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

Education: a multi-disciplinary 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.
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In 2002, the URI Transportation Center continued to actively pursue opportunities to advance transportation awareness in the Center’s three major activity areas; research, education, and outreach.

The Transportation Center selected thirteen new research projects in 2002. These addressed specific issues in the four focus areas identified for the fourth research cycle:

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

All of the initial year’s researchers and many of the second year’s teams submitted final reports. Most of these reports have now been published and are available on the Transportation Center’s web site, www.uritic.uri.edu.

The Transportation Center began offering the first set of courses under the partnership agreement with the National Highway Institute. The courses are one to four day sessions aimed at transportation professionals in the New England region. The courses are intended to supplement offerings in the region that are sponsored by the various State DOTs.

During the year, two new transportation faculty members joined the University, one in Civil and Environmental Engineering and one in the College of Business Administration. These faculty members are helping to develop new courses and programs within the University. These expanded offerings will meet the needs of students on campus interested in transportation and will form a part of a proposed certificate program in transportation management. In addition, a graduate course in bridge management, developed under funding from the Center, will enable the University to offer a certificate in Bridge Engineering.

The Transportation Center sponsored or cosponsored several major outreach events in the first two quarters. The Center cosponsored a Model Ports Conference, along with the US Coast Guard, the Rhode Island and Connecticut Sea Grant programs, and Roger Williams University. The Transportation Center and the Brookings Institution began assessing the opportunities for multijurisdictional transportation planning with a workshop cosponsored by the Slater Institute. We also sponsored a session on “Listening to our Customers” at the Northeast Association of State Transportation Officials (NASTO) meeting, held in Newport. Finally, we sponsored our Second
Overview

Annual National Transportation Week Breakfast, with Tad Widby of Parsons Brinckerhoff addressing transportation security awareness.

In the summer of 2002, we continued the transportation camp program, holding week-long camps for Native Americans, elementary and middle school students in with the Pawtucket Boys and Girls Club, and elementary and middle school students at a Providence charter school. We also offered a series of field trips for the college students participating in the RI DOT summer internship program.

Looking ahead, we will be building on efforts begun this year to establish additional faculty positions. Our objectives are to add transportation management and logistics expertise and transportation planning capability. We have also begun a series of activities that will further our participation in introducing transportation to pre-college students. The most significant effort in this regard is an agreement among the RI DOT, a math-science charter school in Providence that has a predominantly minority student population, and the URI Transportation Center to develop transportation curriculum. This will include having a full time teacher to teach transportation technology and engineering, the establishment of a summer institute program to give students an early introduction to transportation as a field of study and work.

The URI Transportation Center looks forward continuing our successes in the future.

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

CENTER THEME
Surface transportation systems and advanced transportation infrastructure with special reference to the marine environment.
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

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

- **Michael McMahon**  
  Executive Director, RI Economic Development Corporation

- **Al Moscola**  
  Acting General Manager, RI Public Transit Authority

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

### Operating Council

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

- **M. Beverly Swan**  
  Provost, VP Academic Affairs, URI

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

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

- **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
The URITC has a very flat management structure. The URITC Executive Director is responsible for the ongoing operation of the Transportation Center. In this effort, the Executive Director reports directly to the President of the University of Rhode Island.

Policy guidance is provided by an Executive Board, chaired by the URI President and composed of senior members of the Center’s stakeholder groups. The Executive Board has designated an Operating Council to provide recommendations between formal meetings of the Board.

The Executive Director is supported by three program managers who are responsible for the three primary activity areas of the Transportation Center: Research, Education, and Outreach.

The program managers are faculty members from three different Colleges. The Executive Director is also supported by five full time staff members who assure that the work of the Center actually gets completed.

Dr. Richard J. Horn
Executive Director

Dr. William Croasdale
Chair, Outreach Advisory Committee

Ken Froberg
Specialist

Thomas F. Humphrey
Chair, Education Advisory Committee

Dr. Martin H. Sadd
Chair, Research Advisory Committee

Catherine J. Manchester
Principal Clerk Stenographer

Gail Paolino
Word Processing Typist

John S. Peterson
Senior Information Technologist

Judith Watson
Fiscal Management Officer
NEW PROJECTS FOR 2002

The URITC research program is conducted through an open, competitive process. Each year research objectives are established and announced to prospective researchers by way of a call for problem statements.

In 2002, the URITC funded 13 new projects. All projects fall within the major theme areas of “...surface transportation systems and advanced transportation infrastructure with special reference to the marine environment.”
NEW PROJECTS
Stretching Ability of Chip Seal Membranes
2002-536175 Dr. Milton Huston (URI Civil & Environmental Engineering)

Harnessing the Power of Relational Databases for Management of Geotechnical and Geologic Data
2002-536176 Professor Daniel Murray (URI Geosciences)

Determining the Effectiveness of New Technology Data Collection Devices for Real-Time Transportation System Management
2002-536177 Dr. Christopher Hunter (URI Civil & Environmental Engineering)

Developing and Applying a Transportation Model for Aquidneck Island
2002-536178 Professor Farhad Atash (URI Community Planning & Landscape Architecture)

Integrated Transportation Pricing Strategy for Newport
2002-536179 Professor Timothy Tyrrell (URI Environmental and Natural Resource Economics)

Development of a Course on Bridge Management
2002-536180 Professor George Tsiatas (URI Civil & Environmental Engineering)

Wood Filters as an Innovative Treatment Method for Roadway Runoff Pollutants
2002-536181 Dr. Thomas Boving (URI Geosciences)

RI DOT 2001 Bicycle Transportation User Survey Developing Intermodal Connections for the 21st Century
2002-536182 Professor R. Choudary Hanumara (URI Department of Computer Science & Statistics)

Development of Thermochromic Paints, Plastics, and Rubbers for Rapid Visual Assessment of Temperature
2002-536183 Dr. Brett Lucht (URI Department of Chemistry)

Dredging in a Changing Scientific and Regulatory Environment - Year 2
2002-536184 Professor Richard Burroughs (URI Department of Marine Affairs)

Mechanical Behavior of Recycled Asphalt Material Under Dynamic Loading Conditions
2002-536186 Professor Martin Sadd (URI Mechanical Engineering)

Replacement of Chromate in Paints and Corrosion Protection Systems
2002-536XXX Dr. Mercedes Rivero-Hudec (URI Department of Chemistry)
*Selected but not yet funded

Application of a Multimodal Demand Simulation Model to Assess Container Transportation Policy Issues in the Northeast
2002-536XXX Professor Thomas Grigalunas (URI Environmental and Natural Resource Economics)
*Selected but not yet funded
New Project

Stretching Ability of Chip Seal Membranes

Issues
• Traditional chip seals are often ineffective in keeping freezing water out of cracks where expansion causes further failure of the road surface.
• Engineers have long searched for the “Perfect Mix” of binder material and stone chips for sealing cracked pavement.

Abstract
Cracking occurs in pavements as a result of aging, thermal stresses and traffic loading. In many cases, water is let into the crack, where it freezes, which then widens the cracks and undermines the pavement subbase.

Traditional methods to avoid water infiltration involve the use of a chip seal, which is a liquid binder asphalt membrane sprayed over the pavement with stone chips rolled into the liquid binder.

Recently, rubberized asphalt chip seals have been used to keep the water out. However, cold weather can cause the pavement to shrink, and subsequently, the chip seal to separate from the pavement, allowing water to seep in.

