URI Transportation Center

2003
The URI Transportation Center was established in 1999 to conduct multidisciplinary education, research, technology transfer, and outreach for surface transportation systems and advanced transportation infrastructure.

The Center is one of 27 national centers supported by the U.S. Department of Transportation through the University Transportation Centers Program.

The Center has a full-time staff of five, headed by an Executive Director. URI faculty members head the education, research, and tech transfer / outreach efforts. The Center also has an Executive Board chaired by the URI President and composed of senior members of the Center’s stakeholder groups. An operating council provides additional leadership.

**About the URI Transportation Center**

**THEME**
“Surface Intermodal Transportation Systems and Advanced Transportation Infrastructure with Special Reference to the Marine Environment.

**MISSION**
“To advance U.S. technology and expertise in the many disciplines composing transportation through the mechanisms of education, research, and technology transfer at a university-based center of excellence.”

**FOCUS**
- Intermodal systems planning, management, logistics, and modeling with special reference to the regional context
- Transportation management and traffic control
- Advanced infrastructure materials in transportation
- Environmental protection, safety, and security

**National UTC Goals:**

**Education:** a multidisciplinary program of course work and experiential learning that reinforces the transportation theme of the Center.

**Human Resources:** an increased number of students, faculty and staff who are attracted to and substantively involved in the undergraduate, graduate, and professional programs of the Center.

**Diversity:** students, faculty, and staff who reflect the growing diversity of the U.S. workforce and are substantively involved in the undergraduate, graduate, and professional programs of the Center.

**Research Selection:** an objective process for selecting and reviewing research that balances multiple objectives of the program.

**Research Performance:** an ongoing program of basic and applied research, the products of which are judged by peers or other experts in the field to advance the body of knowledge in transportation.

**Technology Transfer:** availability of research results to potential users in a form that can be directly implemented, utilized, or otherwise applied.
Welcome & About the Center

- About the Center
- Director’s Report
- Center Staff
- Executive Board and Operating Council

Center Highlights

- National Transportation Week Breakfast
- Regional NHI Training Courses
- 2002 Outstanding Student of the Year
- Education and Outreach Partnership
- URIde Community Bike Share Program
- A Transportation Planning Program
- Reported Success Stories

Research Project Status

- New Research Projects
- Ongoing Research Projects
- Completed Research Projects
- Publications and Presentations
During the first six months of 2003, the URI Transportation Center (URITC) achieved significant results in our three primary areas of activity: education, research and outreach/technology transfer.

The URITC continued to expand the University's capacity to provide transportation education. We offered several National Highway Institute courses during the first six months of 2003. We also worked with the Federal Highway Administration Division office and Rhode Island Department of Transportation to develop a one-day course on Context Sensitive Solutions. The course itself will be offered on a pilot basis in the fall. The URITC was also successful in recruiting a new faculty member who will take up a transportation planning position in the College of Business Administration.

The Center's research program saw eight new projects selected for funding, four of which were initiated in this period and four of which will begin in the fall. As of June 30, 2003, eighteen previously funded projects are completed with final reports available on the URITC web site. The completed and on-going research efforts resulted in numerous presentations and publication, and requests for URITC researchers to serve as experts on transportation topics.

The Transportation Center outreach and technology transfer efforts were varied. The URITC sponsored the Third Annual National Transportation Week Breakfast, with the RI DOT Director as the keynote speaker. We supported the development of a student initiated community bike program for the URI campus. We concluded the arrangements for the URITC to assume direction of the Local Technical Assistance Program, which primarily will serve public works officials in Rhode Island cities and towns.

We also initiated several new efforts to reach out to pre-college aged students. The URITC signed a partnership agreement with RI DOT and the Times Square Academy, a Providence math and science charter school, to develop a transportation curriculum for the school. We participated in the Rhode Island Construction Career day, during which 1200 students were given a chance to explore opportunities in the construction industries. In a related effort, we have begun planning for a school-to-career program for the transportation and construction industries in cooperation of the Rhode Island Department of Labor and Training.

The following report provides details of the URI Transportation Center's work over the period January 1 to June 30, 2003.
Center Staff

**Dr. Richard J. Horn**  
Executive Director

**Dr. William Croasdale**  
Chair, Outreach Advisory Committee

**Thomas F. Humphrey**  
Chair, Education Advisory Committee

**Catherine J. Manchester**  
Principal Clerk Stenographer

**John S. Peterson**  
Senior Information Technologist

**Dr. Martin H. Sadd**  
Chair, Research Advisory Committee

**Ying Qin**  
Research Associate

**Judith Watson**  
Fiscal Management Officer
The URITC Executive Board is composed of the principal University and public sector stakeholders. The members of the Executive Board were instrumental in the development of the Center and remain actively engaged in supporting the Transportation Center.

The group provides advice to the President of the University of Rhode Island and to the Executive Director in terms of the goals and overall objectives of the Center’s programs.

**Executive Board**

Robert L. Carothers, Chair  
President, URI

James Capaldi  
Director, RI Department of Transportation

Christopher L. Bergstrom  
Executive Director, RI Economic Policy Council

Michael G. Cheston  
Executive Director, RI Airport Corp.

