technotes

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Spotlight: Anne Arundel County Department of Public Works

Making a mark using mobile technology and setting the stage with ACS

Written by Carly Keane and Greg Africa

During a recent MD T2 Advisory Board meeting topics such as Adaptive Signal Control and mobile technology were discussed. Greg Africa, Deputy Director of Anne Arundel County's Department of Public Works shared some of his recent project successes. Here's what they did.

Mobile Technology Applications

In addition to laptops and 800 Megahertz radio communications, the Bureau of Highways management are equipped with Blackberry smart phones. The use of smart phones enhances the communications and information for supervisors during emergencies, inclement weather operations and daily customer service delivery. Mobile applications and smart phone tools enable the supervisor to be more effective in the field by having precise real-time data at their fingertips.

There are over 11,000 road segments in Anne Arundel County. The Road Query Application is expected to be the workhorse tool of the bureau given its user friendliness and easy accessibility. This application was developed in-house and provides information about the roads and associated roadway assets in Anne Arundel County. This application can geolocate any County-maintained road segment in the County and display it in map or satellite view. The user can also drill down and look up detailed road segment inventory information such as:

- End points;
- County road segment number, and state road number;
- City, zip code, subdivision, road district, councilmanic district, ownership, and date accepted into county inventory (if applicable);
- ADC map and GIS grid locations;
- Center line length, pavement width, ROW width, road type, and road functional classification; and
- Historical comments and notes, such as deed and easement information.

If the road segment is County owned or maintained, the user can look up the road segment's pavement condition report information such as:

- Rehabilitation history and cost, such as: pavement composition, latest rehabilitation date, latest rehabilitation type, fiscal year budget, current status, contract information, construction conflicts, rehabilitation cost, and construction notes;
- Overall ratings, such as: current pavement rating, maintenance needed, inspector notes, drainage deficiencies, and traffic volume;
- Detailed pavement ratings, such as: ride quality, potholes, alligator cracks, longitudinal cracks, rutting, transverse cracks, shrinkage cracks, raveling, polished aggregate, corrugations, shoving/pushing, bleeding and comments;
- Curb, gutter and sidewalk conditions, such as: ratings, composition, type and comments;
- Guardrail: length and comments.

Continued on page 4

MARYLAND TRANSPORTATION TECHNOLOGY TRANSFER CENTER

Local Technical Assistance Program (LTAP)
University of Maryland at College Park

www.mdt2center.umd.edu

INSIDE:

Innovation Helps Maryland Bridges in Time for School

Using innovation and accelerated construction techniques enabled the Maryland State Highway Administration to replace two bridges on bus routes while school was out for the summer and save money in the process.

The project, which received a Highways for LIFE grant for its innovation, used prefabricated bridge elements, incentive contracting and full road closures with detours to speed construction. As a result, the job was done in three months, two of which involved summertime full road closures, instead of the 15 months required for traditional construction techniques, according to a Federal Highway Administration report on the project, Bridge Replacement on MD 28 and MD 450, Frederick County and Anne Arundel County, Maryland.

An economic analysis found that the innovative project saved about $1.49 million, or 32 percent, over the cost of a similar project using conventional construction practices. A significant amount of the cost savings was reduced safety costs resulting from the use of full road closure—an approach designed to eliminate the exposure of motorists to work zones and workers to traffic by temporarily closing a road for rehabilitation or maintenance. Highway agencies have found that full road closures are an effective way to expedite delivery of projects, including another Highways for LIFE project to reconstruct part of Trunk Highway 36 in North St. Paul, Minn.

Precast slabs and other innovations helped the Maryland SHA cut construction time and enhance quality on a bridge replacement project.

Improved Safety and Quality

"This project achieved a high level of quality and was brought to completion quickly and safely as a direct result of innovative contracting and construction methods," the report said. "Many of the innovations employed were validated as a result of the many experiences gained through this project."

No motorist incidents or worker injuries were reported at either site during construction, which means the project exceeded the Highways for LIFE goals for motorist and worker safety. Over time, the project is expected to meet the goal of a 20 percent reduction in motorist fatalities and injuries, both because of the use of safer, more durable bridge surfaces and less need to access the bridges for future maintenance.

The most significant measure of quality improvement for the two 80-year-old, structurally deficient bridges was the visible improvement in structural adequacy and maintainability. Precast, prestressed portland cement concrete slabs fabricated off site and shipped to the project sites provided a high-quality road surface and diminished need for future maintenance of the replaced structures.