By determining the displacement (as a function of temperature) and the resulting stretching of each chip seal, it should be possible to estimate their bridging ability. By combining the different binders with the stone and using both un-aged and aged binders, the varying degrees to which the different systems can span cracks of different widths and movements would be demonstrated.

The project would help the RIDOT in determining the most effective type and grade of modified asphalt to use in their pavement preservation program.

Potential Outcomes
• Decreased failure of chip seal treatments
• Less water infiltration into cracks can lead to a lowered cost of maintaining existing roads.

For More Information:
Dr. Milton Huston
Department of Civil Engineering
University of Rhode Island
Kingston, RI 02881
401.874.5498
huston@egr.uri.edu
Harnessing the Power of Relational Databases for Management of Geotechnical and Geologic Data

Issues
- RI Geographical borehole data are often held in inconsistent paper form, making it hard for transportation practitioners to access and analyze.
- Borehole data are invaluable to engineers involved in surface transportation projects, revealing valuable sub-surface geotechnical information.

Abstract
Geotechnical information is often gathered by the use of boreholes, or deep holes into the earth’s surface. These boreholes hold important geological and geotechnical data that allow for a virtual “snapshot” of the substrate below the surface. Bridge engineers use these data to determine how deep to drive support piles for example, and road engineers decide on asphalt mixes and transit routes based on what’s below the surface.

The historical problem with borehole data has not been a lack of actual borehole profiles, but in the access and distribution of the information found in drills. Often borehole information was isolated on paper forms, stuffed in a file cabinet at one of many surveying agencies around the state. Moreover, even when accessible, the data are often not optimally usable because locations are not well defined, are incomplete, or the method and nomenclature used to record the data was inconsistent, confusing or inaccurate.

In previously funded URITC projects the project team had produced an interactive CD-ROM that allowed basic searching of borehole records to be then downloaded into a GIS-based framework to permit analysis. This project will expand this web-based core library into a multi-dimensional relational database, with the ability to store a complete subsurface record in a unified database that provides real-time access and interactive capabilities.

Potential Outcomes
- Borehole information helps transportation practitioners in the design and engineering of roads, bridges, waterways etc.
- Highly-accessible and searchable form borehole data
New Project

Determining the Effectiveness of New Technology Data Collection Devices for Real-Time Transportation System Management

Issues
• Current roadway sensors do not accurately measure slow moving or bumper to bumper traffic.
• Intelligent Transportation Systems (ITS) require real-time data collection devices to analyze traffic.
• As new real-time sensors come to the market, they must be tested in a variety of scenarios to determine effectiveness.

Abstract
According to the National Highway Traffic Safety Administration, traffic in the United States has increased 30 percent in the past ten years, and the number of cars on the road is projected to increase by 50 percent in the next decade. As vehicular traffic has increased, road sensors used to collect traffic data have shown their weaknesses in measuring traffic volume, vehicle type, speed, etc. Although most devices tend to perform well under average traffic conditions during peak traffic moments, most sensors cannot accurately measure traffic conditions.

Because of this lack of accurate measuring sensors, transportation analysts are often at a loss for real traffic data in their decision-making. Dr. Hunter and his research team are performing controlled experiments using state-of-the-art traffic sensors, along with traditional video cameras for ground-truthing, or a control. The team then compares the data from the sensors with the actual video to measure effectiveness of each sensor under different traffic conditions.

The team is working with the RI Department of Transportation (RIDOT) to deploy sensors and devices in both urban and suburban areas of the state. Video connections will also be set up at test sites, with both sensory and video data going back to a control center for statistical analysis. The data analysis will come down to making comparisons versus the ground-truth data as to the accuracy of the data. The team hopes to define which sensors perform best under certain traffic conditions, leading to improved use of traffic sensors for future remote electronic data collection across the state.

Potential Outcomes
• Improved knowledge of current traffic sensors and applications
• Enhanced traffic data collection capabilities state-wide
• Increased collaboration and knowledge sharing between the University and Transportation Practitioners
• Better traffic data can lead to better analysis and improvements to the transportation system.
New Project

Developing and Applying a Transportation Model for Aquidneck Island

Issues
• Sprawling development along Aquidneck Island’s primary highway has increased traffic volume and decreased regional mobility.
• Policy makers and stakeholders lack an organized data framework for analyzing spacial and demographic data.
• Policy makers and stakeholders lack training in the use of a computer modeling programs often to analyze traffic and other data in a GIS context.

Abstract
Like many suburban areas of the United States, Rhode Island’s Aquidneck Island, which is made up of the towns of Middletown, Newport and Portsmouth, finds itself facing the problems of urban sprawl and traffic congestion. Sprawling development and a historical lack of planning have led to an island with one major corridor that cannot accommodate current traffic volumes. Lines of shops, malls and traffic lights keep traffic moving at a snail’s pace.

To produce the model, the Aquidneck Island Planning Commission is working in partnership with the RI Statewide Planning Program to update and enhance the Aquidneck Island portion of the State’s Transportation Model.

The computer application is designed for transportation professionals to store, display, manage and analyze transportation data. The application uses geographical, environmental and demographical information to model transportation trends and vulnerabilities. The model will be presented to community legislators in hopes of maximizing mobility, promoting economic development and coordinated land use, and protecting natural resources on the island.

Potential Outcomes
• Consolidation and analysis of existing data sets in an organized and visual form leads to better decision-making.
• Increased collaboration, data, and knowledge sharing between interest groups
New Project

Integrated Transportation Pricing Strategy for Newport

Issues
- Newport is a major tourist destination with overwhelming automobile traffic volume.
- Water shuttles, centralized parking and trolleys can be better used to alleviate traffic and parking problems.

Abstract
Newport Rhode Island is a major regional tourist destination with numerous attractions, 26,000 residents and 3-4 million visitors each year.

Most tourists arrive by automobile. During peak visitor days, in the summer and on weekends in the spring and fall, traffic volumes overwhelm the capacity of the City’s streets leading to an often less-than-relaxing vacation experience.

But what many of the people sitting in their cars in Thames Street traffic don’t know is that Newport’s major attractions, namely the wharfs, beaches, mansions, Cliff Walk and the Tennis Hall of Fame are well within a pleasant walk, trolley or ferry ride of downtown.

Reducing congestion will also increase the time they have to spend at attractions and in local businesses, making the experience of visiting a more relaxing pleasant one. In an effort to reduce congestion, an new central parking facility is proposed near the Pell Bridge ramps, along with a water shuttle around Newport Harbor and to Fort Adams.

URITC researchers are examining ways to promote the use of centralized parking, trolley and ferry services by devising a transportation pricing strategy that will encourage the use of so-called “smart” transportation options.

Potential Outcomes
- A higher quality experience for Newport visitors
- Improved quality of life for people who live and work in Newport
- Improved access to shops and attractions in Newport
- Reduced costs related to traffic congestion including business costs associated with time stalled in traffic
New Project

Development of a Course on Bridge Management

**Issues**
- Bridge management is often overlooked in civil engineering curriculums at the graduate level.
- Curriculum items related to bridge management are currently scattered across the disciplines of structural engineering, information technology, economics, planning and operations research.
- Industry is asking for more graduates with expertise in bridge management.

