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technotes

MD T² CENTER

MARYLAND TRANSPORTATION TECHNOLOGY TRANSFER CENTER

LOCAL TECHNICAL ASSISTANCE PROGRAM (LTAP)

University of Maryland at College Park

INSIDE

T² Program Manager explains the LTAP/T² program to Maryland's Governor Martin O'Malley at the Maryland Municipal League convention in Ocean City

T² Center Exhibits At The Maryland Municipal League's 2007 Convention In Ocean City, MD

Ed Stellfox, Ocean City, MD — Hundreds of city and town officials from throughout Maryland gathered June 24-27, 2007 at the Convention Center in Ocean City, Maryland to learn about and discuss municipal issues, to network with their fellow city and town officials, and to enjoy socializing at the Maryland Municipal League's annual convention. MML's 2007 convention theme, "Communities United Succeed," focused on how cities and towns come together to achieve mutual goals and solve common problems in day-to-day routines and in time of emergencies. Everyone benefits when municipal officials work together to shape their communities and solve problems. This is a theme that is reinforced when we present our training programs where attendees usually share experiences from the real world leading to a better understanding of the topic and linking them with their "neighbors" from across the state.

LaJeune Stover (Administrative Assistant) and I attended and worked the T² booth on "Municipal Main Street" along with several dozen Municipal Exhibits from BelAir through Crisfield. There were also 200 plus booths in the main exhibit hall. Exhibitors displayed a wide array of products and services including computers, wireless technology, engineers, GIS systems, financial services, insurance, lighting, ordinance codification, recreation and parks equipment, water and wastewater supplies and consultants. The main draw for my road worker friends however was the public works equipment and vehicles. We were happy to meet the many attendees who stopped at the booth to ask what our program was all about. An especially welcome visitor was Maryland Governor Martin O'Malley who stopped by shortly for an explanation of our services. As always, the convention was a major success as well as a pleasurable experience for all.

Full-Depth Reclamation Using Cement
(Recycling Roads Saves Money and Natural Resources)

By Barry Wilder, Southeast Cement Association

Deteriorating roads are a constant problem for cities and counties. That's why engineers and public works officials are turning to a process called full-depth reclamation (FDR) with cement. This process rebuilds worn out asphalt pavements by recycling the existing roadway. The old asphalt and base materials are pulverized, mixed with cement and water, and compacted to produce a strong, durable base for either an asphalt or concrete surface. There's no need to haul in aggregate or haul out old material for disposal. Truck traffic is greatly reduced, and there is little or no waste. FDR recycles the materials from deteriorated asphalt pavement, and, with the addition of cement, creates a new stabilized base. A surface consisting of a thin bituminous chip seal, hot-mix asphalt, or concrete completes the rebuilt road. The recycled base will be stronger, more uniform, and more moisture resistant than the original base, resulting in a long, low-maintenance life. And most important, recycling costs are normally 25 to 50 percent less than removal and replacement of the old pavement.

Full-depth reclamation using cement can cut costs up to 50% and will increase longevity of roads.

FDR with cement recycles existing asphalt pavements and aggregate bases to create a thicker pavement structure and a longer lasting base.

Material Conservation: A Wise Choice

FDR with cement conserves virgin construction materials and makes smart economic and strategic sense. If old asphalt and base materials are not recycled, they must be disposed of or stockpiled, increasing transportation costs and utilizing valuable landfill space.

FDR with cement makes the reconstruction of old roads a largely self-sustaining process. The original "investment" in virgin road materials becomes a onetime cost, which is reclaimed through cement stabilization and the addition of a new, thin surface course.

Design and Construction: Simple and Fast

The complete recycling process can be finished in one day, and traffic can be maintained throughout construction. The procedure includes the following steps:

Site Investigation: The site should be investigated to determine the cause of failure. Core samples or test holes should be used to determine layer thicknesses and to obtain samples of the material to be recycled. Material sampling should include the asphalt surface, base course aggregate, and subgrade soil.

Thickness Design: Pavement thickness can be determined by using Portland Cement Association's Thickness Design for Soil-Cement Pavements. Other methods, such as the American Association of State Highway and Transportation Officials' Guide for Design of Pavement Structures can also be used.