Lessons Learned

To minimize both project costs and variability in quality and process, the project involved a single contract awarded to one low bidder to build both bridges concurrently. Prompt completion was assured by incentive and disincentive clauses for on-schedule performance. Contract administration, however, was a challenge for the Maryland SHA because the project sites were located in different districts. In the future, according to the project report, the agency may assign one district to manage combined projects.

Continued on page 3

Innovation Helps Maryland Bridges in Time for School

(continued from page 2)

The agency realized many benefits from the use of full road closures, including increased safety and decreased construction and curing time for major construction. "Any time you can construct a project with a detour in place, it is a benefit," said Jeff Robert of the Maryland SHA. "This creates a safer situation for construction workers and the traveling public and allows the work to be done quicker."

Because of the construction time savings generated by the use of prefabricated superstructure elements, the agency is investigating the use of precast substructure elements to further minimize construction time and traffic impacts on future projects. "These projects performed within the Highways for LIFE program served as effective stepping-stones to better, more efficient construction methods," the report said.

To read the Maryland, Minnesota and other technical reports on Highways for LIFE demonstration projects, go to www.fhwa.dot.gov/hfl/summary/projects_summary.cfm.

Let us Help You Save Money!!

Check out these courses for helpful cost saving tips:

Introduction to Temporary Traffic Control
July 23rd: a one-day course designed to give participants a complete overview of traffic control in work zones, including applicable standards, devices used, component parts and their requirements, and installation/removal considerations.

Highway Capacity Interrupted Flow
July 24th: This one-day course will cover the theory and methodology of the 2010 Highway Capacity Manual for interrupted flow.

Techniques for Reducing Construction and Maintenance Costs
October 16-17th: It is essential to conserve resources, find energy efficient and low maintenance materials and to use more efficient techniques. This workshop will conclude with groups of participants developing a cost control plan for a project.

Check out all our current courses on pages 5-7.

This article was reprinted from the November/December 2011 (Issue 27) of INNOVATOR, a publication of the United States Department of Transportation and Federal Highway Administration.

CITE Blended Courses for 2012

The Consortium for ITS Training and Education (CITE) announces its Blended Course schedule for 2012. A "blended" course combines the best features of both instructor-led and web-based instruction. Features include: live discussions through the use of conference calls, convenient, flexible web-based learning, a specific time schedule in which to complete the course, and student interaction through the use of a discussion board.

Scheduled courses include:

- Introduction to Systems Engineering, September - October 2012
- Traffic Signal Timing, September - October 2012
- Road Weather Information Systems (RWIS) Equipment and Operations, October - December 2012

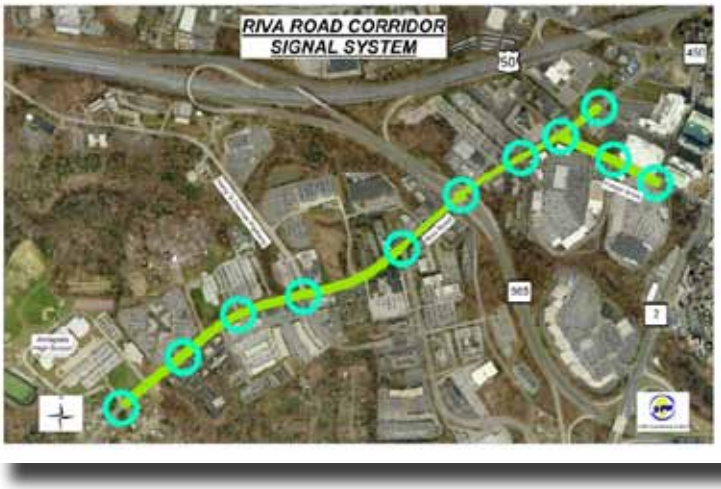
For more information about or to register for CITE's Blended Courses visit: www.citeconsortium.org

Planned upgrades to the Road Query Application include additional data layers that will display:

- Topographic lines;
- Property lines;
- Traffic signal, pavement markings and road sign inventory and condition report;
- Closed storm drain and culvert system inventory and condition data; and
- Storm water management pond and best management practices inventory and condition data.

