and living laboratory for interactive study, practice, and education.

8. Lab Capabilities:

The Initiative for Bicycle and Pedestrian Innovation is a cross-university and cross-disciplinary program aimed at advancing bicycle and pedestrian transportation as mainstays of Oregon's state, regional and local transportation systems. By mobilizing partnerships across various

sectors, interests and institutions, the Initiative strives to produce outcomes that are comprehensive and innovative in their approach. The Initiative's programs include research, education, and information-sharing across sectors, interests, and institutions that will enhance policies, programs, and projects focused on promoting bicycle and pedestrian transportation. This includes: research that is relevant to practitioners, policy-makers and communities; the translation of that research into a user-friendly and accessible language; and university and continuing education opportunities that foster a new generation of transportation professionals.

9. Lab Equipment:**10. Partners:**

Department of Planning, Public Policy and Management, University of Oregon
College of Engineering at Oregon State University
Bicycle Transportation Alliance
Bike Gallery
State of Oregon Bicycle and Pedestrian Program
City of Portland Office of Transportation
Alta Planning + Design

11. Examples of Current and Past Work:

IBPI's research agenda focuses on work that is relevant to and responds to the demands of practice, industry, and policy development. Research projects will focus on providing evidence that will support full integration of bicycle and pedestrian modes within transportation planning, design, engineering, programs and policy.

Current research includes Dr. Jennifer Dill's "Bike-GPS: Understanding and Measuring Bicycling Behavior" project. This research project is studying how often people bicycle, how far, long, and fast or slow they bicycle, and where they bicycle. The results of this study will be used to understand how various factors influence people's decisions on whether and where to bicycle, including where they live, the presence of bike lanes and paths, and other factors. The first phase of the project included a random phone survey of adults in the Portland, Oregon region. The second phase of the project involves using global positioning system (GPS) devices on people's bicycles to accurately record where and when they ride their bicycle.

12. Notes (other information you'd like included):

Website: <http://www.ibpi.usp.pdx.edu/>

Freight & Logistics Lab

2. Lab Type:

Freight

3. Center/Institute Name:

Oregon Transportation Research and Education Consortium (OTREC)

4. University Name:

Department of Civil & Environmental Engineering
Portland State University

5. Center Contact Information:

Oregon Transportation Research and Education Consortium (OTREC)
Director, Dr. Robert Bertini
Portland State University
301A Engineering Building
PO Box 751
Portland, OR 97207

Phone: 503-725-4249

Fax: 503-725-5950

6. Lab Manager Contact Information:

Miguel Figliozzi
503-725-2836
figliozzi@pdx.edu

7. Lab Mission/Purpose:

The efficient movement of consumer products, industrial supplies and other staples of modern life is critical to the competitiveness and development of modern economies and societies. Freight and logistics play a critical role in meeting these demands.

The purpose of the Freight and Logistics lab is to strengthen the ability of public and private sponsors to move goods and provide services. The lab will focus on the design and development of practical solutions to enhance the efficiency and connections of all freight modes. Research and development include research technology, policy, and operational issues associated with freight and logistics issues.

Given the close linkages between freight and logistics with society and business/economic growth, the Freight and Logistics Lab will be also used to strengthen ties and promote teaching innovation with the School of Urban Studies and Planning and School of Business Administration at PSU.

8. Lab Capabilities:

The Freight and Logistics Lab will utilize computing software to simulate, study, and optimize large scale discrete optimization problems, especially in the area of optimization under uncertainty and applied to freight/logistic planning, distribution, and vehicle routing.

9. Lab Equipment:

The lab will include the latest equipment to collect and store freight movement and traffic data as well as socio-economic-land use data. An upcoming goal for the lab is the integration of real-life traffic and GPS data with the current models and applications in freight and logistics.

10. Partners:

The Freight and Logistics lab interacts with public and private stakeholders interested in research and development of solutions to freight/logistics problems in the Pacific Northwest region. Collaboration and joint research projects dealing with trucking and intermodal freight movements are under way with partners such as the Port of Portland, the City of Portland, and the Oregon Department of Transportation (ODOT).

11. Examples of Current and Past Work:

Current funded projects include the development and evaluation of algorithms for time-varying vehicle routing problems, the study of the impact of time windows and delivery sizes on the vehicle-miletraveled (VMT), and the creation of Oregon's freight data storage.

The Freight and Logistics Lab has a strong relationship with both the Intelligent Transportation Systems Lab and Traffic Signal Lab at PSU. A medium term goal of the lab is the integration of traffic/flow data with economic and land use information in order to improve freight and logistics demand and spatial models.

Additional areas of research include:

- Understanding and measuring the impacts of transport and supply chains disruptions on shippers' costs and operations.
- Development of new congestion measures that integrate socioeconomic and real-time traffic data information for freight movements in urban and intercity areas.
- Development of algorithms for vehicle routing and distribution in congested urban areas.
- The integration of real-time traffic data with GPS and GIS technology to ameliorate freight congestion.
- The impact of toll and lane pricing on freight demand and supply chains.

12. Notes (other information you'd like included):

InfraStructure Testing and Applied Research (iSTAR) Lab

2. Lab Type:

Infrastructure, Materials, and Maintenance

3. Center/Institute Name:

Oregon Transportation Research and Education Consortium (OTREC)

4. University Name:

Department of Civil & Environmental Engineering
Portland State University

5. Center Contact Information:

Oregon Transportation Research and Education Consortium (OTREC)
Director, Dr. Robert Bertini
Portland State University
301A Engineering Building
PO Box 751
Portland, OR 97207
Phone: 503-725-4249
Fax: 503-725-5950

6. Lab Manager Contact Information:

Peter Dusicka
(503) 725-9558
dusicka@pdx.edu

7. Lab Mission/Purpose:

The *iSTAR* Laboratory is located on the campus of Portland State University. The mission of the *iSTAR* lab is to enhance durability and improve functionality of our infrastructure by conducting applied research and disseminating the gained knowledge to all sectors of the engineering community as well as the general public. Research and testing conducted at the laboratory is in the area of earthquake engineering, application of innovative materials and numerical simulation in an effort to meet our mission. Large scale experiments are used to study the structural elements, assemblies or non-structural equipment using our shake table and hydraulic actuators. Detailed numerical models and analyses are also conducted.

Outreach and technology transfer are also an important function of the laboratory through tours that highlight the laboratory's efforts and seminars for the practicing industry.

8. Lab Capabilities:

Facilities include a strong floor laboratory equipped with dynamic hydraulic actuators and the largest shake table in the Pacific Northwest. Physical tests and numerical modeling are combined to thoroughly investigate a wide range of issues including:

- Seismic testing and earthquake simulation to failure or to specific test protocol;

- Evaluation of fatigue and dynamic impact load effects;
- Non-linear numerical modeling of structural systems and critical components.

The laboratory is 3600 sq. ft space and includes 1600 sq. ft of strong floor with 100,000 lb tie downs at approximately 4-foot centers, a machine shop and meeting area. The laboratory is serviced by a 25-ton overhead crane and has truck access for material and specimen delivery.

9. Lab Equipment:

Shake Tables for Seismic and Impact Load Simulation

Horizontal Shake Table:

- platform of 10 ft x10 ft with tie downs
- payload capacity of 20,000 lb
- max. acceleration of 3g

Vertical Shake Table:

- platform of 2 ft x 2 ft with tie downs
- payload capacity of 5,000 lb
- max. acceleration of 5g

Hydraulic Actuators and Load Frames

Cyclic and Fatigue Loading:

- Tension-compression actuator capable of dynamic loads up to 220,000 lb and 20" stroke
- Tension-compression actuator of 110,000 lb cyclic load capacity and 6" stroke
- Self reacting load frame with hydraulic grips and capacity of 110,000 lb and 6" stroke

Monotonic Loading:

- Custom load frames with hydraulic jack for up to 700,000 lb capacity and 10" stroke.
- Numerous 120,000 lb capacity hydraulic jacks ranging from 3" to 6" stroke

Data Acquisition & Instrumentation

- portable 24 channels for field and additional 32 channels of in-laboratory high sample rate data acquisition
- instrumentation includes accelerometers, displacement transducers, strain gauges
- digital video of tests also available

10. Partners:

Bonneville Power Association
Oregon Department of Transportation
Multnomah County
Gunderson
Underwriters Laboratories
Masonry and Ceramic Institute of Oregon

11. Examples of Current and Past Work:

Evaluation of Glass FRP Bridge Deck for Broadway Bridge Renovation

Vibrations Measurements on I-5 Columbia River Crossing
Shake Table Qualification of High Voltage Insulators
Seismic Evaluation of Telecommunication Equipment
Double Action Ringfeders
Strength Test of Composite Panels for Rail Cars

12. Notes (other information you'd like included):

Kiewit Center for Infrastructure and Transportation

2. Lab Type:

Infrastructure, Materials, and Maintenance

3. Center/Institute Name:

Oregon Transportation Research and Education Consortium (OTREC)

4. University Name:

School of Civil, Construction and Environmental Engineering
Oregon State University

5. Center Contact Information:

Oregon Transportation Research and Education Consortium (OTREC)
Director, Dr. Robert Bertini
Portland State University
301A Engineering Building
PO Box 751
Portland, OR 97207

Phone: 503-725-4249

Fax: 503-725-5950

6. Lab Manager Contact Information:

Christopher Higgins
(541) 737-8869
chris.higgins@oregonstate.edu

7. Lab Mission/Purpose:

The Kiewit Center for Infrastructure and Transportation serves as the umbrella organization for almost all research within the School of Civil and Construction Engineering at OSU and coordinates multi- and inter-disciplinary transportation research projects across campus. In addition to conducting funded and unfunded research, the Center provides a variety of outreach activities to support practicing professionals throughout the Pacific Northwest.