Laboratory Evaluation: Material samples from the site should be pulverized in the laboratory to create an aggregate-soil mix that will be similar to that expected from the reclamation process. The mix design procedure is the same as that performed for soil-cement. This includes the determination of maximum dry density and optimum moisture content. Pulverization Construction begins with pulverizing the existing asphalt pavement using equipment that resembles a large roto-tiller. The depth of pulverization is usually 6 to 10 inches (150 to 250 mm), which on secondary roads will typically include all of the surface and base, plus some part of the subgrade.

Shaping and Grading

The pulverized material is shaped to the desired cross-section and grade. This could involve additional earthwork in order to widen the roadway. Final base elevation requirements may necessitate a small amount of material removal or addition. FDR with cement recycles existing asphalt pavements and aggregate bases to create a thicker pavement structure and a longer lasting base. Core sample taken from FDR project.

Spreading Cement

A measured amount of cement is spread either in dry or slurry form on the surface of the shaped roadway.

Water Application

Water is added to bring the aggregate-soil-cement mixture to optimum moisture content (water content at maximum dry density as determined by ASTM D558).

Mixing

The aggregate-soil-cement-water mixture is combined and blended with the pulverizing/mixing machinery. More than one pass of the mixer may be required to achieve a uniform blend of materials.

Compaction

The mixture is compacted to the required density of at least 96 percent of standard Proctor density (ASTM D558). The compaction is usually performed with vibratory rollers. A pneumatic-tired roller may follow to finish the surface. Final compaction should take place no more than two hours after initial mixing of the cement. The

cont. on page 6

One traffic engineering challenge is to provide safe and efficient travel for motor vehicles, bicycles, and pedestrians within the constraints of our built environment.

THE WORLD OF A TRAFFIC ENGINEER

By Bradley Dicola

Traffic engineering includes a wide array of topics and issues, many of them very close to home to the everyday citizen. It is not always understood, however, what exactly a traffic engineer does. Traffic engineering exists within the larger context of transportation engineering. Transportation engineering deals with the planning and design of all transportation systems, including air, rail, water, and roadway. This may include the design of airports, ports and harbors, canals, rail lines, transit systems, roadways, and multi-use paths. Traffic engineering provides for safe and efficient movement of pedestrians, bicycles, and motor vehicles. This is done through traffic signals, signs, and markings. Similar positions that may overlap with traffic engineers include traffic and transportation planners and highway engineers. (Note that the title of traffic engineer and highway engineer are often interchanged with one another, depending upon the nature of the work and the organization of the agency.)

According to the Institute of Transportation Engineers Yearbook, traffic engineering is defined as follows: Traffic Engineering is that phase of engineering which deals with the planning, geometric design, and traffic operations of roads, streets, and highways, their networks, terminals, abutting lands, and relationships with other modes of transportation for the achievement of safe, efficient, and convenient movement of persons and goods. This definition provides an idea of the diversity of topics and disciplines in which the traffic engineer is involved — everything from safety studies to intersection improvements to congestion relief. The role that traffic engineers play in the operation of our transportation system is vital to national mobility, economic growth, and traffic safety. Traffic engineers everywhere face new challenges, as it becomes more difficult to add capacity by way of additional roadway construction. Traffic operations solutions, including intelligent transportation systems (ITS), need to be utilized to provide the continued efficient movement of goods and people.

Safety

Safety is a priority for every traffic engineer. Traffic engineers are concerned with signs, markings, and signals; establishing speed limits; and evaluating sight distance — just to name a few of the areas. Traffic engineers also evaluate troublesome roadway locations, analyze crash histories, and evaluate countermeasures to improve safety.

Traffic Operations

Traffic engineers are also heavily involved in traffic operations, which focuses on making roadways more efficient. By studying traffic operations, traffic engineers can develop signing, marking, and signaling schemes that allow traffic to flow more effectively. As traffic engineers become more knowledgeable about traffic patterns, vehicles move more smoothly, and congestion is reduced or eliminated without constructing more roads. Traffic operations are particularly important in urban areas that are facing congestion problems and find it cost-prohibitive to construct new capacity. Traffic operations includes the effective design and maintenance of traffic signals and signal systems, as well as the implementation of ITS technologies to provide for better traffic flow and transportation system utilization. The core goal of traffic operations analysis is to maximize the safe movement of vehicles through the existing roadway network in the most efficient manner possible.