David Farmer  
Dean, URI Graduate School of Oceanography

Lucy Garliauskas  
RI Division Administrator, FHWA  
Executive Board Advisor

Richard J. Horn  
Executive Director, URI Transportation Center

Bahram Nassersharif  
Dean, URI College of Engineering

Edward M. Mazze  
Dean, URI College of Business Administration

Stephen P. McAllister  
Associate Commissioner for Finance, Office of Higher Education

Michael McMahon  
Executive Director, RI Economic Development Corporation

Al Moscola  
General Manager, RI Public Transit Authority

John O’Brien  
Chief of Statewide Planning Program, RI Department of Administration

Jeffrey Seemann  
Dean, URI College of the Environment & Life Sciences

M. Beverly Swan  
Provost, Vice President Academic Affairs, URI

Janett Trubatch  
Vice Provost, Research, Graduate Studies & Outreach, URI

J. Vernon Wyman  
Assistant Vice President, Business & Finance, URI

**Operating Council**

Phil Kydd, Chair  
Assistant Director, RI Department of Transportation

Richard Horn  
Executive Director, URI Transportation Center

Janett Trubatch  
Vice Provost, Research, Graduate Studies & Outreach, URI
“National Transportation Week is an opportunity to celebrate our achievements in transportation and face up to the challenges ahead. It also is an excellent time to convey to the American people how proud we are to be transportation workers. All of us, military and civilian, are proud to serve as members of America’s team. We will continue to foster the strong relationship between industry and government, working as partners to spur economic growth. Working together we will make transportation safer. We also will make it simpler for users to benefit from transportation resources, and we will ensure that investments and systems work smarter.” — Norman Y. Mineta, Secretary of Transportation

In celebration of National Transportation Week, the URI Transportation Center hosted the Center’s Third Annual National Transportation Week Breakfast, held at the Crowne Plaza Hotel on May 13.

Highlights of the event included a keynote address by RI Department of Transportation director James Capaldi who spoke about “The Changing Environment of Transportation in Rhode Island,” and the signing of memoranda of understanding between the RIDOT, Providence’s Times2 Academy, and the URI Transportation Center.

RIDOT Director James R. Capaldi was the keynote speaker for the breakfast, highlighting “The Changing Environment of Transportation in Rhode Island.”

From left to right: Richard Horn, Executive Director of the URI Transportation Center, Robert L. Carothers, President, The University of Rhode Island, Dan Berman, Assistant Division Administrator, Federal Highway Administration, Phil Kydd, Assistant Director, RIDOT, Lucy Garliauskas, Division Administrator, Federal Highway Administration, James R. Capaldi, Director, RI Department of Transportation

Signing of Cooperative Agreement by the RI Department of Transportation, University of Rhode Island and the Times2 Academy-James R. Capaldi, Director, RIDOT, Robert L. Carothers, President, URI, and Stanley Thompson, Academic Dean, Times2 Academy
Regional NHI Training Courses

Offered around the country since the late 1980s, the course details FHWA requirements and policies for Federal-aid design and construction contracts. The course material now includes important changes resulting from Federal transportation legislation, such as the 1991 Intermodal Surface Transportation Efficiency Act and the 1998 Transportation Equity Act for the 21st Century. Participants who complete the course, both new employees and repeat participants, will be better prepared for their responsibilities through an up-to-date understanding of current requirements in four broad areas: *Construction contract provisions and procedures for conformance with Federal-aid requirements *Construction contract administration issues *FHWA policy - review of relevant statutes, regulations, and directives *Detecting and reporting suspected fraud. The Contract Administration Core Curriculum is maintained and administered by the Contract Administration Group, Office of Program Administration, in the FHWA Infrastructure Core Business Unit. It covers Federal-aid contract provisions, administrative procedures, and applicable policies as prescribed in FHWA's statutes and regulations.

Drilled Shafts 2/5/2003 - 2/7/2003, 30 Participants
Drilled shafts is an alternate type of deep foundation that may be more cost-effective than driven piles in bridge piers, at river crossings, retrofit operations, high-mast lighting, earth-retaining structures, single column piers and similar applications. This course provides participants with all aspects of designing, installing and monitoring of drilled shafts. It covers uses, advantages, and disadvantages of drilled shafts for transportation structure foundations; general requirements for subsurface investigations for drilled shafts; construction methods for drilled shafts; construction case histories; construction specifications; principles of design of drilled shafts for axial and lateral loading; expansive soils, downdrag and similar effects; load testing; inspection; integrity testing; repair and retrofit of defective shafts; and cost estimation. Target Audience: Geotechnical engineers, bridge designers, and resident engineers. The course embraces both construction and design, and it is important that all participants attend all lessons, not just those in the immediate area of interest. A key issue is how the details of construction affect the way in which a drilled shaft should be designed and how the intent of the design affects inspection. Participants in the course are expected to have a degree in engineering for which they have passed an undergraduate course in soil mechanics and/or have successfully completed NHI Course 132012 Soils and Foundations Workshop. This course is not intended for field or laboratory personnel without a background in engineering.
Outstanding 2002 Student of the Year, Oran “Skip” Viator

Each year, the URI Transportation Center selects one outstanding student of distinction on the basis of academic and research merit. The student receives a one-thousand-dollar award, and honored with other awardees from other university transportation centers at a ceremony in Washington.