**Abstract**
A graduate level course on bridge management will be developed. The course will be submitted to become a regular course via the standard procedures of the University of Rhode Island. In addition, it will be part of a currently proposed Graduate Certificate in Bridge Engineering. The course content will encompass information from various disciplines including structural engineering, information technology, economics, planning, and operations research.

The course will develop stronger ties with the Rhode Island Department of Transportation (RIDOT). There is the potential for close co-operation including demonstrations, case studies and even data collection by students. We expect that students who take this course will have critical skills needed by today’s bridge engineers and decision makers.

This course will be unique in that no university-level comprehensive bridge management courses are available nationwide. Only a handful “civil infrastructure management” courses exist and only short courses on bridge management. There is therefore the potential for future wider dissemination of such a course.

**Potential Outcomes**
- Provide students with critical skills needed by today’s bridge engineers and decision makers.
- Course curriculum could also be used for seminars and short courses related to bridge management.
- A graduate level course on bridge management as part of a proposed graduate certificate in bridge engineering.
New Project

Wood Filters as an Innovative Treatment Method for Roadway Runoff Pollutants

Issues
• Roadway transit produces billions of gallons of contaminated runoff each year.
• Runoff often contains high levels of toxic heavy metals and petroleum hydrocarbons.
• Filtration of these particulates is difficult and costly.

Abstract
Vehicle exhaust, tire disintegration and brake dust are all products of surface transportation.

Although drivers seldom wonder where the water from roadway drains go, environmental scientists have long traced the combination of heavy metal particulates and petroleum hydrocarbons that often end up poisoning surface and ground water supplies.

Unlike other dirty water that is normally treated by a sewage treatment plant, the unique particulates found in urban and highway storm water runoff are both difficult and costly to remove from the water.

In an innovative approach, URITC Researcher Dr. Thomas Boving is studying how the use of wood filters can help remove these contaminates from the water.

Contaminated water is routed through the filters while in a retention pond, passing through several stages of filtration. Initial laboratory research shows that the wood chips found in the filters are an effective means of filtering out the harmful contaminants, and the team is now experimenting with several wood species trying to maximize the effectiveness. Current research is examining the use of Aspen wood as the filter material.

Potential Outcomes
• Smaller, less expensive, more efficient and environmentally sound ways to dispose of roadway runoff
• Decreased metal and petroleum sediment on roadways and retention ponds
• A marketable product with applications outside of the transportation sector
For More Information:

Dr. R. Choudary Hanumara
Department of Computer Science & Statistics
University of Rhode Island
Kingston, RI 02881
401.874.2701
hanumara@cs.uri.edu

RI DOT 2001 Bicycle Transportation User Survey Developing Intermodal Connections for the 21st Century

Issues

- It is important that transportation planners have accurate, readily available user data to determine the needs of the bicycle-using community.
- It’s not known exactly how many people are using bicycles to commute to work in Rhode Island.

Abstract

The purpose of this research project is to develop, analyze and disseminate a comprehensive bicycle user survey that will provide key insights into the factors that encourage or discourage bicycle use as an alternative travel mode in the State of Rhode Island.

The survey is administered in two stages. A short “on-path questionnaire” will be administered at popular bike paths, followed up by a longer and more comprehensive mail-in questionnaire. The longer questionnaire includes questions about demographics, economic impact, current means of transportation and perceptions and evaluations of the State’s bike paths.

To achieve a margin of error of at least five percent in the estimation, a sample size of 385 is required. With an approximate return rate of 50 percent, some 800 questionnaires will be sent out, with hopes of receiving approximately half.

Results from the survey will be processed in SAS and graphical representations of the data will be produced in Excel.

The important baseline data gathered in this project will aid the RI Department of Transportation (RIDOT) bicycle project planning and design. The survey will be instrumental in the measurement of potential support for the construction of additional bicycle facilities on a statewide basis in RI DOT. The data could also be the basis for a more comprehensive study to access changes in attitudes of Rhode Island residents towards bicycling, especially as a means of promoting healthy lifestyles.

Potential Outcomes

- Metrics which help us understand who is currently using bicycles for formal transportation and who is not.
- Greater inclusion of bikeways and other incentives for cyclists.
- Reduced traffic congestion as commuters choose bikes and other alternative means of transportation.
New Project

Development of Thermochromic Paints, Plastics, and Rubbers for Rapid Visual Assessment of Temperature

Issues
• Hot or extremely cold objects often present a danger.
• A simple pigment which changes color based on temperature could warn of changes in temperature on various transportation-related objects could help identify that object as dangerous.

Abstract
Imagine driving over a bridge which could actually change color when the air temperature were to reach freezing. What about rubber tires which turn red when they are under-inflated? They’re not such crazy thoughts says URI professor and URITC researcher Dr. Brett Lucht, who along with his project team, has created an additive which when mixed with a paint or other composite displays changes in temperature by changing color.

In effect, the thermochromic coatings, plastics, or rubbers are thermal sensors that detect a change in temperature with optical or visual transformation. A color change, called thermochromic transition, results. This change can be tailored by chemical modification.

The thermochromic polymers can be incorporated into commercially available paints, plastics, and rubbers. The thermochromic paints can be applied in various manners including brush, sponge, roller, and airbrush and adhere strongly to paper, plastic, and painted metal surfaces.

It's a highly practical application of chemistry, and it’s no surprise that such a novel and practical idea would invite commercial interest. Lucht and KM Scientific, the project’s external partner, recently submitted and signed a patent application and licensing agreement for the technology.

Potential Outcomes
• Introduction into rubber tires would provide visual warning of tire overheating due to improper inflation, a major cause of blowouts.
• Thermochromic road signage could warn of icy road conditions.
• Radiator caps and other engine parts could warn of risk of serious burns when hot.

For More Information:
Dr. Brett Lucht
Department of Chemistry
University of Rhode Island
Kingston, RI 02881
401.874.5071
blucht@chm.uri.edu
For More Information:

Dr. Richard Burroughs
Department of Marine Affairs
University of Rhode Island
Kingston, RI 02881
401.874.4045
rburroughs@uri.edu

"...provides a unique and critical policy analysis of the single most significant environmental and economic challenge to our marine transportation infrastructure..."

- John B. Torgan
Narragansett BayKeeper

New Project

Dredging in a Changing Scientific and Regulatory Environment

Issues
• Public policy related to dredging has many stakeholders, but lacks a systematic framework for decision-making.
• Integrating environmental quality into transportation management is a formidable challenge.

Abstract
Dredging is a highly complex activity influenced by a myriad of regulatory bodies and legislation. Legislation includes the Clean Water Act, the Marine Protection Research and Sanctuaries Act, and the Water Resources Development Act and others. Associated laws include the National Environmental Policy Act, the Coastal Zone Management Act, the Rivers and Harbors Act, and in certain instances the Resource Conservation and Recovery Act, and the Comprehensive Environmental Response, Cleanup, and Liability Act.

A systematic analysis of how institutions, policy, and management vary and the consequences of those differences on decision processes has not been undertaken. To address this gap, this study will document how legislative, regulatory, scientific and public input frameworks for dredging management in Rhode Island. The study will also examine how legislative change, scientific advances, and public input could be integrated to improve governance procedures and ultimately policy decisions.

For a decision to be made concerning a dredging project, federal agencies, state agencies, environmental groups, terminal operators, and shipping companies, among others, must coordinate their activities and interests. This historical lack of coordination can be attributed to a lack of a systematic framework, which this project is addressing.