Planning

Planning is another area of involvement for traffic engineers. Quantifying the current state of the roadway system is important to determining potential future needs in the transportation network. Traffic engineers are often responsible for making sure that speed, volume, crash, and other data are continuously collected and properly documented. The data collected serves as an important factor in determining the need for new projects and their priority in funding. Traffic engineers also assist planners in determining the traffic impacts of new development. Traffic engineers face a wide variety of challenges and must be familiar with several different fields of work such as traffic law, driver psychology, and human perception. The ability to perform these tasks well is important to the efficiency and safety with which goods and people travel.

How Can Traffic Engineering Expertise Benefit Locals

Most West Virginia municipalities do not have a traffic engineer on staff, yet are faced with issues such as traffic congestion, lack of parking, and troublesome intersections. Municipalities often get calls from citizens complaining of speeding vehicles and high traffic volumes in their neighborhood. A traffic engineer can help the municipality by setting out traffic recorders to gather speed and volume data and analyzing the information collected. Another request that municipal street departments get is request for stop signs. Often the public and city council request the installation of stop signs, thinking that they are the solution to speeding problems. A traffic engineer can help determine if indeed a stop sign is the best option or if other alternatives should be used.

Many West Virginia towns and cities are not designed to be both pedestrian and motorist friendly. Hilly terrain, narrow streets, and narrow sidewalks or lack of sidewalks are just a few of the challenges faced by motorists and pedestrians. A traffic engineer can help assess the situation and suggest ways to accommodate motorized and non-motorized modes.

The WV LTAP is fortunate to have a traffic engineer on staff and is available to provide on-site technical assistance to your community. Please contact us if we can be of assistance.

TYPICAL ACTIVITIES OF A TRAFFIC ENGINEER

1. Conducting traffic impact studies, including conducting traffic counts and analyzing data
2. Designing roadway intersections and parking lots
3. Determining feasibility and best practices for traffic calming devices
4. Analyzing crash data, determining causes of crashes and selecting countermeasures
5. Enhancing traffic operations

SHOULDER MAINTENANCE: DON'T DEFER IT

By Stephanie R. Fishman, Project Assistant, Technology Transfer Center, University of New Hampshire

In the rush to complete projects before winter, some municipalities may have postponed shoulder work. However, deferral can result in shoulders that don't serve their purposes, which are just as important through the winter as they are the rest of the year. Those purposes are to:

- Provide side support to the pavement.
- Drain water away from the pavement into ditches.
- Provide a safe area for emergency use by vehicles.

While best completed in autumn, some shoulder work can be performed in winter, barring a long spell of sub-freezing, snowy weather. If the weather doesn't cooperate, best get to the work as soon as shoulders dry out enough to sustain repair in spring.

DRAINAGE

To fulfill their drainage purpose, shoulders must not be higher than the pavement edge, and the shoulder slope should be steeper than the pavement slope. These characteristics are necessary to drain snowmelt as well as rainfall. On high, rutted, or inadequately sloped shoulders, snow and ice may accumulate near the pavement-shoulder junction, creating a "dike" there. As rain and melting snow and ice drain from the road, the dike on the shoulder will direct the flow longitudinally along the pavement and shoulder at the junction, creating a mini-ditch.

As you know, this is a bad place to collect water, for the road is vulnerable here. Water will enter cracks in the pavement at the junction, as well as soak into the adjacent gravel or turf shoulder, where it will gain access to the road base and sub-grade. As the water migrates beneath the pavement and experiences freeze-thaw cycles, it loosens and softens the base and sub-grade material. Traffic loads displace the material by flexing the pavement into the soft spots. Quite quickly, the flexing pavement develops potholes and alligator cracks, further access points for water to accelerate the road's deterioration.