Oran “Skip” Viator completed his PhD in Civil and Environmental Engineering in May, 2002. As a doctoral candidate, Skip participated in two URI Transportation Center research projects. The first studied chemical contaminants in the sediments off Quonset Point Rhode Island, the proposed site of a major cargo/passenger port for which dredging would be required. The characterization of the contaminants within this area was essential to determine if there were toxic constituents present that could be re-suspended in the water column by dredging. Skip was the primary trace metal analyst for all samples collected during the project.

The second project was the “Contamination of Urban Lakes by Storm Runoff from Highway and Railway Drainage Systems”. This project studied surface sediments, radiometrically dated cores, and water samples collected during and after wet weather events to document both historical and modern contamination inputs to the lakes. Skip participated in the wet weather field portion of this study, directing the sample site selection, site preparation, public and private coordination and training of all personnel involved in the wet weather study. His untiring efforts and attention to detail in both projects were major factors in the successes of the work.

Additionally, he conducted and supervised the analysis of over 180 samples for 22 separate constituents. The results of this research will be instrumental in the future design of storm drainage systems within the watersheds of urban lakes. Prior to beginning his work at URI, Skip was a career naval flight officer.
A Partnership for the Promotion of Education and Outreach

Highlighting the common interest of encouraging women and minorities to enter transportation-related career paths, the University of Rhode Island Transportation Center, the Rhode Island Department of Transportation, and the Rhode Island Times2 Academy entered into a cooperative agreement aimed at increasing the number of students entering transportation-related careers.

The URI Transportation Center is working with Providence’s Times2 Academy, heralded as one of the most innovative academic enrichment programs in the nation.

The establishment of a transportation and engineering curriculum introduces and encourages students to enter transportation-related careers and provides prerequisites for entry into college programs. The Times2 Academy will have a full time teacher to teach transportation technology and engineering, and will form the TRAC Club as an extra curricular activity at the school.

The URITC will also establish a summer transportation institute to expose secondary school students to and participate in a series of academic experiences designed to explore transportation careers and provide training in mathematics, science, and technology. The URITC will also work to establish a scholarship program for TRAC students.
URIde Community Bike Share Program

URIde, the URI community bike share program, grew out of the successful Fall 2001 Honors Colloquium, “A Just and Sustainable Future: Overcoming Barriers to Change.” Tim Beatley of the University of Virginia, one of the presenters at the colloquium, introduced the idea of public bike share programs from his experience in Europe. Alli Fong, a student and avid cyclist, was taken with the idea and urged the creation of a similar program at URI.

Results of the interviews and focus group discussions showed that there was extensive student interest in a bike share program, with the caveats that there must be enough bikes and “hubs” so that it would be easy to locate and use bikes. Based on the positive results, the program moved forward. Students and program staff solicited for bikes. With publicity from the URI press office, bike donations began to roll onto campus and freshman students and upperclassmen mentors participated in bike repair classes on Thursday evenings. The program began in earnest in September 2002.

The URI Transportation Center provides funding to assist the URIde program, promoting the use of alternative forms of transportation and to study the effectiveness of the concept for the University.
Development of a Transportation Planning Program

Transportation planning becomes increasingly important as urban/suburban issues become prominent. To date, the University of Rhode Island has not had an established program in transportation planning. As a result, the RIDOT and the Statewide Planning Program are providing funding to establish transportation planning capability to serve a multidisciplinary program in transportation through the URI Transportation Center.

Course Development
Transportation planning courses will be developed in consultation with faculty and stakeholder groups. Initially, the individual courses will be developed within the College of Business Administration but they are intended to be cross-listed in order to serve business, community planning, transportation engineering and social science students. Courses may be at the undergraduate or graduate level depending upon an assessment of university needs. The courses will be consistent with an objective of creating transportation certificate programs. Thus, some courses will be at the graduate level. Courses must also be developed consistent with the objective of creating an interdisciplinary transportation management masters program.

Core Planning Research Capability
A critical component of the program is the development of a core research capability to address transportation planning issues. Thus an initial research project will be defined in consultation with the sponsoring agencies. Graduate student(s) will be incorporated into the research project to establish a basis for graduate level work in transportation planning.

Assessment of Planning Issues of RI Transportation Options
This program will provide transportation planning expertise to address transportation options and proposals for the state of Rhode Island. Members of the university, faculty, and students, will participate in assessments and research to assure that community and context are appropriately addressed in transportation proposals. This will include short-term issues as well as longer-term considerations.

State Stakeholder Needs Assessment
The planning team developed under this program will also work closely with state agencies to assure that the URITC and the university anticipate and meet the transportation planning needs of stakeholders.
Success Stories

Reported Success Stories

Success related to project Wood Filters as an Innovative Treatment Method for Roadway Runoff Pollutants 6/2003
American Excelsior, Inc., the leading manufacturer of wood fibers in the U.S, has agreed to support our project in kind by supplying us with several hundred pounds of aspen wood fibers.

Success related to project RIDOT 2001 Bicycle Transportation User Survey Developing Intermodal Connections for the 21st Century 6/2003
PowerPoint presentation at 2003 Rails to Trails Trail Link Conference in Providence, Rhode Island, giving an overview of the project.

Success related to project Wood Filters as an Innovative Treatment Method for Roadway Runoff Pollutants 6/2003
Patent application for wood filter technology (U.S. Pat. Appl. Ser. No. 60/390,750) was submitted to U.S. Patent Office.