Potential Outcomes
• A defined legislative and regulatory history of dredging
• A framework leading to increased coordination between federal and state agencies, environmental groups, terminal operators, and shipping companies
New Project

Mechanical Behavior of Recycled Asphalt Material Under Dynamic Loading Conditions

Issues
- Recycled asphalt material does not always perform as does new aggregate.
- The relationship between aggregate size, shape, volume, binder moduli, strength and debonding and recycled asphalt performance is unknown.

Abstract
The use of recycled pavement materials is an important issue at both state and national levels. Unfortunately these materials commonly exhibit poor mechanical characteristics, thus limiting their use. Professor Sadd and the project team are examining the mechanical and fracture properties of recycled asphalt concrete under dynamic loading conditions.

Asphalt is a heterogeneous material composed of aggregates, binder cement and air voids and may be thought of as a cemented particulate system. The load carrying behaviors are strongly related to the local load transfer between aggregate particles, and this is taken as the microstructural response.

Damage evolution will be monitored, and the extent of final damage of the material will be analyzed. Further experimental verification has included tests on specially prepared cemented particulate systems, which are allowing the detailed measurement of aggregate displacements and rotations using video imaging and computer analysis. Modeling simulations have been developed for a variety of material microstructures, including aggregate gradation and distribution, and binder volume and porosity.

Potential Outcomes
- A better understanding of how and why recycled asphalt fails
- Increased performance and use of recycled asphalt

For More Information:
Prof. Martin Sadd
Department of Mechanical Engineering
University of Rhode Island
Kingston, RI 02881
401.874.5548
sadd@egr.uri.edu
Replacement of Chromate in Paints and Corrosion Protection Systems

Issues
• Chromates used in anti-corrosive paints and coverings is highly-carcinogenic.
• Disposal of removed coatings is difficult and costly.

Abstract
Chromate coatings are very effective in providing corrosion resistance and are widely used in the manufacturing and transportation industries: equipment and car manufacturers as well as auto-body shops use chromate in paints to prevent corrosion; chromate-containing paints are also used in bridges, rail stock and ships. However, chromium (Cr VI) is considered a carcinogen with an extremely low (0.1 mg/m³) personal exposure limit (PEL).

At URI, three patents have been filed which lead directly to chromate replacement. Two involve conductive polymers while the third involves a chromium replacement (URI alternate to chromate). At present, these three different techniques are being combined into a paint primer with the intent of providing extensive corrosion resistance for steel and aluminum alloys.

Such combined approach holds the promise to revolutionize the corrosion protection treatment area for bridges, cars, ships and rolling stock. Simultaneously, the potential toxic effects of the new formulations on marine life are being examined.

Potential Outcomes
• Lowered carcinogenic corrosion protection for bridges, cars and rolling stock
• Non-toxic and environmentally friendly to land and marine organisms
• A chromate-free coating with corrosion resistance equal to or greater than conventional coatings
New Project

Application of a Multimodal Demand Simulation Model to Assess Container Transportation Policy Issues in the Northeast

Issues
• There are already significant ports along the Northeast corridor, in New York, New Jersey, Halifax and Montreal. It is not clear that an additional East Coast port will have economic viability.
• The container shipping industry lacks a systematic framework to pull together environmental and economic and environmental data in port demand analyses.

Abstract
With all the rhetoric regarding the construction of a multi-modal port in Rhode Island, this project seeks a quantitative analysis of both the demand for and environmental effects of an additional port in the Northeastern United States.

Building a multi-modal port is a huge capital project, and fluctuating demand for the port make it extremely difficult to predict the potential viability of such a project. In short, there are already significant ports along the Northeast corridor, in New York, New Jersey, Halifax and Montreal. It is not clear that an additional East Coast port will have economic viability.

Environmental concerns are always an issue when such a large scale energy-consuming project is proposed. Air and noise emissions from multi-modal vehicles such as trucks, trains and container ships are a large part of the equation.

Dr. Grigalunas will use modern game theory to produce a multi-modal container transportation simulation model, looking at both economic demand and ecological viability for an additional intermodal port in the region.

Potential Outcomes
• A comprehensive model for assessing multi-modal container transportation issues for the public, government officials, industry, and other researchers
• A systematic framework for analysis leads to better environmental and economic decision-making

For More Information:
Dr. Thomas Grigalunas
Department of Environmental & Natural Resource Economics
University of Rhode Island
Kingston, RI 02881
401.874.4572
grig@uri.edu

“...one of the prime concerns in marine research fields in many parts of the world...”

-D. Jung-Ook Lee
President, Korea Maritime Institute
ONGOING & COMPLETED RESEARCH
ONGOING PROJECTS

Dredging in a Changing Scientific and Regulatory Environment
2001-536151 Professor Richard Burroughs (URI Department of Marine Affairs)

Development of Thermochromic Paints, Plastics, and Rubbers for Rapid Visual Assessment of Temperature
2001-536152 Dr. Brett Lucht (URI Department of Chemistry)

Field Study of Composite Piles in the Marine Environment
2001-536153 Dr. Christopher Baxter (URI Department of Ocean and Civil Engineering)

Development of a Customer Satisfaction and Service Quality Measurement Method and Tool for the Rhode Island Public Transit Authority
2001-536154 Professor Albert Della Bitta (URI Department of Business Administration)

Contamination of Urban Lakes by Storm Runoff from Highway and Railway Drainage Systems
2001-536155 Professor John King (URI School of Oceanography)

Development of an Advanced Pavement Deicing System
2001-536156 Dr. David Taggart (URI Department of Mechanical Engineering)

Investigation of Potential for Intermodalizing Paratransit in Rhode Island
2001-536157 Dr. Christopher Hunter (URI Department of Civil & Environmental Engineering)

Replacement of Chromates in Paints and Corrosion Protection Systems
2001-536158 Dr. Mercedes Rivero-Hudec (URI Department of Chemical Engineering)

Intelligent Traffic Anomaly Diagnosis Through the Integration of Diverse Information Sources
2001-536159 Dr. Joan Peckham (URI Department of Computer Science & Statistics)

Processing of Cenosphere-Cement/Asphalt Composite Materials and Evaluation of their Mechanical and Acoustic Properties
2001-539160 Professor Arijit Bose (URI Department of Chemical Engineering)

Driver Distraction and Detection
2001-536161 Dr. Manbir Sodhi (URI Department of Industrial Engineering)

Creating Safe Transportation Options for College Students
2001-536162 Professor Norbert Mundorf (URI Department of Communication Studies)

Comprehensive Framework for Sustainable Container Ports Development of US East Coast in the 21st Century
2001-536163 Professor Thomas Grigalunas (URI Department of Environmental & Natural Resource Economics)

Effect of Microstructure on the Static and Dynamic Behavior of Recycled Asphalt Material
2001-536164 Professor Martin Sadd (URI Department of Mechanical Engineering)
Re-Thinking the Region: Transportation Networks and Regional Competitiveness
2001-536168 Professor Maureen Moakley (URI Department of Political Science)

Exploring Ways of Influencing Transport Behaviors by Using Telecommunications Technologies
2000-536131 Professor Nikhilesh Dholakia (URI Department of Business Administration)

Chemical Retention Capacity of a Newly Constructed Roadway Runoff Detention Pond System
2000-536132 Dr. Thomas Boving (URI Department of Geosciences)