SUPPORT AND EMERGENCY ACCESS

Shoulders that slope too greatly, however, tend to erode. Erosion will expose the pavement edge. Lacking support, the edge may crumble under vehicle loads. Once again, water gains a path to the road base and sub-grade. Eroded shoulder materials may accumulate in ditches, where they can impede ditch flow. As detailed in the fall 2002 Moving Forward, damming water in a ditch is as bad for your road's base and sub-grade as diking it at the pavement-shoulder junction. As an emergency pull-off for vehicles, a steep and eroded shoulder may make a driver's bad situation worse. Furthermore, a shoulder that drops off from the pavement edge can "trap" an errant vehicle's right tires, which may result in a loss of control or rollover as the driver attempts to regain the pavement.

CONDITIONS TO REPAIR

Shoulder repairs slow roadway deterioration and reduce shoulder erosion, thus preventing more costly roadway repair and minimizing the amount of sediment that reaches ditches and streams. Municipalities should repair dirt or gravel shoulders that exhibit one or more of the following conditions:

- The shoulder is higher than the pavement edge.
- The surface shows ruts or corrugations more than 1 inch deep.
- The slope is too close to level to promote good drainage.
- Cuts and gullies have exposed the pavement edge.
- There is more than a 2-inch drop-off to the shoulder from the pavement edge.

Weather permitting, municipalities should repair asphalt shoulders if they are cracked or if a seam has opened between shoulder and travel surfaces.

HOW TO REPAIR THEM

Municipalities can correct poor conditions on dirt and gravel shoulders by reshaping and replenishing. Reshaping corrects the first three conditions above: high places, ruts and corrugations, and slopes that are too close to level. With a motor grader, crews should shape and smooth the shoulder to the appropriate slope and compact it to ensure that it is not higher than the pavement edge. Replenishing corrects the final two conditions above: cuts and gullies, and drop-offs. After reshaping and compacting the shoulder, crews add, spread, and compact additional gravel. Shoulders must support vehicle loads. Their materials, therefore, should be similar to those of the road base. Before reshaping and replenishing, it may be necessary to remove organic debris, clays, silts, and other unsuitable materials. Repair of asphalt shoulders is similar to repair of asphalt pavements. Suitable weather is required to seal cracks on the shoulder and gaps between shoulder and pavement.

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Reproduced Here From: Illinois Interchange, Vol. 15, No.1, Spring Issue 2007

Full-Depth Reclamation Using Cement

(Recycling Roads Saves Money and Natural Resources)

cont. from page 7

Core sample taken from FDR project.

field density and moisture are monitored for quality control purposes.

Curing

The goal of curing is to keep the base continuously moist so the cement can hydrate. The completed base should be coated with bituminous primer to seal in the moisture.

Pavement Surface

The new pavement surface consisting of a chip seal, hotmix asphalt, or concrete is constructed to complete the FDR process.

Quality Control

The success of an FDR project depends upon careful attention to the following control factors:

- Adequate pulverization
- Proper cement content
- Proper moisture content
- Adequate density
- Adequate curing

From: ROAD TALK, Vol. 20. Nov. 3 Fall 2006

Tools For Training A Qualified Transportation Workforce

New products and courses available from the Transportation Curriculum Coordination Council (TCCC) are giving State and local transportation departments the tools they need to train today's workforce, while simultaneously saving time and money.

Formed in 2000, the TCCC includes representatives from the Federal Highway Administration (FHWA), State departments of transportation, the American Association of State Highway and Transportation Officials, Associated General Contractors, National Asphalt Pavement Association, and the American Concrete Pavement Association. Also represented are the American Road and Transportation Builders Association and regional training and certification groups. TCCC members work together to identify transportation training needs and opportunities.

"The council's efforts are vital to addressing a serious problem facing today's transportation industry: sharing transportation skills and knowledge," said Pete Rahn, director of the Missouri Department of Transportation. "The TCCC's efforts keep State and local transportation departments from reinventing the wheel, saving time and money, and also help ensure we develop and retain a qualified transportation workforce nationwide."

A new TCCC training database will debut next month. The database will compile information on courses that are available across the country from States, FHWA, industry, and academia. "A highway agency looking for a particular course can see, for example, if another agency has already developed one and is making it available to other States," says Christopher Newman of FHWA's Office of Asset Management. The database will be available on TCCC's revamped Web site, which will also be unveiled in May. The updated site will link with FHWA's National Highway Institute (NHI) Web site, to provide easier access to information about TCCC courses offered through NHI.