Success related to project Wood Filters as an Innovative Treatment Method for Roadway Runoff Pollutants 6/2003
Meeting at UMass, Amherst, with Dr. Xing and Dr. Cook (LSU) to develop research proposal for future work on wood filter technology (e.g. NMR studies).

Success related to project Development of Thermochromic Paints, Plastics, and Rubbers for Rapid Visual Assessment of Temperature 6/2003
Article published in Cosmetics & Toiletries describes some potential applications of the thermochromic pigments under investigation.

Success related to project Implementation of a Highway Monitoring Program Utilizing Intelligent Transportation Systems (ITS) 4/2003
The ITS equipment that was recommended to RIDOT was installed on Route 146 in July 2003.

Success related to project Exploring Ways of Influencing Transport Behaviors by Using Telecommunications Technologies 4/2003
Top paper, Human Information Technology Division award presented at the Eastern Communication Association, Washington, DC. This paper reports research on the impact of distance learning on travel behavior of college students. It is an attempt to assess the potential and actual impact in this population. Individual difference and communication variables related to pertinent behavior change are addressed.
Success Stories


Success related to project Exploring Ways of Influencing Transport Behaviors by Using Telecommunications Technologies 1/2003
Full-page article on telework research by the team in Providence Business News points to factors currently inhibiting telework in RI, and future growth prospects.

Success related to project Application of a Multimodal Demand Simulation Model to Assess Container Transportation Policy Issues in the Northeast 1/2003
T. Grigalunas participated in Port and Channels Committee, Transportation Research Board, National Research Council, Washington, D.C.

Success related to project Application of a Multimodal Demand Simulation Model to Assess Container Transportation Policy Issues in the Northeast 1/2003
T. Grigalunas was asked by state of Delaware to serve as outside expert to review new analysis of Delaware Bay and River Dredging Project.

Success related to project Comprehensive Framework for Sustainable Container Ports Development of U.S. East Coast in the 21st Century (yr 3) 1/2003
T. Grigalunas was appointed as a member, and participated in the initial meeting of the new Transportation and the Environment Task Force of the Transportation Research Board.

T. Grigalunas and J. Opaluch were asked by state of Delaware to undertake a second independent review and critique of all revised economic studies of the cost and benefits to Delaware of proposed deepening project for Delaware Bay and River (2003).
New Projects for 2003

**Experimental Evaluation of Novel Composites for Use in Transport of Explosive Materials**

Dr. Carl-Ernst Rousseau, Assistant Professor  
University of Rhode Island Department of Mechanical Engineering  
Year Initiated: 2003 - 536196

At both the state and national levels, there exists a desire to improve highway safety. This is indeed essential in light of the well publicized number of human casualties quoted each year. Added to the already existing problems are new threats brought about by criminal elements skilled in the use of explosives. It is purported in this study to partially remedy against this new safety hazard by seeking materials that might shield transportation vehicles against shattering of their containers. As a result of these explosions, shattered pieces could fly off and further endanger bystanders or cargo. The facilities will be established to implement blast testing of materials advanced for that purpose.

**Calibration of Scour Models Using Advanced Sonar Technology for Bridge Safety**

Dr. James Miller, Professor  
University of Rhode Island Department of Ocean Engineering  
Year Initiated: 2003 - 536197

Riverbed scour near bridge piers is a widespread problem which causes scour holes to develop, piers to fall and, ultimately, bridges to collapse. Measurement of riverbed scour and deposition near bridge piers is essential for the proper maintenance and safety of bridges. Scour processes have been extensively studied and mathematical models have been developed from physical models and field data. But scour depths predicted using these models could vary substantially when these models are applied outside the range of conditions for which they have been developed. Field measurements of scour depths are needed to put practical constraints and limits on these models. The team will conduct these field measurements using a number of underwater acoustic instruments and techniques. These instruments include depth sounder, side scan sonar, and a sub-bottom profiler. These measurements will be conducted aboard the Department of Ocean Engineering research vessel R/V CT-1 or similar research vessel. This will also then serve as a rapid assessment tool for scour and has the potential to complement or replace inspection by divers.

**Liquefaction Potential of Inorganic and Organic Silts**

Dr. Christopher Baxter, Assistant Professor  
University of Rhode Island Department of Ocean & Civil Engineering  
Year Initiated: 2003 - 536198

This is a proposal to study the liquefaction potential of inorganic and organic silts under earthquake loads. These soils are prevalent in Rhode Island and in many urban areas, and there is no clear evidence about how these soils will behave during a design earthquake. This research will involve a detailed laboratory testing program involving cyclic triaxial tests and a sampling program involving fixed piston and block samples. A
careful sampling program is critical for this type of study because of the extreme difficulty in obtaining undisturbed samples of saturated silts. The results of this research will have a direct impact on the seismic design of surface transportation infrastructure, such as highway bridges and embankments, built on the organic and inorganic silts of Rhode Island.