Intermodal Transport of Petroleum Products - Smart Terminals
2000-536133 Dr. Winston Knight (URI Department of Industrial Engineering)

High Order GPS Base Station and Web Delivery System
2000-536134 Professor Peter August (URI Department of Natural Resources Science)

Replacement of Chromates in Paints and Corrosion Protection Systems
2000-536135 Dr. Mercedes Rivero-Hudec (URI Department of Chemical Engineering)

Fiber Reinforcement of Concrete
2000-536136 Professor Richard Brown (URI Department of Chemical Engineering)

A Web-based Core Library for Rhode Island
2000-536137 Dr. O. Don Hermes (URI Department of Geosciences)

Effect of Microstructure on the Static and Dynamic Behavior of Recycled Asphalt Materials
2000-536138 Professor Martin Sadd (URI Department of Mechanical Engineering)

TRANSmap: An Integrated, Real Time Environmental Monitoring and Forecasting System for Highways and Waterways in RI
2000-536139 Dr. Malcolm Spaulding (URI Department of Ocean Engineering)

Comprehensive Framework for Sustainable Container Ports Development of US East Coast in the 21st Century
2000-536140 Dr. Thomas Grigalunas (URI Department of Environmental & Natural Resource Economics)

Implementation of a Highway Monitoring Program Utilizing Intelligent Transportation Systems (ITS)
2000-536141 Dr. Milton Huston (URI Department of Civil Engineering)

Moving Smart in Rhode Island
2000-536142 Dr. Joan Peckham (URI Department of Computer Science & Statistics)
Inorganic and Organic Characterization of Dredged Sediments from the Proposed Quonset Point Channel in Narragansett Bay
2000-536143 Professor Raymond Wright (URI Department of Civil & Environmental Engineering)

Performance Improvement and Measurement of Open-Graded Asphalt Mixes
2000-536144 Dr. Mohammad Faghri (URI Department of Mechanical Engineering)

Magnet and Induced Impacts of Quonset Container Port
2000-536145 Professor Ed Mazzi (URI Department of Business Administration)

Red Light Running in Rhode Island
2000-536146 Dr. Christopher Hunter (URI Department of Civil & Environmental Engineering)

Fiber Reinforcement of Concrete
1999-536101 Professor Richard Brown (URI Department of Chemical Engineering)

Multi Modal Vehicle Display Design and Analysis
1999-536103 Professor Manbir Sodhi (URI Department of Industrial Engineering)

Beneficial Uses of Dredge Material from the QPD Intermodal Port Terminal
1999-536104 Dr. Armand Silva (URI Department of Ocean & Civil Engineering)

Development of an Advanced Bridge, Highway and Runway De-Icing System
1999-536107 Dr. David Taggart (URI Department of Mechanical Engineering)

Interactions of Transportation and Telecommunications Behaviors in Relation to RIIR: Modeling the User Perspective
1999-536111 Dr. Nikhilesh Dholakia (URI Department of Business Administration)

1999-536113 Dr. David Shao (URI Department of Industrial & Manufacturing Engineering)

Smart Speed Bumps
1999-536114 Professor William Ohley (URI Department of Electrical Engineering)
COMPLETED PROJECTS

TRANSMAP: An Integrated, Real Time Environmental Monitoring and Forecasting System for Highways and Waterways in RI
1999-536100 Professor Malcolm Spaulding (URI Department of Ocean Engineering)

Geologic Transportation Maps for the 21st Century
1999-536102 Professor O. Don Hermes (URI Department of Geosciences)

The Design & Development of Information & Computer Systems for URITC
1999-536105 Dr. Joan Peckham (URI Department of Computer Science & Statistics)

Comprehensive Framework for Sustainable Container Ports Development of US East Coast in the 21st Century
1999-536106 Professor Thomas Grigalunas (URI Department of Environmental & Natural Resource Economics)

Effect of Microstructure on the Static and Dynamic Behavior of Recycled Asphalt Material
1999-536108 Professor Martin Sadd (URI Department of Mechanical Engineering)

Modeling for Real-Time Traffic Control in the Rhode Island Intelligent Road
1999-536109 Professor William Palm (URI Department of Mechanical Engineering)

Using Cenospheres to Develop New Asphalt and Cement Based Concrete Materials
1999-536110 Professor Arun Shukla (URI Department of Mechanical Engineering)

Data Analysis and Detection Methods for Online Health Monitoring of Bridge Structures
1999-536112 Professor Sau-Lon Hu (URI Department of Ocean Engineering)
“It’s really that the brain can only do so much at one time... In a demanding traffic situation, to have a complicated conversation, is just taking a chance.”

-URITC Researcher Manbir Sodhi

It has long been suspected that cell phones distract drivers and can lead to traffic accidents. URITC research attempts to define how much distraction

URITC Cell Phone Research profiled on ABC Evening News with Peter Jennings and Good Morning America

Although once considered a luxury item, cellular telephones have become commonplace in American cars. And if Americans have a love-affair with cellular phones, their first love was with the automobile. According to the National Highway Traffic Safety Administration (NHTSA) U.S. drivers spend an average of 541 hours a year in the cars, and 54 percent of these drivers carry and use cell phones while they drive. Put these two loves together and some say it is an accident waiting to happen.

And cellular phones are not the only source of distraction. Electronic devices in cars are becoming more and more advanced. Eventually most cars will be equipped with such marvels as electronic navigation systems, email, games, internet - all potential distractions.

Although common sense tells us that a distracted driver is more likely to have a traffic accident, Dr. Manbir Sodhi in his URITC funded project “Multimodal Vehicle Display Design and Analysis” is using test equipment to monitor eye movement to quantify precisely how much and what kinds of distraction lead to traffic accidents. Using eye and head movement sensors and cameras to collect data, Sodhi was able to track eyeball movement during test distractions.

In recent interviews with ABC News with Peter Jennings and on Good Morning America, Dr. Sodhi described his use of eye movement sensors and cameras that show just how distracted drivers become while talking on the phone or playing with the radio.

Along with the national television news exposure, Dr. Sodhi’s research has also appeared recently in Business-Week, Science Daily and the Providence Journal.

-120.1 Million Cell Phones are in use in the United States.
-By 2005 there will be 1.26 Billion cell phones in use around the world.
-Nearly 118,000 wireless calls are made each day to 911 and other emergency numbers from cell phones; more than 43 million annually.
-54 percent of drivers have wireless phones in their vehicles at all times.

Source: National Highway Traffic Safety Administration (NHTSA)
Papers, Presentations and Success Stories

FY 2001 URITC 536151 Prof. Richard Burroughs
Dredging in a Changing Scientific and Regulatory Environment
Reported Papers, Publications, Success Stories from January 1, 2002 to December 31, 2002

05/2002 Presentation entitled “Uncertainty in Dredging Decisions: Diagnosis and Alternatives” at a meeting of the Coastal Society

FY 2001 URITC 536152 Dr. Brett Lucht
Development of Thermochromic Paints, Plastics, and Rubbers for Rapid Visual Assessment of Temperature
Reported Papers, Publications, Success Stories from January 1, 2002 to December 31, 2002

01/2002 Submitted PCT patent application on thermochromic polymers

03/2002 Presentation entitled “Investigation of the Thermochromic Properties of Polystyrene Dispersed in Host Polymers” at National American Chemical Society Meeting.

