M A S S

INTERCHANGE

Volume 20, Number 3 Summer 2006

ANNIVERSARY ISSUE

WHERE'S THE CAKE?

Baystate Roads Team (l-r)
Audrey Lehane, Matt Tassinari, Susan Lee, John Collura, & Chris Ahmadjian with Paul Shuldiner (seated in center) celebrating our 20th anniversary with a transit cake

If the Program is 20 years old: Does this mean that I am getting old? I know the Program is maturing, but surely not me. Although, I do seem to remember not needing bifocals when I started with the Baystate Roads 14 years ago. If, in fact, I am getting older, I like to think I am maturing as well as the Program is, but that is certainly open for discussion.

I was not here when it all began in 1986, but four people who were are still involved (LTAPers tend to stick around). Sue Lee retired as program coordinator several years ago, but like many other retired University people came back as a part-time retired employee and now creates our newsletters. Dr. Paul W. Shuldiner, who has been the program director since 1986, just retired this August and turned the directorship over to Dr. John Collura. John was just a young UMass professor when it all started. Matt Turo from MassHighway is now the only non-retired original person who is still active in the Program and has served as its technical representative since the beginnning.

The first program manager was Meryl Ann Mandell who worked out of an empty room with a work plan. She created the resource library, the database and the first training programs. Meryl is now working for MassHighway in Northampton as the district planner. Silvio Baruzzi was the second program manager. He continued to grow Baystate Roads over the next several years and then left to become a highway superintendent himself.

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Glenn Burdick Master Roads Scholar

Baystate Roads Program is pleased to introduce Master Scholar, Glenn Burdick, from the Town of Florida. Yes, that's really in northwestern Massachusetts on the Mohawk Trail with an elevation range of 700' to 2,500' and a temperature range of 9 to 30 degrees in the winter. Settled in 1783, it sits atop the Hoosac Mountain Range in the Green Mountains. Postcards from Florida, MA will illustrate beautiful hilltop vistas rather than sandy beaches.

Florida has a population of 800 with 50 miles of roadways, the majority of which are paved. Glenn is especially busy during the winter season overseeing snowplowing in this northwestern Berkshire County community. As superintendent of the Department of Public Works, he oversees a crew of four and has applied many years of experience and training to improving the infrastructure in Florida.

Mr. Burdick brings his skills and knowledge gained from training at the Massachusetts Military Academy and Division Safety School at Camp Edwards to the public service sector. He is especially interested in educating his crew in the maintenance and proper operation of heavy equipment. With his background in leadership training, Glenn also strives to develop safe and efficient work procedures and the cross training of personnel.

During his six years at the DPW, Glenn has overseen many major projects and improvements. A new concrete bridge was constructed on Savoy Road with all work completed by the town crew. Every culvert in town has been replaced with ADS when repairs were needed. The landfill was recently terminated requiring a complete revamping of the town's waste management system.

Glenn is currently advocating for funding from the Federal Emergency and Management Agency (FEMA) for reimbursement following townwide damage from the devasting storm of October 2005. The Massachusetts Emergency Management Agency (MEMA) is lending assistance in his quest for $160,000 in payment toward costs associated with repair of a bank on River Road. Disagreement centers around FEMA's interpretation of what is "integral" to a roadway. Glenn has argued that the bank above or below the road as well as retaining walls are part of the roadway.

Along with his other commitments at the Florida DPW, Glenn found time to design a logo which represents the path of Route 2 through town (see above).. There have been many accidents at the hairpin turn on the top of the mountain especially since drivers are distracted by the beautiful vista off the north side.

John Moultrie Master Roads Scholar

John has called Georgetown, MA home since 1951 and served in various capacities at the highway department since 1980. In 1992 he was elected highway surveyor, a position with duties comparable to a highway superintendent including maintenance and repair of all roadways, sidewalks, parks, bridges, drainage, etc. Since 1992 John has been tree warden and also sits on committees for the library building, urban roadways and traffic. Elected to the planning board in 1999, he has served in the past as clerk and currently as chairman.