**Enhancing Driving Safety through Proper Message Design on Variable Message Signs**

Dr. Jyh-Hone Wang, Associate Professor  
University of Rhode Island Department of Industrial and Manufacturing Engineering  
Year Initiated: 2003 - 536195

It is recognized that variable message signs (VMS) play a key role in intelligent transportation systems, not only to alleviate acute problems caused by road work accidents, but also to help enhance driving safety. Highway Authority in Rhode Island has, since the late 1990s, been using VMS to communicate real-time traffic information and travel advice to motorists. As this method becomes increasingly used, it is important to present sign messages that can be comprehended correctly and promptly by motorists, especially in high-volume traffic and construction/repair zones. Due to restricted VMS space, even simple ideas can be difficult to communicate to motorists moving at highway speeds. Properly designed sign messages can spell the difference between understanding and confusion. The effectiveness of VMS messages depends on sign design, message design, and display format. Previous projects sponsored by URITC and RIDOT studied sign design and obtained significant findings. This project addresses the issues of message design and display format. It will evaluate the effectiveness of information delivered by a variety of VMS messaging with various wordings and display formats. This evaluation will be stratified by drivers’ demographics (gender, age, and linguistic ability), and driving speed. Special focus will be placed on the elder population and ethnic groups for whom English is not their primary language. Two study approaches will be employed in the project, a lab simulation approach and a field study approach. The former will take place in the Motorist Performance Lab at URI. Virtual driving experiments will be devised to capture subjects’ responses to different VMS appearing at the roadside in a virtual driver’s sight while moving at highway speed. The latter will be carried out on selected highway segments where VMSs are present. In-vehicle digital camcorder will be installed to capture drivers’ responses. Results obtained from the field study will be compared with those from the lab simulation with the intention to find a correlation between them. From this study, specific recommendations will be made to industry, highway authorities, and traffic management to help them optimize the message design and use of VMS to enhance driving safety.
Ongoing Projects

Enhancing Driving Safety through Proper Message Design on Variable Message Signs
Dr. Jyh-Hone Wang, Associate Professor
University of Rhode Island Department of Industrial and Manufacturing Engineering
Year Initiated: 2003 - 536195

Experimental Evaluation of Novel Composites for Use in Transport of Explosive Materials
Dr. Carl-Ernst Rousseau, Assistant Professor, University of Rhode Island Department of Mechanical Engineering
Year Initiated: 2003 - 536196

Calibration of Scour Models Using Advanced Sonar Technology for Bridge Safety
Dr. James Miller, Professor, University of Rhode Island Department of Ocean Engineering
Year Initiated: 2003 - 536197

Liquefaction Potential of Inorganic and Organic Silts
Dr. Christopher Baxter, Assistant Professor
University of Rhode Island Department of Ocean & Civil Engineering
Year Initiated: 2003 - 536198

Stretching Ability of Chip Seal Membranes
Dr. Milton Huston, Professor
University of Rhode Island Department of Civil Engineering
Year Initiated: 2002 - 536175

Harnessing the Power of Relational Databases for Management of Geotechnical and Geologic Data
Dr. Daniel Murray, Professor
University of Rhode Island Department of Geosciences
Year Initiated: 2002 - 536176

Determining the Effectiveness of New Technology Data Collection Devices for Real-Time Transportation System Management
Dr. Chris Hunter, Associate Professor
University of Rhode Island Department of Civil Engineering
Year Initiated: 2002 - 536177
Ongoing Projects

Developing and Applying a Transportation Model for Aquidneck Island
Dr. Farhad Atash, Professor
University of Rhode Island Department of Community Planning & Landscape Architecture
Year Initiated: 2002 - 536178

Integrated Transportation Pricing Strategy for Newport
Dr. Timothy Tyrrell, Professor
University of Rhode Island Department of Environmental and Natural Resource Economics
Year Initiated: 2002 - 536179

Development of a Course on Bridge Management
Dr. George Tsiatas, Professor
University of Rhode Island Department of Civil Engineering
Year Initiated: 2002 - 536180

Wood Filters as an Innovative Treatment Method for Roadway Runoff Pollutants
Dr. Thomas Boving, Assistant Professor
University of Rhode Island Department of Geosciences
Year Initiated: 2002 - 536181

RI DOT 2001 Bicycle Transportation User Survey Developing Intermodal Connections for the 21st Century
Dr. R. Choudary Hanumara, Professor
University of Rhode Island Department of Computer Science and Statistics
Year Initiated: 2002 - 536182

Development of Thermochromic Paints, Plastics, and Rubbers for Rapid Visual Assessment of Temperature
Dr. Brett Lucht, Associate Professor
University of Rhode Island Department of Chemistry
Year Initiated: 2002 - 536183

Dredging in a Changing Scientific and Regulatory Environment - Year 2
Dr. Richard Burroughs, Professor
University of Rhode Island Department of Marine Affairs
Year Initiated: 2002 - 536184
Ongoing Projects

**Mechanical Behavior of Recycled Asphalt Material Under Dynamic Loading Conditions**
Dr. Martin Sadd, Professor
University of Rhode Island Department of Mechanical Engineering
Year Initiated: 2002 - 536186

**Application of a Multimodal Demand Simulation Model to Assess Container Transportation Policy Issues in the Northeast**
Dr. Thomas Grigalunas, Professor
University of Rhode Island Department of Environmental and Natural Resource Economics
Year Initiated: 2002 - 536XXX

**Replacement of Chromate in Paints and Corrosion Protection Systems**
Dr. Mercedes Rivero-Hudec, Associate Professor
University of Rhode Island Department of Chemical Engineering
Year Initiated: 2002 - 536XXX

**Dredging in a Changing Scientific and Regulatory Environment**
Dr. Richard Burroughs, Professor
University of Rhode Island Department of Marine Affairs
Year Initiated: 2001 - 536151