8. Lab Capabilities:

Facilities

- Geotechnical Testing Laboratory
 - Testing in support of both practice-oriented investigations and state-of-the-art research
 - Advanced geo-mechanical modeling of soil-structure interaction
 - Full-scale, well-instrumented testing of field geo-systems
- Highway Materials Laboratory
 - Investigation of innovative highway construction materials
 - Evaluation of recycled materials for use in construction

- O.H. Hinsdale Wave Research Laboratory
 - Physical modeling of tsunami and ocean wave-structure interaction studies
 - Analysis of off-shore structures
- Large-Scale Structural Testing Laboratory
 - Structural evaluation of full-size beams, columns, and assemblies
 - Development of earthquake resistant and energy dissipating systems
- Combined environmental and structural testing of full-scale structural members including freeze-thaw, controlled temperature, and humidity

Research Centers

- National Center for Accessible Transportation
 - Investigation of advanced technologies for accessible transportation systems

9. Lab Equipment:

10. Partners:

Oregon Department of Transportation

11. Examples of Current and Past Work:

- Health Monitoring and Advanced Technologies Backbone for Bridge Evaluation and Maintenance Applications
- Wave and Storm Surge Forces on Bridges
- Direct Reliability Assessment of Reinforced Concrete Bridges
- Environmental Durability of CFRP for Shear Strengthening
- Pricing and Capacity Competition on Large Mixed-Ownership Networks
- Investigating Premature Pavement Failure Due to Moisture
- Mechanistic Pavement Design Input Parameters
- Bridge Deck Design Criteria & Testing
- Acoustic Emission Testing and Modeling for Applications to Concrete
- Enhanced Software Development for the Finite Element Analysis and Reliability-Based Assessment of Highway Bridges
- Seismic Performance of Stair Assemblies
- Methodologies for Establishing Advisory Curve Speeds on Oregon Highways
- Evaluate Safety Investment Program
- Oregon Interstate 5 Free Corridor Project
- Socio-Economic Effects of Fees

12. Notes (other information you'd like included):

Web site: <http://kiewit.oregonstate.edu/>

Intelligent Transportation Systems (ITS) Laboratory

2. Lab Type:

Technology

3. Center/Institute Name:

Oregon Transportation Research and Education Consortium (OTREC)

4. University Name:

Department of Civil & Environmental Engineering
Portland State University

5. Center Contact Information:

Oregon Transportation Research and Education Consortium (OTREC)
Director, Dr. Robert Bertini
Portland State University
301A Engineering Building
PO Box 751
Portland, OR 97207

Phone: 503-725-4249

Fax: 503-725-5950

6. Lab Manager Contact Information:

Robert Bertini
(503) 725-4249
bertini@pdx.edu

Christopher Monsere
(503) 725-9746
monsere@pdx.edu

Miguel Figliozzi
(503) 725-2836
figliozzi@pdx.edu

7. Lab Mission/Purpose:

This lab conducts research on how intelligent transportation systems (ITS) can most effectively be deployed in the Portland Metro area and throughout the nation. Intelligent transportation systems are the application of information technologies - computers, sensors, and telecommunications - to improve highway management and vehicle performance and safety, including, for example, electronic toll collection, truck and transit fleet control systems, and electronic variable message signs.

Mission: The Intelligent Transportation Systems Laboratory strives to stimulate and conduct multidisciplinary research on transportation issues, facilitating the dissemination of information and encouraging the implementation of research results to ensure resource preservation and economic productivity.

8. Lab Capabilities:

Intelligent Transportation Systems (ITS) are existing and new technologies, including information processing, sensors, communications, control, and electronics, combined in innovative ways, integrated into the management of our multimodal transportation system aimed at saving lives, time, and resources.

Transportation is the backbone of our society—the movement of people and goods provides the foundation of our quality of life and economic prosperity. Fulfilling the need for a transportation system that is both economically sound and environmentally efficient requires a new way of looking at—and solving—our transportation problems. The strategy of adding more and more highway capacity neither solves our transportation problems, nor meets the broad national vision of an efficient, integrated transportation system. We focus on the integration and improvement of all modes—highway, transit, bicycle, pedestrian and freight.

Traffic crashes and congestion take heavy tolls in lives, lost productivity, and wasted energy. ITS enables people and goods to move more safely and efficiently through a state-of-the-art, intermodal transportation system.

9. Lab Equipment:

10. Partners:

National Science Foundation (NSF)
Oregon Department of Transportation (ODOT)
City of Portland
TriMet
U.S. Department of Transportation
Federal Transit Administration
BMW
Metro
Clackamas County
Foundation for Air Medical Research and Education
Oregon Museum of Science and Industry (OMSI)
Northwest Transportation and Education Alliance (NWTTEA)
Oregon State University (OSU)
Oregon Institute of Technology (OIT)
Oregon Health and Sciences University (OHSU)
Oregon Transportation Research and Education Consortium (OTREC)
Technical University Dresden, Germany
TransNow
University of Calabria, Italy

11. Examples of Current and Past Work:

- Mining Archived Intelligent Transportation Systems Data: A Validation Framework for Improved Performance Assessment and Modeling (National Science Foundation)
- Using Archived Data to Measure Operational Benefits of ITS Investments (Oregon Department of Transportation and TransNow)
- Empirical Comparison of German and U.S. Traffic Sensor Data and Impact on Driver Assistance Systems (BMW Group)
- Frontier Evaluation of Video Recognition Travel Time System (ODOT)
- Great Cities Prototype for Advanced Public Transit Systems in Multimodal Corridors (Federal Transit Administration)
- Measuring the Impacts of Speed Reduction Technologies on Highway Safety (ODOT)
- Update and Enhancement of Oregon's Crash Reduction Factors (ODOT)
- Development of Custom Data Collection Software for Palm-Based Handheld Computers (PSU)
- Changes in Travel Behavior/Demand Associated with Managed-Lanes Facility System Expansion (NCHRP)
- Transit Buses as Traffic Probes for Arterial Performance Measurement (PSU)
- Using Existing ITS Commercial Vehicle Operation (ITS/CVO) Data to Develop Truck Travel Time Estimates and Other Freight Measures (ODOT)
- Community and School Traffic Safety Partnership: Research and Evaluation (City of Portland)

12. Notes (other information you'd like included):

The laboratory, its staff, facilities and its data streams are available for research and evaluation projects, training and education functions and consulting on projects of all kinds. Please contact faculty listed above for further information.

Website: www.its.pdx.edu

Traffic Signal Lab

2. Lab Type:

Planning

3. Center/Institute Name:

Oregon Transportation Research and Education Consortium (OTREC)

4. University Name:

Department of Civil & Environmental Engineering
Portland State University

5. Center Contact Information:

Oregon Transportation Research and Education Consortium (OTREC)
Director, Dr. Robert Bertini
Portland State University
301A Engineering Building
PO Box 751
Portland, OR 97207

Phone: 503-725-4249

Fax: 503-725-5950

6. Lab Manager Contact Information:

Christopher Monsere
(503) 725-9746
monsere@pdx.edu

7. Lab Mission/Purpose:

The theme of the Traffic Signal Lab is to integrate traffic signal hardware and systems with a strong focus on data processing of traffic signal information. The Department of Civil and Environmental Engineering at Portland State University has dedicated approximately 400 square feet of lab space in the new Engineering Building for this lab, and it will be the first of its kind in Oregon. In traffic operations, the traffic signal is a key component in the transportation system which strives to deliver efficient, safe, and reliable movement of traffic. Using advanced simulation software and other tools, this lab will help relate the physical and simulation environments to foster a greater student understanding of transportation concepts. The Traffic Signal Lab will be used in a teaching environment, as well as for a wide variety of research activities.

8. Lab Capabilities:

The Traffic Signal Lab will include a teaching workstation with six student training workstations. Each workstation will have a computer, monitor, and traffic signal controller (either virtual software or an actual physical controller), and connections to the central teaching workstation. The teaching workstation will function as the central computer and can control and

connect with all workstations. This workstation will also serve as the point of connection to the regional ITS network and the City of Portland's central system signal software. This will allow the lab to function as a virtual traffic signal system that can be configured to any real-world condition. Research can be conducted using the Traffic Signal Lab to transform available data into useful outputs such as real-time traveler information, measurement of historical performance, the identification of poorly performing signals, etc.

Goals for the lab include working the City of Portland and other partners to include a "remote field lab" concept intersection where PSU researchers could access video, signal timing, and detector information in the lab. Many research questions could be explored with the application of the appropriate theoretical models, some which still need to be proven and applied to real-world empirical data.