FY 2001 URITC 536156 Dr. David Taggart
Development of an Advanced Pavement Deicing System
Reported Papers, Publications, Success Stories from January 1, 2002 to December 31, 2002

01/2002 Presentation entitled “Application of Jetting Technology to Pavement Deicing” at the Annual Meeting of the Transportation Research Board, Washington, DC

FY 2001 URITC 536159 Dr. Joan Peckham, Dr. Christopher Hunter
Intelligent Traffic Anomaly Diagnosis Through the Integration of Diverse Information Sources
Reported Papers, Publications, Success Stories from January 1, 2002 to December 31, 2002

02/2002 Presentation entitled “Rhode Island Intelligent Traffic Anomaly Diagnosis System. (RIITADS)” at URITC

04/2002 Presentation entitled “Strategies for Diagnosing Traffic Anomalies and Incidents & Predicting Travel Time in Rhode Island” at the RIDOT’s regular “Lunch and Learn” series
Papers, Presentations and Success Stories

FY 2000 URITC 536131 Dr. Nikhilesh Dholakia, Prof. Norbert Mundorf
Exploring Ways of Influencing Transport Behaviors by Using Telecommunications Technologies
Reported Papers, Publications, Success Stories from January 1, 2002 to December 31, 2002

01/2002  Presentation of preliminary findings to external match partner, Fraunhofer-ISI in Karlsruhe, Germany

05/2002  Publication “Effects of the Internet and other Interactive Technologies” in the journal Perspectives of Media Effect. The article discusses the impact of information technology on virtual mobility and other aspects of daily life.

06/2002  Publication of a book by Fraunhofer (the external sponsor of this project) that demonstrates partial transport substitution effects of online activities

11/2002  Dr. Dholakia and Dr. Mundorf presented findings to the BMW Foundation in Berlin, Germany

FY 2000 URITC 536132 Dr. Thomas Boving
Chemical Retention Capacity of a Newly Constructed Roadway Runoff Detention Pond
Reported Papers, Publications, Success Stories from January 1, 2002 to December 31, 2002


03/2002  Presentation entitled “Chemical Retention Capacity of a Newly Constructed Roadway Runoff Detention Pond System” at NE Geological Society of America Meeting, Springfield, MA by Krohn, J and Boving, T.

03/2002  Presentation “Potential Remediation of Heavy Metals Found in the Environment Using Wood: Rate of Absorption of Copper and Zinc on Aspen Wood” at NE Geological Society of America Meeting, Springfield, MA by Thienel, B and Boving, T.

06/2002  Success Story: A provisional patent application for wood filters was filed with the US Patent Office.
Papers, Presentations and Success Stories

FY 2000 URITC 536137 Prof. Daniel Murray
**A Web-based Core Library for Rhode Island**
*Reported Papers, Publications, Success Stories from January 1, 2002 to December 31, 2002*

03/2002  
Presentation entitled “A Web-based Core Library for Rhode Island” at Geological Society of America Meeting (Northeast Section)

FY 2000 URITC 536138 Prof. Martin Sadd
**Effect of Microstructure on the Static and Dynamic Behavior of Recycled Asphalt Materials**
*Reported Papers, Publications, Success Stories from January 1, 2002 to December 31, 2002*

06/2002  
Presentation entitled “Microstructural Simulation of Asphalt Materials: Modeling and Experimental Verification” at 15th Annual ASCE Engineering Mechanics Conference

FY 2000 URITC 536140 Prof. Thomas Grigalunas
**Comprehensive Framework for Sustainable Container Ports Development of US East Coast in the 21st Century**
*Reported Papers, Publications, Success Stories from January 1, 2002 to December 31, 2002*

01/2002  
Presentation at the Transportation Research Board Annual Meeting, Washington, DC.

01/2002  
Presentation entitled “Risk Analysis in Port Planning” at Transportation Research Board Annual Meeting, Washington, D.C.

01/2002  

11/2002 - 03/2003  
Success Story: Faculty T. Grigalunas and J. Opaluch were asked by State of Delaware to undertake an independent review and critique of all economic studies of cost and benefits of proposed deepening project for Delaware Bay and River (2002-2003).

FY 2000 URITC 536142 Dr. Joan Peckham
**Moving Smart in Rhode Island**
*Reported Papers, Publications, Success Stories from January 1, 2002 to December 31, 2002*

03/2002  
Publication entitled “Moving Smart in Rhode Island” is in the Proceedings of the 31st Annual Meeting of the Northeast Decision Sciences Institute. Peckham, J., Hunter, C., DiPippo, L and Herve, J.
Papers, Presentations and Success Stories

FY 1999 URITC 536106 Dr. Thomas Grigalunas
Comprehensive Framework for Sustainable Container Ports Development of US East Coast in the 21st Century
Reported Papers, Publications, Success Stories from January 1, 2002 to December 31, 2002


01/2002  Presentation entitled “Risk Analysis in Port Planning” at Transportation Research Board Annual Meeting, Washington, D.C.

01/2002  Success Story: M. Luo was selected in Ph.D. student competition to present paper Network Model for Simulating Container Port and Multimodal Demand, Ph.D. invited paper, Ph.D. Student competition, Transportation Research Board Meetings, Washington, D.C.

08/2002  Publication entitled “Container Transportation Service Demand Simulation Model for United States Coastal Container Ports”, Ph. D. Dissertation, Department of Environmental Economics, University of Rhode Island

10/2002  Success Story: T. Grigalunas and M. Luo gave “Container Port and Related Multimodal Research at the University of Rhode Island”, a special invited presentation for international scholars, Inha University, Incheon, Korea

11/2002  Presentation entitled “Spatial Economic Model for Simulating Container Port and Intermodal Demand” at International Association of Maritime Economics Annual Meeting, Panama
Development of an Advanced Bridge, Highway and Runway De-icing System

Reported Papers, Publications, Success Stories from January 1, 2002 to December 31, 2002

01/02  Publication entitled “Application of Jetting Technology to Pavement Deicing” Paper presented at Annual Meeting of the Transportation Research Board and published in conference proceedings

01/02  Publication entitled “Application of Jetting Technology to Pavement Deicing,” accepted for publication in the Transportation Research Record
TECHNOLOGY TRANSFER

The availability of research results to potential users in a form that can be directly implemented, utilized or otherwise applied.
Thermochromic paints might someday give us tires that change color when overheating or even bridges that turn red warning of frost.

URITC researchers are looking at how salt usage can be minimized by using a high-pressure spray to break up ice and snow on roadways.

Imagine driving over a bridge which could actually change color when the air temperature were to reach freezing. What about rubber tires which turn red when they are under-inflated? They’re not such crazy thoughts says URI professor and URITC researcher Dr. Brett Lucht, who along with his project team, has created an additive which when mixed with a paint or other composite displays changes in temperature by changing color.

In effect, the thermochromic coatings, plastics, or rubbers are thermal sensors that detect a change in temperature with optical or visual transformation. The thermochromic polymers can be incorporated into commercially available paints, plastics, and rubbers. The thermochromic paints can be applied in various manners including brush, sponge, roller, and airbrush and adhere strongly to paper, plastic, and painted metal surfaces.

It’s a highly practical application of chemistry, and it’s no surprise that such a novel and practical idea would invite commercial interest. Lucht and KM Scientific, the project’s external partner, recently submitted and signed a patent application and licensing agreement for the technology.