**Development of Thermochromic Paints, Plastics, and Rubbers for Rapid Visual Assessment of Temperature**
Dr. Brett Lucht, Associate Professor
University of Rhode Island Department of Chemistry
Year Initiated: 2001 - 536152

**Field Study of Composite Piles in the Marine Environment**
Dr. Christopher Baxter, Assistant Professor
University of Rhode Island Department of Ocean and Civil Engineering
Year Initiated: 2001 - 536153

**Development of a Customer Satisfaction and Service Quality Measurement Method and Tool for the Rhode Island Public Transit Authority**
Dr. Albert Della Bitta, Professor
University of Rhode Island College of Business Administration
Year Initiated: 2001 - 536154
Ongoing Research

Ongoing Projects

Contamination of Urban Lakes by Storm Runoff from Highway and Railway Drainage Systems
Dr. John King, Professor
University of Rhode Island School of Oceanography
Year Initiated: 2001 - 536155

Development of an Advanced Pavement Deicing System
Dr. David Taggart, Professor
University of Rhode Island Department of Mechanical Engineering
Year Initiated: 2001 - 536156

Investigation of Potential for Intermodalizing Paratransit in Rhode Island
Dr. Christopher Hunter, Assistant Professor
University of Rhode Island Department of Civil Engineering
Year Initiated: 2001 - 536157

Replacement of Chromates in Paints and Corrosion Protection Systems
Dr. Mercedes Rivero-Hudec, Professor
University of Rhode Island Department of Chemical Engineering
Year Initiated: 2001 - 536158

Intelligent Traffic Anomaly Diagnosis Through the Integration of Diverse Information Sources
Dr. Joan Peckham, Professor
University of Rhode Island Department of Computer Science and Statistics
Year Initiated: 2001 - 536159

Processing of Cenosphere-Cement/Asphalt Composite Materials and Evaluation of their Mechanical and Acoustic Properties
Dr. Arijit Bose, Professor
University of Rhode Island Department of Chemical Engineering
Year Initiated: 2001 - 536160

Multimodal Vehicle Display Design and Analysis
Dr. Manbir Sodhi, Professor
University of Rhode Island Department of Industrial and Manufacturing Engineering
Year Initiated: 2001 - 536161
Ongoing Projects

Creating Safe Transportation Options for College Students
Dr. Norbert Mundorf, Professor
University of Rhode Island Department of Communication Studies
Year Initiated: 2001 - 536162

Comprehensive Framework for Sustainable Container Ports Development of U.S. East Coast in the 21st Century (Year 3)
Dr. Thomas Grigalunas, Professor
University of Rhode Island Department of Environmental & Natural Resource Economics
Year Initiated: 2001 - 536163

Effect of Microstructure on the Static and Dynamic Behavior of Recycled Asphalt Material
Dr. Martin Sadd, Professor
University of Rhode Island Department of Mechanical Engineering
Year Initiated: 2001 - 536164

Exploring Ways of Influencing Transport Behaviors by Using Telecommunications Technologies
Dr. Nikhilesh Dholakia, Professor
University of Rhode Island College of Business Administration
Year Initiated: 2000 - 536131

Intermodal Transport of Petroleum Products-Smart Terminals
Dr. Winston Knight, Professor
University of Rhode Island Department of Industrial and Manufacturing Engineering
Year Initiated: 2000 - 536133

High Accuracy GPS Base Station and Web Delivery System
Dr. Peter August, Professor
University of Rhode Island Department of Natural Resources Science
Year Initiated: 2000 - 536134

Replacement of Chromates in Paints and Corrosion Protection Systems
Dr. Mercedes Rivero-Hudec, Associate Professor
University of Rhode Island Department of Chemical Engineering
Year Initiated: 2000 - 536135

Fiber Reinforcement of Concrete
Dr. Richard Brown, Professor
University of Rhode Island Department of Chemical Engineering
Year Initiated: 2000 - 536136
Ongoing Research

Ongoing Projects

**TRANSMAP: An Integrated, Real-Time Environmental Monitoring and Forecasting System for Highways and Waterways in RI**
Dr. Malcolm Spaulding, Professor
University of Rhode Island Department of Ocean Engineering
Year Initiated: 2000 - 536139

**Implementation of a Highway Monitoring Program Utilizing Intelligent Transportation Systems (ITS)**
Dr. Milton Huston, Professor
University of Rhode Island Department of Civil Engineering
Year Initiated: 2000 - 536141

**Moving Smart in Rhode Island**
Dr. Joan Peckham, Professor
University of Rhode Island Department of Computer Science and Statistics
Year Initiated: 2000 - 536142

**Inorganic and Organic Characterization of Dredged Sediments from the Proposed Quonset Point Channel in Narragansett Bay**
Dr. Raymond Wright, Professor
University of Rhode Island Department of Civil Engineering
Year Initiated: 2000 - 536143

**Magnet and Induced Impacts of Quonset Container Port**
Mr. Christopher Bergstrom, Executive Director
Rhode Island Policy Council
Year Initiated: 2000 - 536145

**Fiber Reinforcement of Concrete**
Dr. Richard Brown, Professor
University of Rhode Island Department of Chemical Engineering
Year Initiated: 1999 - 536101