9. Lab Equipment:

Ultralyte Lidar Gun
Controller Interface Devices (CID)
Autoscope Rackvision
170 Type Controllers
Suitcase Tester
PCs with monitors
Synchro Software (6 licenses)
VISSIM Software (2 licenses)

10. Partners:

City of Portland
Oregon Department of Transportation (ODOT)
City of Beaverton
City of Vancouver
Transport ITS group

11. Examples of Current and Past Work:

The Traffic Signal Lab has a strong relationship to projects planned, underway or completed in the Intelligent Transportation Systems Lab at PSU. Dr. Chris Monsere and Dr. Robert Bertini are currently conducting research in a number of traffic operation related areas such as arterial performance, freight truck priority, and system-wide area ramp metering.

A current funded project for Dr. Monsere is to study the operational impacts of identifying trucks in the traffic stream and then providing additional green time to allow the trucks to make it through intersections. Loaded trucks use significant amounts of capacity at intersections during the start up period, greatly increasing delay and environmental impacts. The current research approach requires substantial field work and will be enhanced by the lab's remote access to intersections via fiber feed. The amount of data that could be collected and number of evaluations conducted would be greatly increased.

Evaluation of Transit Signal Priority
Evaluating Traffic Signal Operational Improvements for Freight Mobility

Combined Arterial Performance
Using Archived ITS Data to Measure Operational Benefits of a System-wide Adaptive Ramp
Metering
System

12. Notes (other information you'd like included):

Transportation & Livability Research Group

2. Lab Type:

Planning

3. Center/Institute Name:

Oregon Transportation Research and Education Consortium (OTREC)

4. University Name:

Planning, Public Policy and Management (PPPM)

University of Oregon

5. Center Contact Information:

Oregon Transportation Research and Education Consortium (OTREC)

Director, Dr. Robert Bertini

Portland State University

301A Engineering Building

PO Box 751

Portland, OR 97207

Phone: 503-725-4249

Fax: 503-725-5950

6. Lab Manager Contact Information:

Marc Schlossberg

(541) 346-2046

schlossb@uoregon.edu

7. Lab Mission/Purpose:

The Transportation & Livability Research Group at UO focuses on city design that facilitates sustainable human settlements, with a special emphasis on transportation's key role in shaping sustainable urban form. This research group recognizes that well conceived solutions and thinking on transportation and livability cannot happen fully within any single discipline and that cross-discipline dialogue and investigation are keys in addressing issues of sustainability within our communities. Therefore, this research group is comprised of faculty in Community and Regional Planning, Public Administration, Architecture, and Landscape Architecture.

8. Lab Capabilities:

This research group's five core members and areas of expertise are:

Marc Schlossberg (PPPM). Area of work: pedestrian-scaled urban form and community empowerment

- Nico Larco (Architecture). Area of work: medium to high density suburban development and mobility
- Mark Gillem (Architecture and Landscape Architecture). Area of work: street-scaled design and multi-way boulevards

- Yizhao Yang (PPPM). Area of work: community quality of life, housing, and pedestrian accessibility
- Jessica Greene (PPPM). Area of work: health policy with an emphasis on the health status of low-income populations, including transportation's role

9. Lab Equipment:

10. Partners:

City of Eugene
National Center for Walking and Biking
National Multi Housing Council
Center for Health Care Strategies, etc.

11. Examples of Current and Past Work:

- The Influence of Community Walkability and Safety on Active Transportation Among Low Income Children
- Active Transportation, Neighborhood Planning and Participatory GIS
- From Arterial to Asset: Examining the Role of the Multi-Way Boulevard in Coordinated Transportation and Land Use Planning
- Increasing Capacity In Rural Communities: Planning for Alternative Transportation
- Overlooked Density: Re-Thinking Transportation Options in Suburbia
- Healthy Communities, the Transportation-Land Use Connection and Children's Travel

12. Notes (other information you'd like included):

Transportation Modeling Lab

2. Lab Type:

Planning

3. Center/Institute Name:

Oregon Transportation Research and Education Consortium (OTREC)

4. University Name:

Toulan School of Urban Studies and Planning
Portland State University

5. Center Contact Information:

Oregon Transportation Research and Education Consortium (OTREC)
Director, Dr. Robert Bertini
Portland State University
301A Engineering Building
PO Box 751
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Phone: 503-725-4249

Fax: 503-725-5950

6. Lab Manager Contact Information:

John Gliebe
(503) 725-4016
gliebej@pdx.edu

7. Lab Mission/Purpose:

The Transportation Modeling Lab, located on the fifth floor of the Urban Studies Building at Portland State University, was developed by Professor John Gliebe to support research in areas related to analysis, modeling and simulation of transportation systems and traveler behavior.

Dr. Gliebe's research interests are focused on the development of advanced travel demand modeling methods, such as activity-based models and integrated land use and transportation models. Drawing on interests in econometrics and simulation, his objective is to improve the behavioral realism of modeling practices, with the underlying goal being better tools for policy analysis.

8. Lab Capabilities:

The lab includes five high-end Windows-based workstations and one Sun workstation, running a Linux operating system, for use by students in research and class projects. The lab has academic licenses for three major commercial travel demand modeling software programs as well as GIS and statistical programs.

9. Lab Equipment:

10. Partners:

Metro

Oregon Department of Transportation (ODOT)

11. Examples of Current and Past Work:

The lab sees extensive use as Professor Gliebe leads the development of an activity-based dynamic travel demand modeling system for Portland Metro and directs land use modeling research projects for Metro and Oregon DOT. In addition, a project led by Professor Jennifer Dill is using the lab computers to process GPS data collected from bicycle riders and GIS mapping capabilities to better understand how route attributes affect rider path choices.

12. Notes (other information you'd like included):

Center for Urban Studies/Center for Transportation Studies

2. Lab Type:

Planning

3. Center/Institute Name:

Oregon Transportation Research and Education Consortium (OTREC)

4. University Name:

Toulan School of Urban Studies and Planning
Portland State University

5. Center Contact Information:

Oregon Transportation Research and Education Consortium (OTREC)
Director, Dr. Robert Bertini
Portland State University
301A Engineering Building
PO Box 751
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Phone: 503-725-4249

Fax: 503-725-5950

6. Lab Manager Contact Information:

Jim Strathman, Director, CUS
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Jennifer Dill, Director, CTS
(503) 725-5173
jdill@pdx.edu

John Gliebe
(503) 725-4016
gliebej@pdx.edu

Anthony Rufolo
(503) 725-4049
rufoloa@pdx.edu

7. Lab Mission/Purpose:

The mission of the Center for Urban Studies (CUS) is to promote and facilitate the conduct of research and community service for faculty and students on urban issues relevant to the metropolitan area, including transportation. The Center for Transportation Studies, housed within CUS, strives to stimulate and conduct multidisciplinary research on transportation issues,

facilitating the dissemination of information and encouraging the implementation of research results.

8. Lab Capabilities:

Several faculty members from the Toulon School of Urban Studies and Planning are affiliated with CUS and CTS. Dr. Jim Strathman directs CUS. His research interests include transportation and transit planning. He has worked with regional and state agencies to evaluate program effectiveness, including transit performance, driver cessation, and comprehensive plan amendments. Dr. Jennifer Dill directs CTS, with research interests in transportation policy, travel behavior, and interactions between transportation, land use, and the environment. She has worked on several projects evaluating the effects of local and regional transportation and land use policies, often involving original survey research. Dr. Tony Rufolo is an economist who has conducted research on transportation finance, including road user fees and fuel tax evasion. Dr. John Gliebe focuses on advanced travel demand modeling. At any one time, there are up to a half dozen Urban Studies Ph.D. students working on research projects within the Center, and several more master's degree students.

9. Lab Equipment:

10. Partners:

Metro
Oregon Department of Transportation (ODOT)
TriMet
Robert Wood Johnson Foundation

11. Examples of Current and Past Work:

- Evaluation of transit operations: Data applications of Tri-Met's automated Bus Dispatch System
- The Impacts of Transit-Oriented Developments on Travel and Transit Use in Portland
- Understanding and measuring bicycling behavior: Implications for urban planning, health, and research
- Transforming Land Use Regulations to Create Livable Communities that Support Physical Activity in Everyday Life
- Evaluation of the Regional Travel Options Program
- Comprehensive plan amendment impacts on interchanges in Oregon
- Alternatives to the motor fuel tax

12. Notes (other information you'd like included):

Websites: <http://www.upa.pdx.edu/CUS/about/index.html>; <http://www.cts.pdx.edu/>

Interdisciplinary Transportation Analysis and Modeling (iTram) Lab

2. Lab Type:

Planning

3. Center/Institute Name:

Oregon Transportation Research and Education Consortium (OTREC)

4. University Name:

School of Civil, Construction and Environmental Engineering
Oregon State University

5. Center Contact Information:

Oregon Transportation Research and Education Consortium (OTREC)
Director, Dr. Robert Bertini
Portland State University
301A Engineering Building
PO Box 751
Portland, OR 97207

Phone: 503-725-4249

Fax: 503-725-5950

6. Lab Manager Contact Information:

Lei Zhang
(541) 737-2072
lei.zhang@oregonstate.edu

7. Lab Mission/Purpose:

This lab conducts both advanced and applied research on the dynamics of transportation and urban systems, as well as their implications on management and policy decisions. The impacts of transportation and land use policies are often multidimensional. In addition to the traditional mobility and accessibility measures, iTram strives to understand the full ramifications of these policies including their influences on reliability, equity, welfare, finance, economic growth, and sustainability.