Adaptive Signal Control – Riva Road Corridor

Congestion has increased along Annapolis' Riva Road in recent years. It was not uncommon to have bumper-to-bumper traffic from MD 665 to the County's Heritage Office Center in the northbound direction during evening rush hours. Given the difficulty and expense of adding additional capacity on the roadway itself, the County looked for a way to improve the efficiency of the corridor's signal system.



The Federal Highway Administration (FHWA), in partnership with Siemens, the University of Arizona, and Purdue University, developed a new software package, ACS Lite, for use on arterial corridors. It is a modification of Adaptive Control Software (ACS) developed for larger, complicated grid systems of signals. ACS Lite interacts with intersection controllers, monitoring real-time traffic flow and updating the signal timing on a cycle-by-cycle basis. In essence, it reallocates green time from under used movements to crowded movements. The system includes 11 intersections along Riva Road and Forest Drive.

The cost of the engineering design, software, and hardware upgrades to existing signal controllers was $141,200. A Congestion Management/Air Quality grant of $112,960, administered by the Baltimore Metropolitan Council, paid for 80 percent of that cost. The County funded the remaining 20 percent and used its forces to install the equipment. A separately planned upgrade of the County's fiber-optic network was coordinated to provide needed communication links.

Traffic studies were performed along the Riva Road corridor before and after the system was installed in late 2010. Overall, the new system has reduced travel time by 8 percent and total delay by 26 percent in the corridor. The most dramatic improvements have occurred on northbound Riva Road during the evening rush hour, with delay reductions of 82 percent saving commuters over one minute per vehicle, or 70 hours of travel time each day during the three hour evening peak period alone.

Anne Arundel County is working on a second location, along Forest Drive, for the application of the ACS technology. This section of Forest Drive underwent major widening in 2011. At that time, the installation of fiber optic infrastructure was included in the widening project to anticipate the application of ACS technology to maximize the more efficient flow of traffic.

Are you improving operations?
Tell us what you're up to
so we can share your story!

Our Currently Scheduled Courses

The following courses are currently scheduled and we are still adding to the list! For more information or to schedule a class, contact Janette Prince at 301.403.4623 or register online by visiting us at www.mdt2center.umd.edu.

FLAGGER CERTIFICATION

Juan Morales
June 19, 2012, 8:30am – 12:30pm
College Park, Maryland
$100 for all participants
PDHs: 4.0

The safety of workers, motorists and pedestrians is dependent upon the flaggers' performance. Since the flagger position involves safety, proper training is vital; flaggers are expected to pass a test to prove their proficiency and competence level. A MD SHA-approved ATSSA (American Traffic Safety Services Association) flagger card will be issued upon satisfactory completion of this course. This will be valid for 4 years and is acceptable in several states, including MD, VA and DC. The class is presented in PowerPoint© and will include a 25-question multiple choice exam and a flagger demonstration (dexterity test). Students will receive their ATSSA Flagger Certification card the day of the course (upon passing the exam).

THE NEW MD MUTCD 2012

Dane Ismart
June 20, 2012, 8:30am - 4:00pm
Hagerstown, Maryland
This is a FREE course
PDH: 6.0

This one-day training is to enable participants to become familiar with the new MD MUTCD regarding the application of its principles to their traffic control devices in Maryland. As of February 3rd, 2012, the new Maryland Manual on Uniform Traffic Control Devices (MDMUTCD) has been officially adopted by the State of Maryland. The workshop is open to representatives of all traffic engineering and planning organizations and elected officials. Part of the workshop is also geared towards Local Administrators and Elected Officials. Agenda will include compliance days for new and existing traffic control devices, new sections within various chapters of the manual, other changes in standards and guidance, procedure for experimentation and interpretation, etc.

SIGNAL WARRANT AND INTERSECTION CONTROL ANALYSIS

Dane Ismart
June 25, 2012, 8:30am – 4:00pm
College Park, Maryland
$110 for Maryland local government participants
$120 for Maryland state government participants
$135 for all other participants
CEUs: 0.6
PDHs: 6.0

This one-day course will cover the eight MUTCD signal warrants:

- Warrant 1: Eight-Hour Vehicle Volume
- Warrant 2: Four-Hour Vehicle Volume
- Warrant 3: Peak Hour
- Warrant 4: Pedestrian Volume
- Warrant 5: School Crossing
- Warrant 6: Coordinated Signal System
- Warrant 7: Crash Experience
- Warrant 8: Roadway Network

The course will also cover warrants for four-way stops as well as alternatives to traffic control signals. A detailed discussion of the advantages and disadvantages both in the terms of capacity and safety of various types of traffic controls will be presented. The basis for both the installation and the removal of traffic control devices will be covered. As part of the course, workshop problems will be given to the class participants. The class will be provided intersection field data and will determine if signals are warranted for the sample intersections. After completing the workshops, MUTCD signal warrant analysis software will be demonstrated and the workshop problems will be evaluated based on microcomputer analysis. This course is designed for traffic engineers and transportation planners involved in the design and planning of corridors and intersections.