Dr. David Shao, Professor
University of Rhode Island Department of Industrial and Manufacturing Engineering
Year Initiated: 1999 - 536113
Completed Projects

Red Light Running in Rhode Island
Dr. Chris Hunter, Assistant Professor
University of Rhode Island Department of Civil Engineering
Year Initiated: 2001 - 536146

Chemical Retention Capacity of a Newly Constructed Roadway Runoff Detention Pond
Dr. Thomas Boving, Associate Professor
University of Rhode Island Department of Geosciences
Year Initiated: 2000 - 536132

A Web-Based Core Library for Rhode Island
Dr. Daniel Murray, Professor
University of Rhode Island Department of Geosciences
Year Initiated: 2000 - 536137

Effect of Microstructure on the Static and Dynamic Behavior of Recycled Asphalt Materials
Dr. Martin Sadd, Professor
University of Rhode Island Department of Mechanical Engineering
Year Initiated: 2000 - 536138

Comprehensive Framework for Sustainable Container Ports Development of US East Coast in the 21st Century
Dr. Thomas Grigalunas, Professor
University of Rhode Island Department of Environmental and Natural Resource Economics
Year Initiated: 2000 - 536140

Performance Improvement & Measurement of Open-Graded Asphalt Mixes
Dr. Mohammad Faghri, Professor
University of Rhode Island Department of Mechanical Engineering
Year Initiated: 2000 - 536144

TRANSMAP: An Integrated, Real-Time Environmental Monitoring and Forecasting System for Highways and Waterways in RI
Dr. Malcolm Spaulding
University of Rhode Island Department of Ocean Engineering
Year Initiated: 1999 - 536100
Completed Projects

Geologic Transportation Maps for the 21st Century
Dr. O. Don Hermes, Professor
University of Rhode Island Department of Geosciences
Year Initiated: 1999 - 536102

Beneficial Uses of Dredge Material from the QPD Intermodal Port Terminal
Dr. Armand Silva, Professor
University of Rhode Island Department of Ocean & Civil Engineering
Year Initiated: 1999 - 536104

The Design and Development of Information and Computer Systems for the URITC
Dr. Joan Peckham, Professor
University of Rhode Island Department of Computer Science and Statistics
Year Initiated: 1999 - 536105

Comprehensive Framework for Sustainable Container Ports Development of US East Coast in the 21st Century
Dr. Thomas Grigalunas, Professor
University of Rhode Island Department of Environmental and Natural Resource Economics
Year Initiated: 1999 - 536106

Development of an Advanced Bridge, Highway, and Runway Deicing System
Dr. David Taggart, Professor
University of Rhode Island Department of Mechanical Engineering
Year Initiated: 1999 - 536107

Effect of Microstructure on the Static and Dynamic Behavior of Recycled Asphalt Material
Dr. Martin Sadd, Professor
University of Rhode Island Department of Mechanical Engineering
Year Initiated: 1999 - 536108

Modeling for Real-Time Traffic Control in the Rhode Island Intelligent Road
Dr. William Palm, Professor
University of Rhode Island Department of Mechanical Engineering
Year Initiated: 1999 - 536109
Completed Projects

Using Cenospheres to Develop New Asphalt and Cement-Based Concrete Materials
Dr. Arun Shukla, Professor
University of Rhode Island Department of Mechanical Engineering
Year Initiated: 1999 - 536110

Interactions of Transportation and Telecommunications Behaviors in Relation to RIIR: Modeling the User Perspective
Dr. Nikhilesh Dholakia, Professor
University of Rhode Island College of Business Administration
Year Initiated: 1999 - 536111

Data Analysis and Detection Methods for Online Health Monitoring of Bridge Structures
Dr. Sau-Lon Hu, Professor
University of Rhode Island Department of Ocean Engineering
Year Initiated: 1999 - 536112

Smart Speed Bumps
Dr. William Ohley, Professor
University of Rhode Island Department of Electrical Engineering
Year Initiated: 1999 - 536114
REPORTED PUBLICATIONS & PRESENTATIONS

PUBLICATION: “Application of Jetting Technology to Pavement Deicing”
D. Taggart, M. Huston and O. Ibrahim, January 2003
Related URITC Project: Development of an Advanced Pavement Deicing System
Paper accepted for publication in the Transportation Research Record.

PRESENTATION: A Multimodal Transportation Simulation Model for U.S. Coastal Container Ports,
Annual Meeting of the Transportation Research Board, Washington, D.C.
M. Luo and T. Grigalunas, January 2003
“A Multimodal Transportation Simulation Model for US Coastal Container Ports”, Annual Meeting of the Transportation Research Board, Washington, D.C. (Jan.) This paper summarizes the results of the spatial-economic container port and related multimodal simulation model presented in detail in the project report and a Ph. D. dissertation, Luo (2002.)