URITC 2001 - 536152
Development of Thermochromic Paints, Plastics, and Rubbers for Rapid Visual Assessment of Temperature

Another URITC researcher has developed an innovative way of removing snow and ice from road surfaces using high-pressure jetting technology and de-icing chemicals.

Dr. Taggart of URI’s mechanical engineering department is looking at the combined use of jetting technologies and reduced use of deicing agents. Because these chemicals are known to be hazardous to the environment, their use should be minimized. The researchers are exploring such variables as jet pressure, nozzle type, distance and chemical mix in hopes of finding the perfect mix where chemical use is at its minimum and ice-breaking power is maximized.

URITC 2001-536156
Development of an Advanced Pavement Deicing System
Innovative Water Treatment

Although drivers seldom wonder where the water from roadway drains go, environmental scientists have long traced the combination of heavy metal particulates and petroleum hydrocarbons that often end up poisoning surface and ground water supplies.

Unlike other dirty water that is normally treated by a sewage treatment plant, the unique particulates found in urban and highway storm water runoff are both difficult and costly to remove from the water.

In an innovative approach, URITC Researcher Dr. Thomas Boving is studying how the use of wood filters can help remove these contaminants from the water.

Contaminated water is routed through the filters while in a retention pond, passing through several stages of filtration.

Initial laboratory research shows that the wood chips found in the filters are an effective means of filtering out the harmful contaminants, and the team is now experimenting with several wood species trying to maximize the effectiveness.

Dr. Boving filed a patent application in June.

Testing is ongoing at the Gano Street rentention pond at the on-ramp of Route 195 on the East Side of Providence.

URITC 2001-536181
Wood Filters as an Innovative Treatment Method for Roadway Runoff Pollutants
EDUCATION & OUTREACH

Education: a multi disciplinary program of course work and experiential learning that reinforces the transportation theme of the Center.
2nd Annual URITC National Transportation Week Breakfast
May 13, 2002
“Homeland Security & Transportation”
Tad Widby of Parsons Brinckerhoff, Guest Speaker

As part of the 2002 National Transportation Week URITC invited Mr. Tad Widby of Parsons Brinckerhoff to speak on the topic of Homeland Security.

Mr. Widby reminded the audience that transportation systems make prime targets for attacks. The presentation highlighted how increased vigilance and coordination between agencies and information is critical in the unfortunate event of terrorism.

Along with better communications, Mr. Widby also spoke about increasing surveillance, increasing emergency response capabilities, and the isolation of key bridge and tunnel access.

The speaker also stressed the reality that no system is perfect, and decision-making must be strategic, systematic, and built on probabilities of attack and degree of likely impact.

National Transportation Week provides an opportunity for the transportation community to join together for greater awareness about the importance of transportation. National Transportation Week also focuses on making youth aware of transportation-related careers.

“The United States will become increasingly vulnerable to attack on the American homeland, and the US military superiority will not completely protect us …”
Hart-Rudman Commission--February 2001

For more information contact:
Dr. William Croasdale
Director of Technology Transfer & Outreach
URI Transportation Center
85 Briar Lane
Kingston, RI 02881
(401) 874-7075
The URI Transportation Center sponsored two major external events during the year.

**Model Port Workshop**
In February, the URITC along with the US Coast Guard, Roger Williams University, and the Rhode Island Sea Grant Program sponsored the Model Port Workshop. The stated objective of the workshop was “to identify the diverse problems and issues facing U.S. ports, and devise pertinent strategies for ensuring that our ports are safe, secure, and economically and environmentally sustainable in the coming decades.”

One hundred and fifteen port and maritime stakeholders, including senior officials from the US Coast Guard, the US Department of Transportation, met on February 20-21 to hear expert panelists identify critical issues facing the port systems and to work in teams developing the tradeoffs among the often competing objectives. From these activities, potential strategies for decision makers were derived. The results of the workshop are documented in “Proceedings of a Workshop Model Ports for the 21st Century” issued by the U.S. Coast Guard.

**Listening Session with NASTO**
On April 16, 2002, the URI Transportation Center sponsored a session at the Northeast Association of State Transportation Officials (NASTO) meeting, held in Newport, RI. Dick Horn, Executive Director of the URITC moderated the session titled “Listening to our Customers.” A panel consisting of Joe Toole, Director, Office of Professional Development, FHWA, Thomas Humphrey, Volpe Center, USDOT, and Maureen Moakley, Prof. and Chair, Political Science Department, URI, discussed workforce development issues facing transportation industries, training and educational requirements of maintaining a skilled workforce, and the importance of working across jurisdictional lines to achieve regional objectives.
2002 Student of the Year, Oran Viator

Oran (Skip) Viator completed his Ph. D. 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 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.

The URITC is honored to have Oran Viator as its 2002 Outstanding Student of the Year.
URITC’s Unique NHI Educational Partnership

NHI Courses: Educating Transportation Practitioners

The University of Rhode Island and the National Highway Institute (NHI) of the Federal Highway Administration (FHWA) will offer joint training and educational sessions to transportation practitioners in the Northeastern United States.

The mission of the National Highway Institute (NHI) is to provide proactive leadership, expertise, resources, and information to improve the quality of the U.S. highway system in order to enhance economic growth, quality of life, and the environment. The NHI develops and delivers training and education in cooperation with its partners to sustain and expand the transportation community’s professional capacity in technologies and strategies thereby accelerating the implementation of the state-of-the-art and continuing to advance the state-of-the-practice.

March 28, 2002
MUTCD Short Course

April 24-26, 2002
NHI 142036 Public Involvement in the Transportation Decision-Making Process

June 12-13, 2002
NHI 231013 Highway Program Financing

June 21-22 2002
Greenbook Changes Short Course

July 23-25, 2002
NHI 142005 NEPA and Transportation Decision-Making

August 20-23, 2002
NHI 142007 Fundamentals and Abatement of Highway Traffic Noise

November 20, 2002
Red Light Running
Seminars

Our regular seminars allow researchers the opportunity to report on their findings and take questions from stakeholders. The Center asks each researcher to present twice during the reporting year, once towards the beginning of the project and another towards the end.

January
1/18/2002 A Special Fiber Optic Based Highway Weigh-in-Motion (WIM) Sensor
Ramesh B. Malla, Ph.D.

1/25/2002 Replacement of Chromates in Paints and Corrosion Protection Systems
Dr. Mercedes Rivero-Hudec & Prof. Richard Brown, Chemical Eng., URI & Sze Yang, Chemistry, URI

February
Prof. Albert Dellabitta Business Administration, URI

2/8/2002 HAZMAT Awareness
Mr. Kenneth Froberg

2/15/2002 Intelligent Traffic Anomaly Diagnosis through the Integration of Diverse Information Sources
Professor Joan Peckham, Dr. Jean-Yves Herve, Dr. Lisa DiPippo, Computer Science & Statistics, URI & Dr. Christopher Hunter, Civil Engineering, URI

2/22/2002 Effect of Microstructure on the Static and Dynamic Behavior of Recycled Asphalt Material-Early Stages of 2001 Project
Prof. Martin Sadd & Prof. Arun Shukla, Mechanical Eng., URI

March
3/1/2002 Driver Distraction Modeling and Detection
Prof. Manbir Sodhi & Mr. Bryan Reimer, Industrial Eng., URI

3/8/2002 High Order GPS Base Station Support for Rhode Island
Prof. Peter August, Natural Resource Science, URI, Mr. Charles Labash, Research Assoc. IV, Mr. Roland Duhaime, Research Assoc. IV, Mr. Duane Chapman, Research Assoc. III

3/22/2002 Technology for Transportation Infrastructure Condition Assessment
Dr. Kenneth R. Maser, P.E., President, Infrasense Inc.