Georgetown has benefited from John's dedication to improving quality standards and cost saving measures. He developed subcontractor qualifications for snow and ice control. The highway department was recognized for superior snow and ice control by the Lawrence Eagle Tribune and placed in the top 3 out of 25 towns in this survey. The first phase of a stormwater mandate was completed under budget saving the town $50,000; this was accomplished with the Merrimack Valley Planning Commission's assistance.

Jack instituted excavation regulations and a permitting process to protect the town's infrastructure with a performance bond requirement thus ensuring accountability. The pavement management program that he implemented has enabled those responsible to make important decisions regarding the maintenance and rehabilitation of roads.

Over 3 million dollars from grants dedicated for infrastructure improvements were obtained by John along with off-site upgrades privately funded by developers. He has also participated in consortium purchasing programs saving the town thousands of tax dollars; a result that always sounds good to the citizens of any town.

Major construction projects in 2004 included the second phase of the redesign of the urban system ($2.3 million) and creation of the long awaited access road off Tenney Street (a $3 million Transportation Improvement Project). Jack was able to oversee both of these significant endeavors while attending to his everyday duties of overseeing 65 miles of roads.

Membership in the American Public Works Association, Massachusetts Highway Association (currently President of Essex County Highway Association), and the Massachusetts Tree Warden's and Forester's Association provide networking with others in his field.

In his spare time, Jack enjoys restoring old cars, farm tractors and antique stoves. Depending on the season, you can find him busy with woodworking or gardening.

MOVING TOGETHER 2006

Wednesday, October 18—Boston Marriott Courtyard Hotel

Over 200 participants are expected to attend the annual statewide bicycle-pedestrian conference at the Marriott Courtyard Hotel, Tremont Street, Boston. The agenda and registration information is updated at: www.baystateroads.org/mt/

Scheduled workshops currently include:

- Transit Oriented Development Funding for Bicycling and Walking Improvements
- MBTA Initiatives to Improve Mult-Modal Transportation
- Inside the State Bicycle Plan Update
- Road Respect: A State and Local Community Partnership
- Soft-Surface Innovations in Trail Design and Construction

www.bikepedimages.org/Dan Burden

- Overcoming Encroachments on Trail Projects
- Effectively Organizing to Promote Trail Projects

The conference exhibit hall is designed to showcase current products, publicatons and programs to make bicycling and walking more accessible, enjoyable and safe. Exhibitor packets can be downloaded at: www.baystateroads.org/mt/

DEATHS RISE ON OUR HIGHWAYS IN 2005

The National Highway Traffic Safety Administration (NHTSA) has just announced that 43,443 people died in traffic accidents in 2005, an increase of 1.4 percent from 2004. The motorcycle death toll continued its rise by 13 percent with 4,553 motorcyclists killed last year. Pedestrian deaths also rose by 4.4 percent to 4,881 in 2005.

"The traffic environment is getting more dangerous,"said Adrian Lund, president of the Insurance Institute for Highway Safety. "People are driving a lot faster. We've lost momentum in reducing alcohol-impaired driving and unprotected road users, like pedestrians, and to some extent motorcyclists are going to suffer from that."

Mandatory helmet laws for motorcyclists have been repealed in some states where sharp rises in deaths have occured. Lund said states need to adopt stricter helmet laws. NHTSA will investigate the rising number of pedestrian deaths by providing $600 million over three years to help states develop safety programs.

However, overall occupant deaths (not including motorcyclists or pedestrians) have declined 1.4 percent to 31,415 and injuries in motor vehicle crashes declined 3.2 percent from 2004.

NHTSA offers the full report on crash statistics annually at: http://www.-nrd.nhtsa.dot.gov/

ITS

Emergency Response and Traffic Signal Preemption

Figure 1: Various Light-Based Emitters

Consider the following scenario: As a local public works employee, you have been appointed to serve on a Task Force to assist in the development of an Emergency Preparedness and Response Plan. Other members on the Task Force include your local Fire Chief who at the first meeting indicates that a critical element of the plan will be the reliable, safe, and efficient operation of traffic signals. He emphasizes the importance of providing a special signal preemption phase for fire and ambulance services at signalized intersections in order to reduce response times and reduce the likelihood of accidents involving emergency vehicles.