Mission: iTram promotes and employs interdisciplinary approaches to conduct research on the relationships between transportation, land use, and natural resources, modeling urban/regional system dynamics and analyzing the full impact of engineering/planning decisions to ensure efficient resource allocation and sustainable development in the broad domain of transportation.

8. Lab Capabilities:

The interdisciplinary team at the iTram lab includes faculty, graduate, and undergraduate students from Transportation, Economics, Agriculture and Resource Economics, Operations Research, and Statistics. The research conducted by iTram uses a variety of techniques, including

optimization, statistics and econometrics, simulation, agent-based methods, artificial intelligence, Geographic Information Systems, and advanced survey techniques. These methods can be applied to analyze systems ranging from a single facility to a large region, and assess the consequences of policies ranging from short-term operations and pricing decisions to long-term investment and ownership choices.

In previous research, the iTram lab has studied freeway operations strategies, incidence management policies, advanced traveler information systems, road pricing and distance-based use fees, vehicle ownership choices, freeway capacity expansion, private roads, alternative urban growth scenarios, and multimodal investment criteria.

9. Lab Equipment:

10. Partners:

Oregon Department of Transportation (ODOT)
U.S. Department of Transportation (USDOT)
Portland Metro
Oregon State University (OSU)
Portland State University (PSU)
University of Oregon (UO)
Oregon Transportation Research and Education Consortium (OTREC)
Oregon Survey Research Center (SRC)
University of Minnesota Network, Economics, and Urban Systems Research Group (NEXUS)

11. Examples of Current and Past Work:

- Co-Evolution of Land Use and Transportation in Urban and Regional Systems (OTREC)
- Welfare and Financial Impact of Unleashing Private Sector Investment in Transportation Systems (Oregon State University)
- Socio-Economic Impact of a Distance-Based Road User Fee (Oregon Department of Transportation)
- Freight Performance Measures: Approach Analysis (ODOT and OTREC)
- Economics Analysis of Price Competition and Capacity Choice on Large Mixed-Ownership Networks (Kiewit Center for Transportation and Infrastructure)
- Benefits of Removing Institutional Barriers to Incident Management Programs (ODOT and OTREC)
- No More Freeways: Urban Land Use-Transportation Dynamics without Freeway Capacity Expansion (OTREC)
- Multimodal Investment Criteria and the Economic Importance of Freight Transportation (ODOT)
- User Responses to the Trip-Check Statewide Traveler Information System (ODOT)

12. Notes (other information you'd like included):

The laboratory, its staff, facilities and its data streams are available for research and evaluation projects, training and education functions and consulting on projects of all kinds. Please contact the faculty listed above for further information. Website:

<http://web.engr.oregonstate.edu/~zhangle/wiki/>

National Center for Accessible Transportation (NCAT)

2. Lab Type:

Planning

3. Center/Institute Name:

Oregon Transportation Research and Education Consortium (OTREC)

4. University Name:

College of Engineering
Oregon State University

5. Center Contact Information:

Oregon Transportation Research and Education Consortium (OTREC)
Director, Dr. Robert Bertini
Portland State University
301A Engineering Building
PO Box 751
Portland, OR 97207

Phone: 503-725-4249

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6. Lab Manager Contact Information:

Katharine Hunter-Zaworski
(541) 737-9906
katharine.hunter-zaworski@oregonstate.edu

7. Lab Mission/Purpose:

The National Center for Accessible Transportation (NCAT) at OSU addresses the need for research and development for improving access to public transportation for all. Travel is an important part of the American way of life, and although great strides have been made in the last twenty years to improve access for people with disabilities, travel by public transportation is still difficult. NCAT conducts basic research on accessibility issues and develops practical, cost-effective improvements in transportation technologies, with the goal of making transportation more accessible for everyone.

8. Lab Capabilities:

Supported by research and development funds, NCAT's most recent success was its selection to serve as host for the Rehabilitation Engineering Research Center (RERC) on Accessible Public Transportation. All primary modes of public transportation are included – intra-city and over-the-roadbuses, trains, and air travel. There are common features to all modes and an important element of the center activities is the goal of identifying means to bring consistency to the accessibility features of all modes of transportation. The current focus of the center is air travel and accessibility for the new Bus-Rapid Transit (BRT) system being developed. The approach

relies on specific types of expertise within the center and strong collaboration with entities external to the center.

9. Lab Equipment:

10. Partners:

Alaska Airlines / Horizon Airlines
American Association of Retired Persons (AARP)
American Public Transportation Association (APTA)
Amtrak
Association of Flight Attendants (AFA)
Boeing Aircraft
Bombardier Aircraft
Continental Airlines
Delta Airlines
Federal Aviation Administration (FAA)
Lane Transit District, Eugene, Oregon
Mahlon Sweet Field, Eugene Airport (EUG)
National Center for Accessible Media (NCAM)
National Multiple Sclerosis Society
Northwest Airlines
Open Doors Organization
Oregon State University (OSU)
OSU College of Engineering
OSU College of Health and Human Sciences
OSU Survey Research Center
Oregon Health & Science University (OHSU)
Oregon Institute on Disability and Development
Paralyzed Veterans of America (PVA)
Portland International Airport (PDX)
Project ACTION
Reagan International Airport
Southwest Airlines
Trace Center at University of Wisconsin-Madison
Transportation Security Administration (TSA)
United Cerebral Palsy
United States Access Board
United States Department of Transportation
The Velocity Group
Wireless RERC at Georgia Tech

11. Examples of Current and Past Work:

Current Research Activities:

- The biomechanics of boarding and travel in confined spaces such as aircraft.
- The psychology of existing and proposed accessibility solutions

- Rear Facing Securement for Bus Rapid Transit Vehicles

Current Development Activities:

- Vehicle boarding technologies
- Open-caption communications systems
- Single-aisle-vehicle accessible lavatories
- Passenger assistance training tools and techniques

12. Notes (other information you'd like included):

Website: <http://ncat.oregonstate.edu/>

Traffic Engineering Laboratory and Pavement Engineering Laboratory

2. Lab Type:

Infrastructure, Materials, and Maintenance

3. Center/Institute Name:

Oregon Transportation Research and Education Consortium (OTREC)

4. University Name:

Civil Engineering, Oregon Institute of Technology

5. Center Contact Information:

Oregon Transportation Research and Education Consortium (OTREC)

Director, Dr. Robert Bertini

Portland State University

301A Engineering Building

PO Box 751

Portland, OR 97207

Phone: 503-725-4249

Fax: 503-725-5950

6. Lab Manager Contact Information:

Roger Lindgren

(541) 885.1947

roger.lindgren@oit.edu

7. Lab Mission/Purpose:

The OIT Traffic Engineering Laboratory is housed in Cornett Hall at OIT, and was initiated in 2007. Traffic simulation and other traffic engineering activities previously accomplished in a mixed-use Civil Engineering student computer lab now have their own designated space. The primary users of the Traffic Lab are students enrolled in a senior elective traffic engineering course.

The OIT Pavement Engineering Laboratory, also housed in Cornett Hall, has been significantly enhanced over the past five years with the support of both on-campus and off-campus groups. The lab is used primarily for a junior level comprehensive pavement design course (which includes both pavement material and structural designs). The Lab is also used by senior students as part of a 3-term senior project sequence in which students perform pavement designs for large scale projects modeled closely on “real world” conditions.

8. Lab Capabilities:

The Pavement Lab is fully equipped for the mix design of asphalt pavement structures using the Superpave® methodology, and the centerpiece is a Superpave compatible gyratory compactor.

The Traffic Lab currently consists of five new computer workstations equipped with state-of-the-practice traffic simulation and evaluation software (VISSIM, PARAMICS, PETRA, HCS etc.). A new “hardware in the loop” traffic simulator (NIATT/McCain CID II) will be commissioned in Fall 2007.

9. Lab Equipment:

(See Lab Capabilities, above)

10. Partners:

Portland State University

Oregon Department of Transportation

Associated General Contractors of America – Oregon-Columbia Section

Asphalt Pavement Association of Oregon

11. Examples of Current and Past Work:

Faculty and students in the Traffic Engineering Lab have conducted a small number of traffic projects including the simulation of suburban Oregon interchanges and the evaluation of different traffic simulation tools for the Oregon Department of Transportation (ODOT). Together with partners at Portland State University and the ODOT, OIT researchers are currently evaluating a rural highway ice detection and warning system in the mountains of southern Oregon .

Due to the current program focus on undergraduate education at OIT, there has been no funded lab research to date in the Pavement Lab. Undergraduate students have worked on some interesting projects in the senior project class, including the design of a permeable pavement in association with a “sustainable construction” project.

It is anticipated that both the Traffic Engineering Lab and the Pavement Lab will support graduate student research projects when the proposed MSCE degree is fully operational.