INTERSECTION AND ARTERIAL SAFETY DESIGN ANALYSIS

Dane Ismart
July 16-17, 2012, 8:30am – 4:00pm
College Park, Maryland
$199 Maryland local government participants
$215 for all other participants
CEU's: 1.2
PDHs: 10.2

This course will have broad general coverage of at-grade intersection analysis and design features. The analysis will include signalized, unsignalized and roundabout intersections. Specific coverage will include capacity, analysis, signal warrants, queue analysis and safety selected design features. Software packages such as HCS and SIDRA will be demonstrated. This course is targeted for municipal engineers; public works directors; state, federal, and private engineers; planners, designers, and traffic engineers that may be involved in the selection and design of intersections.

ASPHALT RECYCLING

Ed Stellfox
April 12, 2012, 8:30am – 12:30pm
College Park, Maryland
$59 for all participants
PDHs: 4.0

This course discusses the advantages of asphalt recycling as part of your road maintenance program. It covers techniques for recycling asphalt pavement, including surface recycling, hot mix recycling (both in plant and on-site), and cold mix recycling. The course emphasizes cold mix recycling, full depth reclamation, reviewing materials, equipment and operations. It also presents recent examples of asphalt recycling projects in several states. The following topics will be discussed: advantages; review of techniques -materials, equipment, and operations for surface recycling, hot-mix recycling, cold-mix recycling, and full depth reclamation.

INTRODUCTION TO TEMPORARY TRAFFIC CONTROL

Juan Morales
July 23, 2012, 8:15am - 4:00pm
College Park, Maryland
$100 for Maryland local government participants
$120 for all other participants
PDHs: 6.0

An introductory course to temporary traffic control in work zones, TCC is a one-day course designed to give participants a complete overview of traffic control in work zones, including applicable standards, devices used, component parts and their requirements, and installation/removal considerations.
This is intended for anyone whose actions affect safety on temporary traffic control work zones, including traffic managers, traffic technicians, inspectors and designers; and will prepare participants to take the Maryland SHA Traffic Manager's course. The following topics will be covered: definition of temporary traffic control (TTC), quantification of the safety problem, manuals and standards applicable in the State of Maryland, fundamental principles of TTC, component parts of the TTC, introduction to traffic control devices, tapers and other transitions, and installation and removal considerations.

HIGHWAY CAPACITY INTERRUPTED FLOW

Dane Ismart
July 24, 2012, 8:30am – 12:30pm
College Park, Maryland
$105 Maryland local government participants
$120 for all other participants
CEU's: 0.6
PDHs: 6.0

This one-day course will cover the theory and methodology of the 2010 Highway Capacity Manual for interrupted flow. The Chapters that will be covered include: Signalized Intersections, Unsignalized Intersections (A) Two-Way Stops (B) Four Way Stops, and Urban Arterial. Changes in each of the interrupted Chapters of the 2010 Highway Capacity Manual will be highlighted during the lectures. The Highway Capacity Software will be demonstrated to the class using sample problems. The new roundabout capacity procedure is covered under a separate course.

BASIC DRAINAGE

Ed Stellfox
July 31, 2012, 8:30am - 3:30pm
College Park, Maryland
$89 for all participants
PDHs: 6.0

This course emphasizes the importance of good drainage with discussions of water and its effects on roads, problems caused by improper drainage, and ways to handle these problems. It covers types of drainage facilities, ranging from ditches, culverts, subdrains, inlets and end structures. Their uses, materials, installation and maintenance as well as erosion control are addressed. It also introduces geosynthetic drainage applications. The following topics will be covered: importance of drainage, characteristics of water, system maintenance, drainage principles, surface and subsurface drainage, ditches, driveways, drainage culverts – materials and placement, headwalls, endwalls and inlets, erosion control, and geosynthetics in drainage.