TCC members work together to identify transportation training needs and opportunities.

TCCC's training tools include a core curriculum for training transportation personnel that covers five program areas: construction, materials, maintenance, safety, and employee development. The curriculum outlines recommended competencies by four skill levels (ranging from entry level employees to project management/administrator level staff) for various tasks and disciplines within a program area, such as quality assurance or project closeout activities.

The Virginia Department of Transportation (VDOT) has adapted the core curriculum to help determine competencies for its construction inspection staff, including inspector trainees, inspectors, senior inspectors, and construction managers. "It has been useful as a model to use in determining competencies for construction inspection staff and in looking to see if training programs comply with the competencies. In striving to deliver quality maintenance and construction projects, the inspection staff must constantly balance the constraints of time, money, and staffing resources," says Bill Beuter of VDOT. "This is another tool in our tool box."

New TCCC courses include online training on pavement preservation. "A pilot for the course held online in February went very well, with people from all over the country participating," says Newman. The final course will be available this month through NHI. States will also be able to host the course on their own web sites.

Also offered by NHI is a TCCC course on Bridge Construction Inspection (Course No. FHWA-NHI-130088). This 4 1/2-day course aims to improve quality, ensure uniformity, and establish minimum competencies for bridge construction inspectors (see sidebar).

The Idaho Transportation Department is currently working on obtaining funding to sponsor the Bridge Construction Inspection course for its personnel. Idaho previously used TCCC resources to develop a resident engineer academy for training. The academy brings together resident engineer staff for an intensive 4 weeks of training, with the group meeting 1 week a month for 4 months. Topics covered include traffic control, claims and change orders, environmental issues, materials acceptance, and essentials of

cont. on page 8

TCCC COURSES

BRIDGE CONSTRUCTION INSPECTION
(Course No. FHWA-NHI-130088)

Skills covered in the course include the ability to:

- Explain the role of the construction inspector as part of the overall project team.
- Interpret drawings and specifications.
- Anticipate possible construction and materials problems.
- Describe the construction sequence for various bridge systems, such as foundations, substructures, and superstructures, and different bridge types and materials.
- Conduct regular systematic inspections of materials and standards of construction.
- Explain and perform basic inspection and testing of materials.
- Perform accurate surveys and checking of dimensions.
- Maintain sufficient records.

The target audience includes construction supervisors; transportation department field inspectors; field, resident, structural, and materials engineers; and other technical personnel involved in the construction inspection of bridges. The course fee is $600 per participant, with a minimum class size of 20 and a maximum of 30.

CONSTRUCTION INSPECTION, WORKMANSHIP, AND QUALITY
(Course No. FHWA-NHI-134055)

Participants will learn how to:

- Identify the components of workmanship as they relate to highway and bridge construction.
- Link different types of specifications to the associated roles and responsibilities of the project inspector, contractor, engineer, and owner.
- Identify situations in which legal issues affect the performance of their assignments.
- Apply the basic concepts of risk assessment to case study examples.

The course is designed for field personnel, from technicians to engineers, who are involved in all aspects of highway construction. It will also be valuable for project managers and resident engineers. The course fee is $270 per participant, with a minimum class size of 20 and a maximum of 30.

For more information on the courses or to register, visit www.nhi.fhwa.dot.gov/.

Anne Arundel County Participates In

National Work Zone Awareness Week

The Anne Arundel County, Maryland, Department of Public Works actively participated in this past April's National Work Zone Awareness Week, with efforts targeted at both roadway construction workers and the general public.