12. Notes (other information you’d like included):

University of Alaska

Structures Laboratory

2. Lab Type:

3. Center/Institute Name:

Alaska University Transportation Center (AUTC) & Arctic Engineering Research Center,
Institute of Northern Engineering

4. University Name:

University of Alaska

5. Center Contact Information:

Alaska University Transportation Center
Director, Billy G. Connor, P.E.
University of Alaska Fairbanks
P.O.Box 755900
Fairbanks, Alaska 99775-5900

907-474-5552

6. Lab Manager Contact Information:

Gary C. Tyndall, P.E.,
907-474-6548
fngct1@uaf.edu

7. Lab Mission/Purpose:

Applied, exploratory, and basic research on transportation safety, security, and innovation in cold regions

8. Lab Capabilities:

9. Lab Equipment:

10. Partners:

11. Examples of Current and Past Work:

12. Notes (other information you'd like included):

Geotechnical Laboratory

2. Lab Type:

3. Center/Institute Name:

Alaska University Transportation Center (AUTC) & Arctic Engineering Research Center,
Institute of Northern Engineering

4. University Name:

University of Alaska

5. Center Contact Information:

Alaska University Transportation Center
Director, Billy G. Connor, P.E.
University of Alaska Fairbanks
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Fairbanks, Alaska 99775-5900

907-474-5552

6. Lab Manager Contact Information:

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907-474-6548
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7. Lab Mission/Purpose:

Applied, exploratory, and basic research on transportation safety, security, and innovation in cold regions

8. Lab Capabilities:

9. Lab Equipment:

10. Partners:

11. Examples of Current and Past Work:

12. Notes (other information you'd like included):

Advanced Materials Testing Lab

2. Lab Type:

3. Center/Institute Name:

Alaska University Transportation Center (AUTC) & Arctic Engineering Research Center,
Institute of Northern Engineering

4. University Name:

University of Alaska

5. Center Contact Information:

Alaska University Transportation Center
Director, Billy G. Connor, P.E.
University of Alaska Fairbanks
P.O.Box 755900
Fairbanks, Alaska 99775-5900

907-474-5552

6. Lab Manager Contact Information:

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907-474-6548
fngct1@uaf.edu

7. Lab Mission/Purpose:

Applied, exploratory, and basic research on transportation safety, security, and innovation in cold regions

8. Lab Capabilities:

9. Lab Equipment:

10. Partners:

11. Examples of Current and Past Work:

12. Notes (other information you'd like included):

Asphalt Mix and Cement Testing Labs

2. Lab Type:

3. Center/Institute Name:

Alaska University Transportation Center (AUTC) & Arctic Engineering Research Center,
Institute of Northern Engineering

4. University Name:

University of Alaska

5. Center Contact Information:

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7. Lab Mission/Purpose:

Applied, exploratory, and basic research on transportation safety, security, and innovation in cold regions

8. Lab Capabilities:

9. Lab Equipment:

10. Partners:

11. Examples of Current and Past Work:

12. Notes (other information you'd like included):

Superpave Lab

2. Lab Type:

3. Center/Institute Name:

Alaska University Transportation Center (AUTC) & Arctic Engineering Research Center,
Institute of Northern Engineering

4. University Name:

University of Alaska

5. Center Contact Information:

Alaska University Transportation Center
Director, Billy G. Connor, P.E.
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7. Lab Mission/Purpose:

Applied, exploratory, and basic research on transportation safety, security, and innovation in cold regions

8. Lab Capabilities:

9. Lab Equipment:

10. Partners:

11. Examples of Current and Past Work:

12. Notes (other information you'd like included):

Environmental Labs

2. Lab Type:

3. Center/Institute Name:

Alaska University Transportation Center (AUTC) & Arctic Engineering Research Center,
Institute of Northern Engineering

4. University Name:

University of Alaska

5. Center Contact Information:

Alaska University Transportation Center
Director, Billy G. Connor, P.E.
University of Alaska Fairbanks
P.O.Box 755900
Fairbanks, Alaska 99775-5900

907-474-5552

6. Lab Manager Contact Information:

Gary C. Tyndall, P.E.,
907-474-6548
fngct1@uaf.edu

7. Lab Mission/Purpose:

Applied, exploratory, and basic research on transportation safety, security, and innovation in cold regions

8. Lab Capabilities:

9. Lab Equipment:

10. Partners:

11. Examples of Current and Past Work:

12. Notes (other information you'd like included):

Cold Room Facilities

2. Lab Type:

3. Center/Institute Name:

Alaska University Transportation Center (AUTC) & Arctic Engineering Research Center,
Institute of Northern Engineering

4. University Name:

University of Alaska

5. Center Contact Information:

Alaska University Transportation Center
Director, Billy G. Connor, P.E.
University of Alaska Fairbanks
P.O.Box 755900
Fairbanks, Alaska 99775-5900

907-474-5552

6. Lab Manager Contact Information:

Gary C. Tyndall, P.E.,
907-474-6548
fngct1@uaf.edu

7. Lab Mission/Purpose:

Applied, exploratory, and basic research on transportation safety, security, and innovation in cold regions

8. Lab Capabilities:

9. Lab Equipment:

10. Partners:

11. Examples of Current and Past Work:

12. Notes (other information you'd like included):

Permafrost Tunnel

2. Lab Type:

3. Center/Institute Name:

Alaska University Transportation Center (AUTC) & Arctic Engineering Research Center,
Institute of Northern Engineering

4. University Name:

University of Alaska

5. Center Contact Information:

Alaska University Transportation Center
Director, Billy G. Connor, P.E.
University of Alaska Fairbanks
P.O.Box 755900
Fairbanks, Alaska 99775-5900

907-474-5552

6. Lab Manager Contact Information:

Gary C. Tyndall, P.E.,
907-474-6548
fngct1@uaf.edu

7. Lab Mission/Purpose:

Applied, exploratory, and basic research on transportation safety, security, and innovation in cold regions

8. Lab Capabilities:

9. Lab Equipment:

10. Partners:

11. Examples of Current and Past Work:

12. Notes (other information you'd like included):

University of Minnesota

HumanFIRST Program

2. Lab Type:

Human Factors

3. Center/Institute Name:

Intelligent Transportation Systems Institute

4. University Name:

University of Minnesota

5. Center Contact Information:

Intelligent Transportation Systems Institute

Director, Dr. Max Donath

University of Minnesota

Center for Transportation Studies

200 Transportation and Safety Building

511 Washington Ave., SW

Minneapolis, MN 55455

(612) 626-1077

6. Lab Manager Contact Information:

Michael Manser

612-625-0447

humanfirst@me.umn.edu

7. Lab Mission/Purpose:

The HumanFIRST (Human Factors Interdisciplinary Research in Simulation and Transportation) Program employs the tools and methods of psychology and human factors engineering to improve scientific understanding of driver performance and cognitive functions.

8. Lab Capabilities:

Combining a core staff of cognitive psychologists and a multidisciplinary network of researchers, HumanFIRST supports a wide variety of research activities aimed at producing safer, more efficient transportation systems.

Immersive driving simulation enables HumanFIRST to accurately capture data on driver performance and behavior under virtually any conditions. For real-world testing and validation, the program has access to a variety of test track and operational research settings.

Traffic scenarios of any type can be created, incorporating a variety of simulated road user types (including pedestrians and bicyclists with realistic motion). Simulation behavior can be altered

dynamically in response to traffic conditions and to driver responses such as eye-glance behavior and interaction with vehicle controls.

9. Lab Equipment:

The centerpiece of the HumanFIRST facility is the VESTR (Virtual Environment for Surface Transportation Research) driving simulator, an immersive virtual-reality environment for evaluating driver performance built around a 2002 Saturn SC2 full vehicle cab. The driver compartment features realistic controls and instrumentation including force feedback on the steering and emulated powerassist during braking. VESTR provides high-fidelity simulation for all sensory channels, producing a realistic sense of presence within the simulated environment.

Data gathering and monitoring devices support the design and evaluation of vehicle telematic systems and auditory/visual/haptic interfaces. VESTR is integrated with a 40-channel psychophysical recording unit that supports the measurement of driver brain activity using Evoked Response Potential paradigms. The simulator is also integrated with an eye tracking system capable of determining which objects in the dynamic simulation receive the driver's attention.

10. Partners:

Federal Cooperative Intersection Collision Avoidance System (CICAS) initiative
Local Road Research Board
Center for Transportation Studies, University Of Minnesota
Minnesota Department of Transportation
National Highway Traffic Safety Association
United States Department of Transportation

11. Examples of Current and Past Work:

HumanFirst provides human factors research support for a wide variety of ITS research projects, working with other programs and laboratories within the ITS Institutes as well as with outside research partners. Some of these studies are listed below.

- Rural Intersection Decision Support/Cooperative Intersection Collision Avoidance Systems (CICAS)
- Effects on Driver Performance of Advanced Traveler Information Systems and 511
- Information Retrieval
- Motorcycle Riding Impairment at Different BAC Levels
- Generational Perspectives on Teen and Older Drivers on Traffic
- Safety in Rural and Urban Communities
- The use of Video Feedback in Urban Teen Driving

12. Notes (other information you'd like included):

Intelligent Vehicles Laboratory

2. Lab Type:

Technology

3. Center/Institute Name:

Intelligent Transportation Systems Institute

4. University Name:

University of Minnesota

5. Center Contact Information:

Intelligent Transportation Systems Institute
Director, Dr. Max Donath
University of Minnesota
Center for Transportation Studies
200 Transportation and Safety Building
511 Washington Ave., SW
Minneapolis, MN 55455

(612) 626-1077

6. Lab Manager Contact Information:

Craig Shankwitz
(612) 625-0323
shank004@umn.edu

7. Lab Mission/Purpose:

The Intelligent Vehicles Laboratory's mission is to develop and test innovative technologies that improve traffic safety by reducing driver error—the cause of most crashes and traffic-related fatalities.