PUBLICATION: “A Multimodal Transportation Simulation Model for U.S. Coastal Container Ports”
M. Luo and T. Grigalunas, January 2003

M. Luo and T. Grigalunas, January 2003
“Estimating the Demand for Port Services: The Importance of Considering Substitute Ports and Multimodal Facilities”. Annual Meeting of the Transportation Research Board, Washington, D.C. (Jan.). This paper summarizes the results of the project report and Ph. D. dissertation (Luo, 2002) described above. Emphasis is given to the importance of demand estimation, challenges faced and the potential bias which can result when substituting ports are omitted when analyzing potential demand for a particular port. A proposed new container port for Rhode Island is used to illustrate the concepts and arguments involved.
PRESENTATION: Simulation of Asphalt Materials Using a Finite Element Micromechanical Model with Damage Mechanics  
M. Sadd, Dai, Parameswaran, A. Shukla, January 2003  
Related URITC Project: Effect of Microstructure on the Static and Dynamic Behavior of Recycled Asphalt Material  
Presented at the 82nd Annual TRB Meeting.  
Abstract: This work presents a theoretical/numerical study of the micromechanical behavior of asphalt concrete. Asphalt is a heterogeneous material composed of aggregates, binder cement and air voids. The load carrying behavior of such a material is strongly related to the local load transfer between aggregate particles, and this is taken as the microstructural response. Numerical simulation of this material behavior was accomplished by developing a special finite element model which incorporated the mechanical load-carrying response between the aggregates. The finite element scheme incorporated a network of special frame elements each with a stiffness matrix developed from an approximate elasticity solution of the stress and displacement field in a cementation layer between particle pairs. A damage mechanics approach was then incorporated within this solution, and this led to the construction of a softening model capable of predicting typical global inelastic behavior found in asphalt materials. This theory was then implemented within the ABAQUS FEA code to conduct simulations of particular laboratory specimens. A series of model simulations of indirect tension tests (IDT) were conducted to investigate the effect of variation of specimen microstructure on the sample response. Simulation results of the overall sample behavior compared favorably with experimental results. Additional comparisons were made of the evolving damage behavior within the IDT samples, and numerical results gave reasonable predictions.

PRESENTATION: Let Your Fingers do the Walking: Autobahn or Infobahn for Retail Consumers?  
R. Dholakia, N. Dholakia and M. Zhao, January 2003  

PUBLICATION: “Heat-Sensitive Polymers Change Color with a Change in Temperature”  
B. Lucht, February 2003  
Related URITC Project: Development of Thermochromic Paints, Plastics, and Rubbers for Rapid Visual Assessment of Temperature  
Technology Advance, Materials Society Bulletin, February 2003
Publications & Presentations

Reported Publications & Presentations

PRESENTATION: Students’ Preference Formation for Internet-based Courses: A Time-based Sequential Model.
R. Dholakia and U. Kwon, January 2003
Related URITC Project: Exploring Ways of Influencing Transport Behaviors by Using Telecommunications Technologies

PUBLICATION: “Risk Analysis in Port Planning”, Transportation Research Record
T. Grigalunas, Y. Chang, and M. Luo, February 2003
Transportation Research Record Sources of risk in port planning are reviewed. Then, a discounted cash flow model is applied, using representative data for a port proposed for Quonset Point, RI. Sensitivity analyses and a more formal, Monte Carlo analysis are carried out. Also, a discrete, dynamic event model is used. The results show the sensitivity of NPV to different assumptions and a frequency distribution for NPV.

PRESENTATION: Wood Filters as an Innovative Treatment Method for Roadway Runoff Pollutants
T. Boving, February 2003
Related URITC Project: Wood Filters as an Innovative Treatment Method for Roadway Runoff Pollutants
Presentation to Transportation Research Board, Washington, DC

PRESENTATION: What Is Red Light Running? A Rhode Island Case Study
C. Hunter, March 2003
Related URITC Project: Red Light Running in Rhode Island
This was a presentation given at the 2003 Institute of Transportation Engineers Technical Conference in Ft. Lauderdale, FL.

PRESENTATION: Traffic Anomaly Diagnosis
J. Peckham, C. Hunter, March 2003
Related URITC Project: Intelligent Traffic Anomaly Diagnosis Through the Integration of Diverse Information Sources. Published in Proceedings and presented at NEDSI (Northeast Decision Sciences Institute) 2003, Providence, RI
PRESENTATION: Distance Learning, Travel Behavior and Communication
N. Mundorf, R. Dholakia, J. Xiao, April 2003
Related URITC Project: Exploring Ways of Influencing Transport Behaviors by Using Telecommunications Technologies

PRESENTATION: Towards an Understanding of Communication and Sustainability: Substitution of Virtual Mobility For Transportation.
N. Mundorf, J. Xiao, J, R. Dholakia, April 2003
Related URITC Project: Exploring Ways of Influencing Transport Behaviors by Using Telecommunications Technologies

PRESENTATION: Thermochromic Pigments Based on Polythiophenes
B. Lucht, May 2003
Related URITC Project: Development of Thermochromic Paints, Plastics, and Rubbers for Rapid Visual Assessment of Temperature
Invited paper for presentation at the High Performance & Functional Pigments conference in Atlanta, GA

PREPRESENTATION: Thermochromic Polymers for the Rapid Visual Assessment of Temperature
B. Lucht, May 2003
Related URITC Project: Development of Thermochromic Paints, Plastics, and Rubbers for Rapid Visual Assessment of Temperature
Invited paper presented at the European Coatings Conference, Smart Coatings II, in Berlin, Germany

PUBLICATION: “Removal of Aqueous-Phase Polynuclear Aromatic Hydrocarbons using Aspen Wood Fibers”
T. Boving and Zhang, June 2003
Related URITC Project: Wood Filters as an Innovative Treatment Method for Roadway Runoff Pollutants
published in Chemosphere.