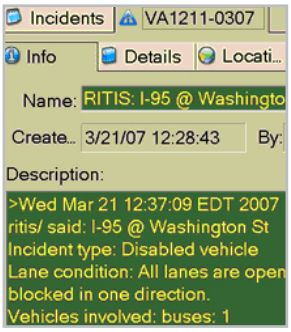
The Bureau of Highways organized a series of event to coincide with National Work Zone Awareness Week (NWZAW). The highlight of the week was a Work Zone Safety Seminar that was attended by over one hundred individuals. Anne Arundel County was the only jurisdiction in the State of Maryland conducting such an event. The event received media attention and was covered in both the Annapolis Capital and in the County's Week in Review. The audience included Public Works personnel, law enforcement, State highway officials and the general public. The following topics were addressed: Work Zone Statistics and High-Visibility Personal Protective Equipment (PPE's); Traffic Control Devices; Flagger Control; Temporary Traffic Control; and Motorist Safety. Our office worked with the instructor, Juan Morales, who is a nationally recognized expert in work zone safety and an instructor for the University of Maryland's T2 Center, to ensure that the content would keep the interest of both our field personnel and the general public.

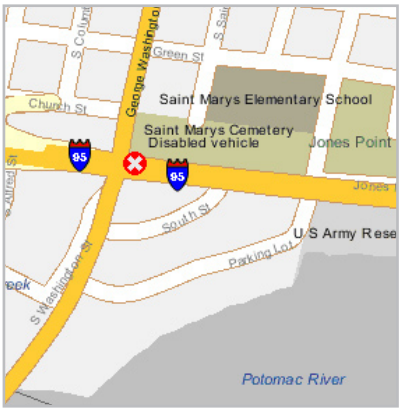
While our office typically provides work zone safety training for the Bureau's employees, we utilized the National Work Zone Awareness Week to consolidate our efforts and make a large impact on our audience. By including other Bureaus, Departments and the general public, we believe that these efforts show our commitment to work zone safety, and should help to reduce the number and severity of work zone accidents in Anne Arundel County. Ultimately, this will provide a safer work environment for our employees, a safer road network for our customers, and a reduced liability to the County.

Howard Weissberg, P.E., PTOE
Assistant Chief
Bureau of Highways
Anne Arundel County Department of Public Works

CapWIN Updates Regional Integrated Transportation Information (RITIS) Data Feed

The Regional Integrated Transportation Information System (RITIS) project at the University of Maryland's Center for Advanced Transportation Technology is working to improve transportation efficiency, safety, and security through the integration of existing transit and transportation management system data in Virginia, Maryland, and the District of Columbia. RITIS is designed to provide real-time, regional information in an electronic, standardized format.





In 2006, CapWIN integrated RITIS into its Data Services Backend (DSB) which enabled users to access regional transportation data securely via CapWIN's mobile client software. Since that time, the RITIS team has been improving the accuracy, timeliness and completeness of data being collected from regional traffic management centers. The new RITIS data feed now accessible via CapWIN incorporates more detail for certain transportation incidents as well as automatically generated incident maps (GIS) for many incidents in Maryland and Northern Virginia.

As always, CapWIN users can "join" and participate in RITIS-created Incidents and provide real-time situational updates from the field. Additional enhancements that will further enhance the data available from RITIS are planned as part of CapWIN's implementation of its Intelligent Transportation Systems (ITS) Grant Award.

From: CapWIN Connection: Feb-Mar 2007

Tools For Training A Qualified Transportation Workforce

cont. from page 7

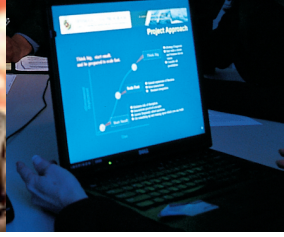
management. Idaho also continues to use training material developed jointly by the TCCC and NHI on "Hot-Mix Asphalt (HMA) Construction" and "Drilled Shaft Inspection."

New TCC courses include online training on pavement preservation techniques.

Another new TCCC course available from NHI is Construction Inspection, Workmanship, and Quality (Course No. FHWA-NHI-134055). "This 2-day course will help transportation professionals involved in the inspection of highway construction projects improve their understanding of the factors that contribute to high-quality projects," says Newman. Using real-life examples, the course covers legal, liability, and risk issues, as well as quality assurance topics (see sidebar on page 7). TCCC courses currently under development include Inspection of Bridge Rehabilitation Projects, Environmental Factors in Construction, and a 4-week maintenance academy for engineers. For more information on TCCC's many resources, or how you can partner with TCCC, visit www.nhi.fhwa.dot.gov/tccc/ or contact Christopher Newman at FHWA, 202-366-2023 (e-mail: christopher.newman@fhwa.dot.gov).