The scale and patterns of Emergency Vehicle Preemption (EVP) deployments seen in individual jurisdictions across the country cover a broad range. The number of signals and the specific signals equipped depend on the issues and problems faced. Some jurisdictions have equipped only a few signals in an effort to provide safe and efficient arterial access from fire/rescue, EMS and police stations located on side streets. Many others have used the systems to address arterial access as well as known problem intersections. Some districts have adopted policies of 100 percent coverage across the entire jurisdiction or in selected downtown areas.

Most of the jurisdictions reporting 100 percent EVP coverage are located on the fringes of older, major metropolitan areas and report that they own and operate signal systems of 150 signals or less. As these communities grew into suburbs, EVP was adopted as an integral component of the public safety and traffic control development plans at an early point in the growth cycle with stakeholders commited to policies to equip 100 percent of the signals. In cases where existing signals were not equipped with EVP, signal systems were brought up to a 100 percent deployment level over several years using bonds or other capital improvement project funding mechanisms. Once at the 100 percent level, these jurisdictions enacted policies requiring that each new signal be installed with EVP.

A signal mounted preemption system requires the installation of a receiving device within the traffic control and radio-based emitter/detector systems. As such, stakeholders must gather information and consider key operational features and interoperability requirements as they plan deployments and recommend EVP technology approaches.

Light and infrared systems employ emitters that are normally mounted on the roof of the EV and are operated in conjunction with the emergency lights (Figure 1). The photo on the left shows an early optical emitter mounted just under the windshield. The upper right photo shows a factory-mounted emitter in front of the light bar. The lower right picture shows a locally-installed emitter on the roof of a cab. The emitter system includes the light unit and a power supply that is located inside the vehicle.

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On the power unit, there is typically a control panel that allows selection of a high priority mode (used for EVP), and a low priority mode (used for transit signal priority). The control panel also includes a feature to assign unique codes to each vehicle operating on the sytem. The codes provide a record of which operator drove the vehicle, as well as protection against unauthorized use. Light- and infrared-based detectors are generally mounted on the signal arm. Mounting requirements include provisions for power and communications cables. Figure 2 shows a mast arm mounted light-based detector. Some jurisdictions install confirmation lights in conjunction with the detector. This light provides feedback to the EV driver that the request for preemption has been received and that the request will be served according to the local preemption transition protocol.

Sound-based systems use the EV siren as the emitter. The waveform of the siren is loaded into the detection and processing equipment such that directional microphones mounted on the signal arm can detect sirens that meet the Federally mandated decibel level of 1,200 db. Once detected, the siren waveform is verified, a preemption request is generated by the phase selector and sent to the signal controller (Figure 3). The system pictured serves a regional hospital with EVP on two approaches.

Figure 2: Mast Arm Mounted Light-Based Detector

Radio-based systems utilize a receiver with an omni-directional antenna to detect a digitally-coded spread spectrum or narrow-band radio transmission from an EV. In these systems, the direction of preemption is selected in the vehicle and a direction-unique signal is transmitted to the intersection. Radio-based systems avoid the line-of-sight limitations associated with light- and infrared-based systems. Once a radio frequency pulse is detected and the proper direction of travel is determined, the preemption request is processed by the phase selector and the signal controller. Table 1 summarizes the technical consideratons of the various EVP options.

The site examples shown in Table 2 represent a range of system maturity, stakeholder relationships, signal

Figure 3: Sound-Based Detection Equipment in Loudoun County, VA

operating concepts and deployment and operational approaches. All three of these communities have been successfully operating EVP systems for over 20 years. It is also worth noting that there are many cities and towns that provide preferential treatment for emergency vehicles in large metropolitan areas in Massachusetts as well as smaller communities such as Amherst, Worcester, and Andover.