3/27/2002 Container Transportation Demand Simulation Model for US Ports Demonstration Applications
Meifeng Luo (GS) and Professor Thomas A. Grigalunas Dept. of Environmental & Natural Resource Economics, URI
April
4/5/2002 A Web-Based Core Library for Rhode Island (Year One Results)
Prof. Daniel Murray, Prof. O. Don Hermes, Mr. Nasir Hamidzada, Res. Assoc, Ill, Dr. Anne Veeger & Prof. Jon Boothroyd Geosciences, URI

4/12/2002 Transitions in the World of Transportation
A Systems View Dr. Joseph M. Sussman, JR East Professor, Dept. CVE, Massachusetts Institute of Technology

4/26/2002 Red Light Running in Rhode Island
Dr. Christopher Hunter, Civil Engineering, URI

October
Prof. Timothy Tyrrell & Dr. Chris Anderson Environmental & Natural Resource Economics, URI

10/11/2002 Harnessing the Power of Relational Databases for Managing Geotechnical and Geologic Data
Prof. Daniel Murray, Mr. Nasir Hamidzada, Dr. Anne Veeger, Prof. Jon Boothroyd & Prof. O. Don Hermes, Geosciences, URI

10/18/2002 Developing and Applying a Transportation Model for Aquidneck Island
Prof. Farhad Atash, Community Planning & Landscape Architecture, URI

10/25/2002 Application of Multimodal Demand Simulation Model to Assess Container Transportation Policy Issues in the Northeast
Prof. Thomas Grigalunas, Dr. Chris Anderson & Prof. James Opaluch, Environmental & Natural Resource Economics

November
11/1/2002 Determining the Effectiveness of New Technology Data Collection Devices for Real-Time Transportation System Management
Dr. Christopher Hunter, Civil Engineering, URI

11/8/2002 Intelligent Traffic Anomaly Diagnosis through the Integration of Diverse Information Sources
Dr. Joan Peckham, Ms. Lucy Liu, Mr. Mingson Zheng, Computer Science & Statistics, URI and Dr. Christopher Hunter, Civil Engineering, URI

11/15/2002 Development of Thermochromic Paints, Plastics and Rubbers for Rapid Visual Assessment of Temperature
Dr. Brett Lucht, Prof. William Euler, Chemistry, URI & Prof. Otto Gregory, Chemical Engineering, URI

11/22/2002 Wood Filters as an Innovative Treatment Method for Roadway Runoff Pollutants
Dr. Thomas Boving & Prof. David Fastovsky, Geoscience, URI

December 2002
12/6/2002 RIDOT 2002 Bicycle Transportation User Survey Developing Intermodal Connections for the 21st Century
Prof. R. Choudary Hanumara & Dr. M. Liliana Gonzalez, Computer Science & Statistics, URI

12/13/2002 Replacement of Chromate in Paints and Corrosion Protection Systems
Dr. Mercedes Rivero-Hudic, Prof. Richard Brown, Chemical Eng., URI & Prof. Sze Yang, Chemistry, URI
This year’s summer day camp program included four separate programs for middle-school children from across the state.

Students from the Pawtucket Boys & Girls Club, the Times² Program of Providence, Narragansett Indian Tribe and others enjoyed day field trips to explore different modes of transportation, engineering sites, and transportation careers.

Students also rode on ferryboats, toured a nuclear submarine, participated in survey work, and built model airplanes as part of the exciting learning experience.

The summer camps are an integral part of URITC’s K-12 outreach program, Transportation Summer Day Camps help students realize the importance of transportation in society. The program also illustrates the many exciting career paths in transportation.
The URITC website provides information on current research projects, research highlights, news, seminars and events.

A new project portal allows URITC researchers to access project information, and fill out reporting forms online.

**Improvements to the URITC Website**

To respond to the need to provide better information to our stakeholders and the general public, the Center expanded and improved its website in a variety of ways.

The new URITC website features full descriptions of ongoing research projects, news, seminars and research opportunities, pulling information directly from a central, internal project management system.

The site also allows Center staff to update and maintain a calendar of events, frequently asked questions, news releases, email lists and project information and management, directly from the website itself.

Project investigators will soon be able to log in to check financial information for their projects directly, through an online administrative portal.

**Increased Visibility for the Center**

The URITC website audience continues to grow. The site now receives more than 3000 visits per month.

**Connecting with Stakeholders**

Subscribers to our email list receive notifications of awards, new projects, seminars and events.

**Online Project Reporting**

URITC Researchers log in to the URITC “Project Portal” where they can fill out various required project reports, including semi and annual progress reports.

*Visit our website at http://www.uritc.uri.edu*
The 2002 budget was approved at a level of $4,298,934, with the Federal share at $1,724,600. Actual commitments and expenditures against this budget are $1,896,522. The distribution of sources of the Year 2002 funds committed are 55.0% from the Federal grant, 21.4% from the University of Rhode Island, and 23.6% from Industry and Public Sector Partners.

The allocations against the 2002 Year grant were 66.2% to research and the administrative costs associated with the research. Education accounted for 10.0% of the funds, Technology Transfer and Outreach efforts accounted for 5.9%, and General Administration and the administrative costs associated with education and tech transfer amounted to 17.9% of the funds.
The 2001 budget was approved at a level of $4,298,934, with the Federal share at $1,724,600. Actual commitments and expenditures against this budget are $3,132,964. The distribution of sources of the Year 2001 funds committed are 50.0% from the Federal grant, 22.5% from the University of Rhode Island, and 25.9% from Industry and Public Sector Partners.

The allocations against the 2001 Year grant were 77.2% to research and the administrative costs associated with the research. Education accounted for 2.0% of the funds, Technology Transfer and Outreach efforts accounted for 4.7%, and General Administration and the administrative costs associated with education and tech transfer amounted to 16.0% of the funds.
The 2000 budget was approved at a level of $3,619,332, with the Federal share at $1,748,000. Actual commitments and expenditures against this budget are $3,963,133. The distribution of sources of the Year 2000 funds committed are 48.4% from the Federal grant, 25.9% from the University of Rhode Island, and 25.7% from Industry and Public Sector Partners.

The allocations against the 2000 Year grant were 85.0% to research and the administrative costs associated with the research. Education accounted for 1.0% of the funds, Technology Transfer and Outreach efforts accounted for 2.0%, and General Administration and the administrative costs associated with education and tech transfer amounted to 12.0% of the funds.
Full implementation of the URI Transportation Center program was authorized on August 30, 1999. The 1999 budget was approved at $3,740,186, with the Federal share at $1,829,300.

These funds were allocated to the three primary activities of the Transportation Center and to general administrative expenses of the Center. The allocations against the 1999 Year grant were 47% to research and the administrative costs associated with the research. Education accounted for 12.0% of the funds, Technology Transfer and Outreach efforts accounted for 3%, and General Administration and the administrative costs associated with education and tech transfer amounted to 38% of the funds.