8. Lab Capabilities:

IV Laboratory research focuses on increasing driver safety in difficult driving conditions through the use of vehicle-guidance and collision-avoidance technologies. Several vehicles serve as experimental testbeds, including the SAFETRUCK (an International 9400 tractor-trailer), the SAFELOW (an International 2540 crew-cab snowplow), a state highway patrol car, and a Minnesota Valley Transit Authority bus used for transit research. Using these vehicles, IV Laboratory researchers are developing, testing, and integrating advanced technologies including:

- Centimeter-level differential global-positioning systems (DGPS)
- High-accuracy digital-mapping systems
- Range sensors, including radar and laser-based sensors
- A windshield head-up display (HUD), a virtual mirror, and other graphical displays
- Haptic and tactile feedback

Other current research topics include:

- Design and testing of custom human interfaces
- Collision-avoidance sensors and algorithms
- Intersection-surveillance systems
- Wireless communication among vehicles and with the infrastructure

9. Lab Equipment:

Several vehicles serve as experimental testbeds, including the SAFETRUCK (an International 9400 tractor-trailer), the SAFELOW (an International 2540 crew-cab snowplow), a state highway patrol car, and a Minnesota Valley Transit Authority bus used for transit research.

10. Partners:

Minnesota Department of Transportation
U.S. Department of Transportation's Research and Special Programs Administration
Federal Highway Administration
Federal Transit Administration
Twin Cities' Metro Transit
Minnesota Valley Transit Authority
Minnesota's Local Road Research Board
Hennepin County

11. Examples of Current and Past Work:

- Advanced Bus Rapid Transit: Innovative Technologies for Dedicated Roadways
- Infrared Sensing for Driver Assistive Systems
- Multiuse, High Accuracy, High Density Geospatial Databases
- Study to Determine Motorcycle Impairment at Different BAC Levels
- Guidance Augmentation for Transit Applications
- GPS Augmentation for Robust Lane Assistance
- Analysis of Highway Design and Geometric Effects on Crashes

12. Notes (other information you'd like included):

Minnesota Traffic Observatory

2. Lab Type:

Planning

3. Center/Institute Name:

Intelligent Transportation Systems Institute

4. University Name:

University of Minnesota

5. Center Contact Information:

Intelligent Transportation Systems Institute
Director, Dr. Max Donath
University of Minnesota
Center for Transportation Studies
200 Transportation and Safety Building
511 Washington Ave., SW
Minneapolis, MN 55455

(612) 626-1077

6. Lab Manager Contact Information:

John Hourdos, Director
(612) 626-5492
Hourdos@umn.edu

7. Lab Mission/Purpose:

The primary research mission of the Minnesota Traffic Observatory is to support research in monitoring, management, and simulation of traffic systems.

8. Lab Capabilities:

Data Acquisition and Sensing

The Minnesota Traffic Observatory (MTO) has developed several generations of data-gathering systems to meet the needs of researchers working on traffic flow issues. The most recent of these is the Beholder system, a fully independent network of video detectors providing space- and time-continuous coverage of the I-35W/I-94 Commons freeway area in Minneapolis.

Beholder expands on the pioneering Autoscope™ system, originally developed at the University of Minnesota and now in widespread commercial use. Beholder's portable monitoring stations are currently deployed on the roofs of several high-rise buildings overlooking the freeway, and transmit data back to the lab via a high-speed wireless network.

The Minnesota Department of Transportation (Mn/DOT) supplies sixteen switchable uncompressed video feeds to the MTO, enabling researchers to switch between more than 300 Mn/DOT cameras monitoring the metropolitan freeway network.

Simulation and Modeling

Several traffic simulation packages are used in the Minnesota Traffic Observatory, primarily AIMSUNNG for “microscopic” simulation based on individual vehicles, and the KRONOS 9 package—developed at the University of Minnesota—for macroscopic or platoon-based simulations. Other packages are used as needed.

Planning Support Systems

The GIS/Map planning table (at right) is a recent development of the MTO. Designed to facilitate collaborative processes, it has been the centerpiece of research in participatory process methodologies and planning support systems design and evaluation. MTO engineers are closely collaborating with local and national planning experts in the development of new planning support tools.

Advanced Visualization Systems

The DEN (Digital Immersive ENvironment) is a high-fidelity 3D interactive immersive display system which serves as a general resource to observe and explore traffic flow scenarios within any environmental context, and from any fixed or moving perspective. MTO engineers are working with civil engineering researchers to use the DEN to evaluate infrastructure-based driver warning systems.

9. Lab Equipment:

(See Lab Capabilities, above)

10. Partners:

FHWA

Mn/DOT

Local and regional agencies

University of Vermont

National Park Service

NGSIM Community

11. Examples of Current and Past Work:

- A Predictive Study of Use Impacts on the Denali Park Road
- Bus Signal Priority Based on GPS and Wireless Communications
- Enhanced Micro-Simulation Models for Accurate Safety Assessment
- Identification and Simulation of Common Freeway Accident Mechanisms
- Accident Prevention Based on Automatic Detection of Accident Prone Traffic Conditions
- Evaluation and Improvement of the Stratified Ramp Metering Algorithm through Microscopic Simulation

12. Notes (other information you'd like included):

University of Vermont

Transportation Air Quality Lab

2. Lab Type:

An on-campus garage and two vehicles with equipment that is used for both real world and lab-based tailpipe emissions data collection.

3. Center/Institute Name:

UVM Transportation Research Center

4. University Name:

University of Vermont

5. Center Contact Information:

Lisa Aultman-Hall
Director, UVM Transportation Research Center
Professor, School of Engineering
University of Vermont
210 Colchester Avenue
Farrell Hall
Burlington, VT 05405

Phone: 802-656-1245

Fax: 802-656-9892

6. Lab Manager Contact Information:

Britt Holmen
Associate Professor
School of Engineering
Room 213B Votey Hall
33 Colchester Ave.
Burlington, VT 05405

Phone: 802-656-8323

Fax: 802-656-8446

7. Lab Mission/Purpose:

To collect unique, second-by-second vehicle emissions data. In addition to the regulated typical exhaust emissions, this includes a focus on ultra-fine and nano-particle number emissions and mobile source air toxics. Researchers seek to connect road type, road grade and individual driver behavior to emissions levels.

8. Lab Capabilities:

Real world and lab-based high temporal resolution tailpipe emissions data collection for gasoline, hybrid and diesel engines.

9. Lab Equipment:

1999 Toyota Sienna minivan
2007 Toyota Prius (convertor to plug-in)
Armfield CM12 Light-duty Diesel Engine Test-bed
SUN RAM 3000 Chassis Dynamometer
MKS 2030-HS High speed Fourier Transform Infrared Spectrometer (measures gas emissions)
Scanning mobility particle sizer
Electrical low-pressure impactor (measures real-time particle size)
12 in-vehicle Global Positioning Systems (Geostats and Trimble)
Crossbow 2 and 3 axis On-board accelerometers
3 Scantools (vehicle-specific) for on-board diagnostics (OBD)
Pitot tube assembly for real-time exhaust flow measurement
Rotating disk minidiluter
Digital video equipment

10. Partners:

College of Engineering and Mathematical Sciences
Vermont Agency of Natural Resources
Vermont Agency of Transportation
Resources Systems Group Inc.

11. Examples of Current and Past Work:

- Modeling particle number emissions as a function of gas emissions
- Comparing emissions from hybrid and non-hybrid vehicles
- Quantifying the emissions benefits of plug-in hybrid vehicles
- Modeling emissions as a function of second-by-second driver velocity and road curvature
- Spatial analysis of emissions using Geographic Information Systems (GIS)
- Analysis of on-board emissions testing of transit buses

12. Notes (other information you'd like included):

Members of this lab also work with social scientists in sociology and communications to study the public understanding of tailpipe emissions and to design effective communication strategies for disseminating these research findings to the public.

University of Wisconsin

Asphalt Engineering Laboratory

2. Lab Type:

Infrastructure, Materials, and Maintenance

3. Center/Institute Name:

Wisconsin Transportation Institute

4. University Name:

University of Wisconsin – Madison College of Engineering

5. Center Contact Information:

National Center for Freight & Infrastructure Research and Education

Director, Dr. Teresa M. Adams

University of Wisconsin

Department of Civil and Environmental Engineering

2205 Engineering Hall

1415 Engineering Drive, Room 272

Madison, WI 53706

Phone: (608) 263-3175

Fax: (608) 263-2512

6. Lab Manager Contact Information:

Hussain U. Bahia

(608) 265-4481

bahia@engr.wisc.edu

7. Lab Mission/Purpose:

This laboratory is part of the Wisconsin Structures and Materials Testing Laboratory (WSMTL) and is fully equipped to perform Superpave binder and mixture tests.

8. Lab Capabilities:

- Rheological properties, failure properties, and thermal properties of asphalt binders
- are measure using specialized rheometers, direct tension, and glass transition devices.
- Includes a full set of asphalt mixture volumetric design equipment and equipment for
- measuring mixture performance using tri-axial loading cells under controlled temperature conditions.
- Advanced instrumentation capabilities of standard Superpave equipment allows special studies in asphalt binder and mixture research.