Communities across the country are striving to provide the highest possible levels of fire/rescue, EMS, and police services using new ITS advancements to facilitate communication between emergency personnel, public works officials, traffic engineers and hospital trauma centers. EVP is one item in the toolkit that improves the responsiveness of public safety services. When EVP is implemented well, the negative impacts on traffic flow are insignificant and public acceptance of the system is high.

Table 1: Summary of EVP Technology Features

TECHNOLOGY CONSIDERATION	STROBE ACTIVATED	SIREN ACTIVATED	RADIO ACTIVATED
Dedicated Vehicle Emitter Required	**Yes**	**No**	**Yes**
Susceptible to Electronic Noise Interference	**No**	**No**	**Yes**
Clear Line of Sight Required	**Yes**	**No**	**No**
Affected by Weather	**Yes**	**No**	**No**
Possible Preemption of Other Approaches	**No**	**Yes**	**Yes**

Source: Tables adapted from *Traffic Signal Preemption for Emergency Vehicles*, Federal Highway Administration, FHWA-JPO-050-010, Washington, DC, Jan. 2006

Table 2: EVP Site Overview

Site Characteristics	Fairfax County, VA	Plano, TX	St. Paul, MN
Area (Sq.Mi.)	**497**	**76**	**53**
Equipped Signals/Total Signals	**37/1.034***	**194/194**	**368/368**
Signal Controller Type	**Type 170**	**Type 170**	**Type 170**
Central Signal Control Center	**Yes**	**Yes**	**Yes**
Signal Operatons Mode	**Semi-actuated**	**Semi-actuated**	**Semi-actuated**
Communication w/ Signals	**Twisted copper** phone lines	**Wireless**	**Twisted copper** phone lines
Preemption Technology Employed	**Vehicle-based** light emitter	**Vehicle-based** light emitter	**Vehicle-based** light emitter
EV Classes Served	**Fire/rescue &** EMS	**Fire/rescue &** EMS	**Fire/rescue,** EMS & police
Transit Priority	**Yes**	**No**	**No**

*** The signals in Fairfax County are part of the Virginia Department of Transportation (VDOT) Smart Traffic Signal System that is a highly integrated system operating across three Northern Virginia counties.**

This is the second article in a new series written by members of ITS Massachusetts, a volunteer organization comprised of professionals from the public, private, and academic sectors dedicated to building ITS awareness, promoting dialogue, and providing educational and training opportunities. For further information, please refer to the ITS Massachusetts website:

www.ITSMassachusetts.org

Article written by Dr. John Collura, ITS Massachusetts Executive Board Member and UMass Transportation Center Director, and Ms. Susan Lee, Baystate Roads Program Staff Assistant.

NEW PUBLICATIONS

BRI-131 Bridge Inspector's Reference Manual
NHI

D&C-163 AASHTO Pavement Overlay Design Instructor's Guide, Reference Manuals and Visual Aids
NHI 1993

D&C-164 Design Details for High-Performance Concrete Pavements
NHI May 2006

D&C-165 Applying GIS and Spatial Data Technologies to Transportation
NHI

GEO-24 New Patch Road Embankment Repair Application Guide
U.S. Dept.of Agriculture October 2005

MAI-52 Vehicle Cleaning Technology for Controlling the Spread of Noxious Weeds and Invasive Species
U.S. Dept. of Agriculture October 2005

REC-27 Asphalt Pavement Recycling Tech - nologies -- Instructor/Participant Manuals
NHI

SAF-147 Developing and Implementing Transportation Management Plans for Work Zones
FHWA

SAF-151 Work Zone Public Information and Outreach Strategies
FHWA November 2005

SAF-152 Implementating the Rule on Work on Safety and Mobility
FHWA September 2005

SOI-71 Design and Implementation of Erosion and Sediment Control
NHI

NEW VIDEOS

MO-254 Dangerous Travelers
USDA Forest Service 2006
26 minutes
DVD covers the best management practices to assist road maintenance crews in controlling the rapid spread of invasive plants. Items highlighted include plant identification, inventory systems, mapping, mechanical removal, herbicide treatments, weed free products, maintenance techniques, and cleaning of equipment.