ASPHALT RESURFACING

Ed Stellfox
August 2, 2012, 8:30am – 12:30pm
College Park, Maryland
$59 for all participants
PDHs: 4.0

This course reviews the various asphalt mixes, their components and their uses. Asphalt resurfacing procedures are covered, including preparation, material, equipment, operation and safety. Special emphasis is placed on proper rolling and compaction of the asphalt overlay. Superpave mix design is discussed as well.
Municipal officials, road commissioners, supervisors, and superintendents; public works and maintenance personnel; equipment operators; and city or town managers are encouraged to attend.

TRAFFIC SIGNS

Ed Stellfox
August 23, 2012, 8:30am – 12:30pm
College Park, Maryland
$59 for all participants
PDHs: 4.0

This half-day course will cover the regulations and guidelines for traffic signs including; regulatory signs, warning signs, and guide signs. A review of the Manual on Uniform Traffic Control Devices (MUTCD) will also be covered. An in depth discussion of sign examples, installation and maintenance, as well as sign management will be covered.

ASPHALT ROADS - COMMON MAINTENANCE PROBLEMS

Ed Stellfox
August 28, 2012, 8:30am - 12:30pm
College Park, Maryland
$59 for all participants
PDHs: 4.0

Municipal employees with road maintenance responsibilities should understand the causes of common maintenance problems on asphalt roads and be familiar with proper repair materials and methods. This course discusses causes and repair procedures for common problems such as cracking, potholes, rutting, corrugations, etc. The procedures cover materials, equipment, and techniques for lasting repairs. Also included, a brief discussion of surface treatment.

PREVENTIVE PAVEMENT MAINTENANCE

Ed Stellfox
September 13, 2012, 8:30am - 3:30pm
College Park, Maryland
$89 for all participants
PDHs: 6.0

Learn about seal coats, slurry seals and micro surfacing - This course is the first step in making your asphalt pavements last longer at lower costs. The course covers preventive maintenance treatments such as chip seals, slurry seals, and micro-surfacing and discusses when and where each technique could be effective. It presents application methods, including preparation, materials, equipment, operations and safety, along with practical tips on how to avoid trouble. This course is open to municipal officials, road commissioners, supervisors, and superintendents; public works and maintenance personnel; equipment operators; and city or town managers.

CONSTRUCTION MATHEMATICS

Ed Stellfox
September 20, 2012, 8:30am - 3:30pm
$89 for all participants
CEUs: 0.6
PDHs: 6.0

Construction inspectors may need to brush up on math skills specifically related to construction inspection, especially basic geometry, fractions, area, volume and conversions. The class lead by Ed Stellfox is a good refresher, and excellent preparation for the construction inspection class. The course was designed for road workers, foremen, superintendants, construction inspectors and supervisors in need of a refresher, especially in preparation for the Construction Inspections class. Depending on the interest of the participants, the course may cover: whole number and fractions, decimals (for measurement and payment), mixed operation fractions and decimals, formula evaluation, techniques of algebra, ration and proportion, percentage, hints for problem solving, useful formulas, square and square roots, conversion, and transportation construction examples.

TECHNIQUES FOR REDUCING CONSTRUCTION AND MAINTENANCE COSTS

Ed Stellfox
October 16-17, 2012; day 1 8:30am - 3:30pm, day 2 8:30am - 12:30pm
$99 for all participants
PDHs: 10.0

Counties and municipalities bear a considerable financial burden with respect to the construction and maintenance of roadways. Inflation, increasing cost of labor, materials and fuel have risen steeply in the past few years. At the same time, municipal budgets have not kept pace. It is essential to conserve resources, find energy efficient and low maintenance materials and to use more efficient techniques. This workshop will conclude with groups of participants developing a cost control plan for a project.

WINTER MAINTENANCE

Ed Stellfox
November 8, 2012, 8:30am - 3:30pm
$89 for all participants
PDHs: 6.0

This course covers all aspects of winter operations- planning and organizing, methods of snow and ice control, salt usage, and winter equipment maintenance. Instructed by Ed Stellfox this lesson will include usage of snow maps, formal snow plans, snow plow and salt spreader operation. This course in intended for municipal officials, road commissioners, supervisors, superintendents, publics works and maintenance personnel, equipment operators, and city or town managers.





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