9. Lab Equipment:

Dynamic Shear Rheometer (DSR)

Bending Beam Rheometer (BBR)

Rolling Thin Film Oven (RTFO)

Direct Tension Tester (DTT)

Pressure Aging Vessel (PAV)
Rotational Viscometer
Gyratory Compactor

10. Partners:

Wisconsin Structures and Materials Testing Laboratory (WSMTL)
Wisconsin Department of Transportation (WisDOT)
Wisconsin Asphalt Pavement Association (WAPA)
Federal Highway Administration

11. Examples of Current and Past Work:

"Using the Gyratory Compactor to Measure the Mechanical Stability of Asphalt Mixtures" by:
Ahmed Fatin Faheem Mahmoud and Professor Hussain Bahia

“Evaluation of the Roles of Adhesion & Cohesion Properties of Asphalt Binders in Moisture
Damage of Hot Mix Asphalt” by: Kunnawee Kanitpong and Professor Hussain Bahia

“Test Method to Determine Aggregate/Asphalt Adhesion Properties and Potential Moisture
Damage” by: Hussain Bahia, Andrew Hanz, Dr. Kunnawee Kanitpong, Dr. Haifang Wen, Bloom
Consultants

12. Notes (other information you'd like included):

Facility Use: The facility can be used by research staff, graduate students, and student hourly
undergraduates to work on funded research projects or work related to their theses.

Financial Arrangements: The Asphalt Engineering Laboratory receives an annual grant for
general upkeep of the lab, as well as funding for projects through the Wisconsin Structures and
Materials Testing Laboratory.

Composite Structures Laboratory

2. Lab Type:

Infrastructure, Materials, and Maintenance

3. Center/Institute Name:

Wisconsin Transportation Institute

4. University Name:

University of Wisconsin – Madison College of Engineering

5. Center Contact Information:

National Center for Freight & Infrastructure Research and Education

Director, Dr. Teresa M. Adams

University of Wisconsin

Department of Civil and Environmental Engineering

2205 Engineering Hall

1415 Engineering Drive, Room 272

Madison, WI 53706

Phone: (608) 263-3175

Fax: (608) 263-2512

6. Lab Manager Contact Information:

Lawrence C. Bank

(608) 262-1604

bank@engr.wisc.edu

7. Lab Mission/Purpose:

To conduct experimental and analytical investigations of fiber composite materials for constructing durable structures and rehabilitating existing transportation structures.

8. Lab Capabilities:

Specific manufacturing technologies include:

- Vacuum bagging, Molding, and Hand lay up

Specific structural applications include:

- FRP strengthening of concrete highway structures (concrete slabs, piers, columns)
- FRP strengthening of timber railroad structures (piles, cap beams, stringers)
- FRP reinforcement for concrete structures (bridge decks)
- FRP pultruded structural systems for highway structures (guardrails, sign supports)
- FRP stay-in-place formwork (structural and non-structural)

Specific ASTM testing and analysis tools include:

- Tension, compression, and shear tests

- Volume fraction and fiber architecture tests
- Differential Scanning Calorimetry (DSC) and optical microscopy
- Durability testing
- Flexural and shear tests for bridge decks

Specific Analysis tools include:

- CompositePro, Abaqus, and Ansys

9. Lab Equipment:

The laboratory has facilities to fabricate, test, analyze and characterize fiber reinforced polymer (FRP) glass and carbon composite materials for structural applications.

10. Partners:

Wisconsin Department of Transportation
Wisconsin Structures and Materials Testing Laboratory
Wisconsin Highway Research Program
Wisconsin Construction Materials Service Center

11. Examples of Current and Past Work:

- Experimental and Analytical Study of Concrete Bridge Decks Constructed with FRP Stay-in-Place Forms and FRP Grid Reinforcing
- Longitudinal Tensile and Transverse Crushing Behavior of a Prototype Multi-cellular FRP Composite Materials Highway Guardrail System
- Rapid Strengthening of Reinforced Concrete Bridge with Mechanically Fastened FRP Strips
- Durability and Service Life Prediction of Concrete Reinforcing Materials
- Analysis of a Bridge Deck Built with FRP Stay-In-Place Forms, FRP Grids, and FRP Rebars
- Experimental and Analytical Study of Fiber Reinforced Polymer (FRP) Grid Reinforced Concrete Bridge Decking, noted as Popular Science “Best of What’s New 2005” Selection.
- Modular 3-D FRP Reinforcing System for a Bridge Deck in Fond du Lac, Wisconsin
- Modular FRP Grid Reinforcing Systems with Integral Stay-in-place Form for Concrete Structures
- Investigation of a Deployable Military Bridge System with a Fiber Reinforced Concrete Deck
- Development of a Specification for Thin Stay-in-Place Forms for Bridge Deck Construction
- LRFD Factors for Pultruded Structural Members

12. Notes (other information you’d like included):

Construction and Materials Support Center (CMSC)

2. Lab Type:

Infrastructure, Materials, and Maintenance

3. Center/Institute Name:

Wisconsin Transportation Institute

4. University Name:

University of Wisconsin – Madison College of Engineering

5. Center Contact Information:

National Center for Freight & Infrastructure Research and Education

Director, Dr. Teresa M. Adams

University of Wisconsin

Department of Civil and Environmental Engineering

2205 Engineering Hall

1415 Engineering Drive, Room 272

Madison, WI 53706

Phone: (608) 263-3175

Fax: (608) 263-2512

6. Lab Manager Contact Information:

Dr. Awad S. Hanna – Director

(608) 263-8903

ashanna@wisc.edu

Gary C. Whited – Program Manager

(608) 262-7243

whited@engr.wisc.edu

7. Lab Mission/Purpose:

The Construction and Materials Support Center (CMSC) is an academic based engineering facility housed at the University of Wisconsin-Madison. The Center was formed in partnership with the Wisconsin Department of Transportation and focuses on implementing research findings and new technologies within the department and other local, state, and federal transportation agencies. It provides support services, investigations, and applied research to deliver timely solutions to problems encountered in all phases of the project delivery systems of public agencies by forming partnerships with local, state, and federal governmental organizations, industry, and academic research institutions.

8. Lab Capabilities:

Applied Research: Researching new construction management techniques, construction and materials engineering processes and procedures, and other innovative project development

practices and technologies that can improve the efficiency and cost effectiveness of the owner agencies.

Special Studies: Short-term investigative studies with a rapid turnaround time, on specific problems or issues of concern to the sponsoring agency or group.

Project Delivery Assistance: Direct project support in all phases of the project delivery process for construction projects.

Materials Testing: Specialized testing of construction materials, evaluating the suitability of materials for the intended function, investigating materials performance or production problems, and assessing suitability of new materials.

Education: Training to agency project staff and others on new techniques and processes, developing application guidance tools for inclusion in manuals, conducting seminars and workshops, and incorporating project results in undergraduate and graduate level courses for engineering students.

9. Lab Equipment:

10. Partners:

Wisconsin Department of Transportation
Wisconsin Highway Research Program
UW-Madison Composite Structures Laboratory
Wisconsin Structures and Materials Laboratory
Recycled Materials Resource Center
USDOT Federal Highway Administration

11. Examples of Current and Past Work:

Current Projects:

- Improved Construction Cost Estimating Procedures for Developing the Engineer's Estimate at WisDOT
- Construction Management Services for the Marquette Interchange Reconstruction Project
- Implementation of GPS Controlled Highway Construction Equipment
- Improving Communications on WisDOT Construction Projects Evaluation of Owner Controlled Insurance Programs (OCIP's) for WisDOT Mega-Corridor Projects
- Methods for Implementing Innovative Transportation Project Delivery Systems
- Strategies for Appropriately Allocating Risk on Transportation Projects
- Rapid Repair and Replacement Techniques for Transportation Structures Damaged by Disasters

12. Notes (other information you'd like included):

Project delivery support, investigative studies and applied research services are available to local, state and federal governmental organizations, industry, and academic research institutions.

Geo-Engineering Laboratories

2. Lab Type:

Infrastructure, Materials, and Maintenance

3. Center/Institute Name:

Wisconsin Transportation Institute

4. University Name:

University of Wisconsin – Madison College of Engineering

5. Center Contact Information:

National Center for Freight & Infrastructure Research and Education

Director, Dr. Teresa M. Adams

University of Wisconsin

Department of Civil and Environmental Engineering

2205 Engineering Hall

1415 Engineering Drive, Room 272

Madison, WI 53706

Phone: (608) 263-3175

Fax: (608) 263-2512

6. Lab Manager Contact Information:

Tuncer B. Edil

(608) 262-3225

edil@engr.wisc.edu

7. Lab Mission/Purpose:

This laboratory provides a comprehensive testing and instrumentation capability to assess geo-material behavior.

8. Lab Capabilities:

Soil and Aggregate Characterization

The Laboratories are supervised by a full-time engineer and equipped to perform most geotechnical tests. Tests determine physical properties such as grain size, shape and compaction and mechanical properties such as stiffness, resilient modulus, and plastic strain. Capabilities also exist for soil suction testing.

Geosynthetics Laboratory

Testing capabilities are available to perform geosynthetics tests to determine physical, mechanical, survivability, hydraulic, and durability properties of all geosynthetics. Other specialized equipment includes large-size direct shear device for interface properties, pullout test, permittivity, transmissivity, axisymmetric tension test devices.

Geoenvironmental Laboratory

Testing capabilities are available for batch and column tests for leachate characterization and the necessary chemical analysis equipment for both organics and metals.