MO-255 Forest Roads and the Environment
U.S. Dept. of Agriculture 2006
116 minutes
DVD gives overview of how the road and environment interact with each other. Introduction to maintenance of low volume roads highlights issues that benefit from proper maintenance activities, including water temperature, fish habitat and aggregate surfacing loss.

PA-161 Public Works Outreach Toolkit
APWA 2003
6 minute outreach video & guide
3 PARTS: A video entitled "Everyday Heroes" emphasizing the everyday role of public works professionals on our quality of life, a 30 second public service announcement for use by local public service agencies or short intros at outreach presentations, and a how-to-guide to help plan outreach.

ST-211 Identifying Meth Lab Waste
USDOT & Colorado DOT 2004
8 minutes
CDROM is intended for adopt-a-highway volunteers. Meth lab waste found on the side of highways is becoming more common and contamination could lead to death or hospitalization. One inhalation of what's known as a "death bag" can lead to instant hospitalization and permanent scarring of the lungs. Cautions are emphasized and instruction given if injury occurs.

ARE MARKED CROSSWALKS SAFER ?

www.bikepedimages.com/Bruce Nesbitt

Santa and his reindeer crossing at the Paul Dudley White Bike Path, Charles River, Boston, MA

Reprinted with permission of the Kansas LTAP center from the KUTC Newsletter Winter 2006 issue. Source: *Safety Effects of Marked Versus Unmarked Crosswalks at Uncontrolled Locations*, FHWA HRT-04-100, Washington, DC, September 2005 and available at: http://www.walkinginfo.org/pdf/r&dsafetyeffects.pdf

Marked crosswalks are thought to increase the visibility and, therefore, safety of pedestrians crossing a street. But do they in every case? This article will share the results of The University of North Carolina's study to determine whether marked crosswalks increase or decrease pedestrian safety at uncontrolled crossings. Uncontrolled crossings are locations without a traffic signal or stop sign controlling traffic approaches.

Study Objective and Methods

The five year study, commissioned by the FHWA compared pedestrian crash data at marked crosswalks and unmarked crossing areas from 1994-1999. Data were collected in 2,000 sites (half of them marked) in 30 cities across the United States. Each marked crosswalk was compared with a nearby unmarked crossing area. Many of the study's marked and unmarked crosswalks were at opposite sides of the same intersection. Data were not collected at school crossings.

Detailed data were collected on traffic volume, pedestrian exposure, number of lanes, median type, speed limit, and other size variables. Cause of crash was also examined (Figure 1). To compare safety between marked and unmarked crosswalks, the data collected were extrapolated to model pedestrian crash rates per million of pedestrian crossings.

The Results

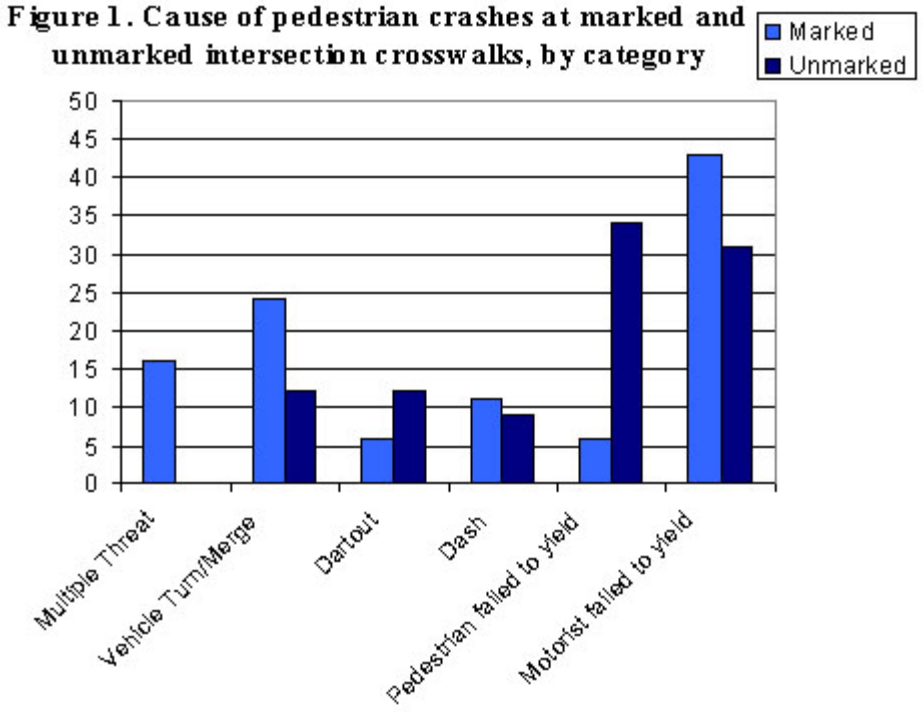
The study found that there was no difference in pedestrian safety between marked and unmarked crosswalks at uncontrolled locations under the following conditions:

- two-lane roads;
- multilane roads without raised medians and average daily traffic volume below 12,000;
- multilane roads with raised medians and average daily traffic volume below 15,000.

Surprisingly, there was a significant *increase* in crashes on roads with marked (versus unmarked) crosswalks under the following conditions:

- multilane roads without raised medians and average daily traffic

Figure 1. Cause of pedestrian crashes at marked and unmarked intersection crosswalks, by category



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volume above 12,000;

- multilane roads with raised medians and average daily traffic volume above 15,000.

Speed, Lanes, Type of Markings

After controlling for factors such as pedestrian and traffic volume, speed limit was not found to be related to crash frequency. However, the authors point out that because 93 percent of study sites had speed limits 25 to 35 mi/h, the lack of association between vehicle speed and crash frequency may be due to lack of speed limit variation in this study.

Multilane crossings had higher crash rates than two-lane crossings. For both marked and unmarked multilane crossings, those with raised medians or raised crossing islands had lower pedestrian crash rates than multilane crossings without them.

Type of crosswalk marking pattern (parallel lines, zebra stripes, etc.) had no effect on pedestrian crash rate.

MUTCD Guidelines

The Manual on Uniform Traffic Control Devices (MUTCD) does not give specific guidelines (such as pedestrian or traffic volume thresholds) for when marked crosswalks should be used at uncontrolled crossings. Instead, its guidance includes:

- Crosswalk width should not be less than 6 feet;
- Crosswalk markings should be provided at points of pedestrian concentration, such as at loading islands, midblock pedestrian islands,and/or where pedestrians need assistance in determining the proper place to cross the streets.

Crosswalk-related Web resources

http://mutcd.fhwa.dot.gov/ ***The Manual of Uniform Traffic Control Devices***

http://www.walkinginfo.org **Comprehensive site on pedestrian issues**

http://safety.fhwa.dot.gov/ped_bike/ped/index.htm **A FHWA site with resources and guidance on pedestrian topics**

The *MUTCD* also says "Crosswalk lines should not be used indiscriminiately. An engineering study should be performed before they are installed at locations away from traffic signals or STOP signs."

Study Conclusions

The study's report says that "under no condition was the presence of a marked crosswalk alone at an uncontrolled location associated with a significantly lower pedestrian crash rate compared to an unmarked crosswalk." This finding makes a strong argument for not spending funds to simply mark crosswalks to try to improve safety at uncontrolled intersections. However, the report also says that marked crosswalks are appropriate in a few cases (e.g. selected low-speed, two-lane streets at downtown crossing locations).

The study also states that measures such as installing pedestrian refuge islands and reducing street crossing distance with chicanes might be considered instead or along with crosswalk markings. The effectiveness of a marked crosswalk increases when coupled with these improvements.

The report contains a detailed table (Table 11, page 54 of report) that provides guidance on whether an uncontrolled location might be a candidate for a marked crosswalk--alone or with other improvements.