Test Pit

A fully equipped hydraulic test pit, 3x3x3m, is available for subgrade/pavement structural model tests. Several MTS structural actuators provide a range of cyclic loading capacity and the associated data acquisition system measures and records forces and displacements. The test pit has been developed as a pavement testing facility complete with a loading frame, sensors for measuring the response of layers, and material handling and placement capabilities. A backhoe is available to handle large quantities of materials for constructing pavement sections. Compaction control devices (soil stiffness gauge, nuclear density gauge, dynamic cone penetrometer and a vibratory tamper) are available.

Field Instrumentation, Dynamic Testing, and Material Characterization

The Geo-Engineering Laboratories are fully equipped with specialized instruments and transducers for the evaluation of the saturated and unsaturated geomaterial response under low-amplitude elastic waves. A brief list of instrumentation includes: Stokoe-type resonant column, P and S-wave ultrasonic sensors, and 10 Hz-10 kHz PCB miniature piezocrystal accelerometers. These sets of instruments are complemented with peripheral electronics, including data acquisition systems, digital storage oscilloscopes, charge amplifiers, power amplifiers, filter/amplifier, electronic multimeters, and signal generators. A soil stiffness gauge, dynamic cone penetrometer, nuclear density gauge, and moisture-density gauge for in situ monitoring of density, moisture, stiffness, and strength are present.

Geophysical Testing

The Geo-Engineering Laboratories also includes geophysical data acquisition systems: a 24 channel Geometrics StrataView seismograph with both vertical and horizontal geophones and a 96 channel roll-along box. This system allows for high resolution seismic imaging and mapping of near surface structures of both man-made and geologic origin. Also equipped with borehole geophones for cross-hole tomographic imaging.

9. Lab Equipment:

(See Lab Capabilities, above)

10. Partners:

Federal Highway Administration

Wisconsin and Minnesota Departments of Transportation

Wisconsin Highway Research Program; Recycled Materials Resource Center

Midwest Regional University Transportation Center

Wisconsin Department of Natural Resources

Alliant Energy, Xcel Energy

LaFarge North America

11. Examples of Current and Past Work:

- Prototype evaluation of working platforms constructed of granular byproducts, fly ash stabilized materials, and geosynthetic reinforced aggregates.
- Long-term field evaluation of working platforms constructed of alternative materials and fly stabilized pavement layers.
- Long-term leachate quality evaluation of industrial byproducts in the field.

12. Notes (other information you'd like included):

Laboratories are primarily for support of research activities. However, testing is available on a contractual basis especially for specialized tests and materials.

Wisconsin Structures and Materials Laboratory (WSML)

2. Lab Type:

Infrastructure, Materials, and Maintenance

3. Center/Institute Name:

Wisconsin Transportation Institute

4. University Name:

University of Wisconsin – Madison College of Engineering

5. Center Contact Information:

National Center for Freight & Infrastructure Research and Education

Director, Dr. Teresa M. Adams

University of Wisconsin

Department of Civil and Environmental Engineering

2205 Engineering Hall

1415 Engineering Drive, Room 272

Madison, WI 53706

Phone: (608) 263-3175

Fax: (608) 263-2512

6. Lab Manager Contact Information:

Steven M. Cramer

(608) 262-7711

cramer@engr.wisc.edu

7. Lab Mission/Purpose:

This series of laboratories is administered by the College of Engineering (COE) and heavily used by Civil and Environmental Engineering (CEE) staff and students. These interdisciplinary laboratories are for testing materials and structures, including bituminous, concrete, wood, and fiber-reinforced polymer materials.

8. Lab Capabilities:

- Includes 1400 square feet of high-strength test floor with 100 kip tie-down points and over 200 square feet of high-strength reaction wall for structural testing.
- A variety of hydraulic, closed-loop system actuators are available, both movable and fixed-frame.

9. Lab Equipment:

Southwark Emery Testing Machine (1,000,000 lbs Tension & Compression, 18 ft test specimens)

BLH Testing Machine (60,000 & 200,000 lbs Tension & Compression)

SATEC MII-400AD (400,000 lbs Compression only)

MTS 810 (22,000 lbs Tension & Compression with Hydraulic Grips)
Structural Floor Actuators (Ranging from 2,000-200,000 lbs.)
MTS Test Frame (12,500 lbs with Hydraulic Grips)
MTS 812 (22,000 & 100,000 with Hydraulic Grips)
MTS Fracture System (20,000 lbs.)

10. Partners:

Wisconsin Department of Transportation
Wisconsin Structures and Materials Testing Laboratory
Wisconsin Highway Research Program
Wisconsin Construction Materials Service Center

11. Examples of Current and Past Work:

“Innovative Bridge Design and Construction IV Bridge B-13-570 over IH39-90 With Wisconsin Precast "W" Girders Utilizing Steel-Free Decks”

By: Han-Ug Bae, Professor Michael Oliva, Professor Lawrence Bank, and Professor Jeff Russell

“Effectiveness and Life Performance of Concrete Bridge Deck and Crack Sealers” By:

Melissa Dorshorst, Professor Jose Pincheira

“Failure Prediction of Gypsum Board Exposed to Elevated Temperatures”

By: Gumpon Sriprutkiat, Onesty Friday, and Professor Steve Cramer

12. Notes (other information you’d like included):

The laboratory provides physical testing facilities and technical assistance to students, and faculty engaged in instruction and research. Service testing is also provided to the public and private firms on a cost-reimbursable basis. All laboratory activity and requests for testing assistance are registered and processed through the WSMTL Office in Room 1314 Engineering Hall. Advanced reservations are essential to ensure space and equipment will be available. Reservations are encouraged at the time of course planning or proposal submission.

Transportation and Urban Systems Analysis Laboratory (TUSAL)

2. Lab Type:

Planning

3. Center/Institute Name:

Wisconsin Transportation Institute

4. University Name:

College of Engineering

University of Wisconsin – Madison

5. Center Contact Information:

National Center for Freight & Infrastructure Research and Education

Director, Dr. Teresa M. Adams

University of Wisconsin

Department of Civil and Environmental Engineering

2205 Engineering Hall

1415 Engineering Drive, Room 272

Madison, WI 53706

Phone: (608) 263-3175

Fax: (608) 263-2512

6. Lab Manager Contact Information:

Jessica Y. Guo

(608) 890-1064

jyguo@wisc.edu

7. Lab Mission/Purpose:

The Transportation and Urban Systems Analysis Laboratory (TUSAL) is a laboratory for supporting computationally intensive, simulation-based research on transportation and other urban sub-systems.

8. Lab Capabilities:

TUSAL is equipped with advanced computing facilities and state-of-the-art software to conduct research in the following areas:

- Travel behavior analysis
- Multimodal passenger and freight transportation demand forecasting
- Integrated urban systems simulation
- Transportation policy testing
- Transportation data mining and integration
- GIS/GPS-based application development

9. Lab Equipment:

10. Partners:

Wisconsin Department of Transportation
Mississippi Valley Freight Coalition
Midwest Regional University Transportation Center
National Center for Freight and Infrastructure Research and Education

11. Examples of Current and Past Work:

Successful practices in Freight Planning

By: Jessica Guo, Ph.D.
Start Date: February 1, 2007
End Date: April 30 2008

Activity-Based Travel-Demand Analysis for Metropolitan Areas (CEMDAP)

By: Jessica Guo, Ph.D.
Start Date: January 1, 2006
Ending Date: December 31, 2006

12. Notes (other information you'd like included):

The facility can be used by research staff, graduate students, and student hourly undergraduates to work on funded research projects or work related to their theses. The laboratory is supported by research project funds.

Wisconsin Traffic Operations and Safety (TOPS) Laboratory

2. Lab Type:

Safety and Operations

3. Center/Institute Name:

Wisconsin Transportation Institute

4. University Name:

College of Engineering

University of Wisconsin – Madison

5. Center Contact Information:

National Center for Freight & Infrastructure Research and Education

Director, Dr. Teresa M. Adams

University of Wisconsin

Department of Civil and Environmental Engineering

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6. Lab Manager Contact Information:

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7. Lab Mission/Purpose:

The Wisconsin Traffic Operations and Safety (TOPS) Laboratory is an organization developed with a mission to improve traffic operations and safety in Wisconsin and across the Midwest through a diverse balance of service partnerships, research and training.

8. Lab Capabilities:

TOPS Laboratory service areas include:

- Traditional Traffic Operations and Safety Engineering and Technology / Services Development.
- Traffic Operations Support Services and Knowledge Management.
- Transportation Operations Data Management.
- Traffic Operations Program Review

- Transportation Operations Data Management

9. Lab Equipment:

10. Partners:

- **Wisconsin Department of Transportation (WisDOT)**

<http://www.dot.state.wi.us/>

- **Federal Highway Administration (FHWA)**

<http://www.fhwa.dot.gov>

11. Examples of Current and Past Work:

- Evaluation of the Flashing Yellow Arrow Permissive Left-Turn Indication Field
- Implementation
- Archived Data Management System (*WisTransPortal*)
- The Cost Effectiveness of Approach Guardrail on County State-Aid Bridges
- Road Weather Safety Audit Plan and Initial Implementation
- Work Zone Queue Analysis Calibration/Validation Support
- Preventative Maintenance Strategies for WisDOT

12. Notes (other information you'd like included):

Laboratories are primarily for support of research and education activities. Contact Mr. Szymkowski for additional details.