The study's report also recommends that parking be set back from the approach to uncontrolled crosswalks by 20-50 feet depending on the posted speed, to improve vision between motorists and pedestrians.

www.pedbikeimages.org/ITE Pedestrian Bike Council

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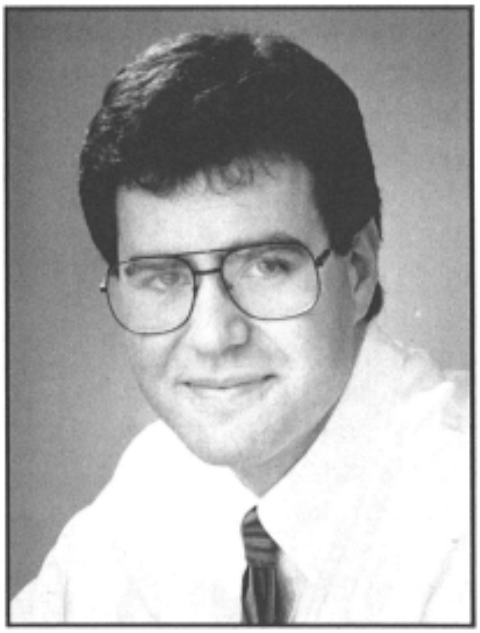
Founding meeting of the Baystate Roads Advisory Committee on May 4, 1987. Richard Tracy, Richard Buser, John Collura, Meryl Mandell, Matthew Turo, Charles Reavey, Paul Shuldiner, Gerard Daigle, and Edward Bates (left to right)

Baystate Roads takes off with Meryl Ann Mandell

Silvio Baruzzi grabs the wheel



Chris Ahmadjian sees the big picture through those big frames

When I applied for the manager's position, Paul wanted to hire someone else, but Sue Lee intervened because she thought I was a better fit. I don't think Paul has regretted making that choice. I will have been with the MA LTAP for 14 years in November 2006 and still enjoy the job.

It is amazing at how the Program and, for that matter, the field of public works have matured . When I started, newsletter layout was done on a table with paper, glue and scissors. Few public works departments had computers and few people imagined that they would later sign up for classes on a web site. In Western Massachusetts some of the highway superintendents were still farmers who took the job on as a part-time activity.

Anti-icing, storm water I or II, traffic calming, roundabouts, GASB34 and Intelligent Transportation Systems (ITS) were not words in anyone's vocabulary. Highway superintendents are now clearly professionals who deal with complex issues that often have no easy solutions. This image has been enhanced by GASB34 and the realization by most municipalities that roadway infrastructure is their largest town asset and that it must be properly maintained.

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The next steps for the Program will be:

- Emphasis on the use of pavement preservation methods to lower costs and extend the life of existing pavements,
- Rigorous inspection of new pavements to insure that communities get what they pay for,
- Use of pavement management to plan for the future, and
- Development of presentation and leadership skills to help sell the plan to others.

We will also closely watch technological innovation and for ways that it can increase productivity and make your jobs easier.

We are all looking forward to the next 20 years and can only imagine the changes that will take place and what public works and this Program will look like then. And, of course, we will always be gathering around the next great cake.

Chris Ahmadjian, Program Manager

in this issue

The Baystate Roads Program, which publishes *Mass Interchange* each quarter, is a Technology Transfer (T2) Center created under the Federal Highway Administration's (FHWA) Local Technical Assistance Program (LTAP). This newsletter is prepared in cooperation with The Executive Office of Transportation (EOT) and the United States Department of Transportation Federal Highway Administration. FHWA is joined by EOT, UMass Transportation Center at the University of Massachusetts/Amherst, and local public works departments in an effort to share and apply the best in transportation technologies.

In addition to publishing *Mass Interchange*, the Baystate Roads Program facilitates information exchange by conducting workshops, providing reports and publications and videotapes on request, and offering one-to-one technical assistance on specific roadway issues. Because the program relies on input from many sources, inquiries, articles, and ideas are encouraged.

LTAP Local Technical Assistance Program

To contact the Baystate Roads Program call (413) 545-2604 or FAX 413-545-6471.

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