From: FOCUS, April 2007, FHWA-HRT-07-012

CURRENTLY SCHEDULED COURSES FOR 2007



The following courses have already been scheduled for 2007. More classes are also being added on a regular basis. Act now to make sure that you or your constituents get a seat before they fill up! For more information or to schedule a class call Janette Prince at (301) 403-4623 or visit our website at http://www.ence.umd.edu/mdt2center.

BICYCLE DESIGN AND PLANNING

September 18, 2007, 8:30 AM - 4:00 PM
Dane Ismart
Linthicum, MD
$95 All Registrants
CEU's: 0.0

Many communities in the United States were not designed for pedestrian and bicycle travel. However, today walk-ability and bike-ability are viewed as signs of a livable community and encourage physical activity. The goal is to create an environment that encourages people to walk and bike for transportation, recreation and exercise. This workshop provides current information on the design, operation and maintenance of successful pedestrian and bicycle facilities. Emphasis is placed on making participants aware of the characteristics and needs of pedestrians and bicyclists and on the importance of an interdisciplinary approach to planning and implementing pedestrian and bicycle programs.

ROUNDABOUT PLANNING AND DESIGN

September 19, 2007, 8:15 AM – 4:00 PM
Dane Ismart
Linthicum, MD
$75 Maryland State Government
$95 Federal, Private, and Out-of-State
CEU's: 0.0

This one-day workshop will provide participants with an introduction to the planning and design of the modern roundabout. Topics covered in the roundabout course will include geometric design, signing, striping, safety, and accommodation of pedestrians and bicyclists.

An important component of the course will be a discussion of the advantages and disadvantages of roundabouts. SIDRA and Rodel software packages will be demonstrated to the class participants and used for capacity and operational analysis of roundabouts. The basic structure of the course will be built around the FHWA Report, "Roundabouts: An Informational Guide". Maryland's Roundabout Guide will also be discussed and included as part of the course.

INTRODUCTION TO GEOSYNTHETICS

October 9, 2007, 8:30 AM – 12:30 PM
Ed Stellfox
College Park, MD
$25 All Registrants
CEU's: 0.0

This course is an introduction to geosynthetics, beginning with a discussion of geosynthetics, what they are, how they are made and how they can be used in a road maintenance program. The course then looks at other geosynthetics and their road system uses, including geogrids, geocells and geowebs, presenting new materials with new applications.

SIGNAL WARRANT & INTERSECTION CONTROL ANALYSIS

October 16, 2007, 9:00 AM – 4:30 PM
Dane Ismart
College Park, MD
$95 Maryland Local Government Only
$125 Maryland State Government
$150 Federal, Private, and Out-of-State
CEU's: 0.0

This course will cover the eight MUTCD signal warrants:
Warrant 1: Eight-Hour Vehicle Volume
Warrant 2: Four-Hour Vehicular 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.

INTRODUCTION TO TEMPORARY TRAFFIC CONTROL

October 29, 2007, 8:15 AM- 4:00 PM
Juan Morales
College Park, MD
$100.00 Maryland Local Government
$150.00 Maryland State Government
$175.00 Federal/Private/Out-of-State
CEU's: 0.0

An introductory course to temporary traffic control (TTC) in work zones, 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.

WORK ZONE DESIGN

October 30-31, 2007, 8:00 AM- 4:00PM
Juan Morales
College Park, MD
$100.00 Maryland Local Government
$150.00 Maryland State Government
$175.00 Federal/Private/Out-of-State
CEU's: 1.2

The course will give participants knowledge of the entire temporary traffic control (TTC) process: planning, design, review, installation, maintenance, and evaluation of proper maintenance of traffic (MOT) controls for work zones. While the functions of planning, design, review, and operation of temporary traffic control are covered in detail, issues concerning safety of pedestrians and highway workers, human factors, and legal responsibility are also addressed.

The procedures and devices covered are generally taken from Part 6 of the Manual on Uniform Traffic Control Devices (MUTCD) and are modified to meet practices and standards in Maryland.

technotes

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- ☐ ITS
- ☐ Soils
- ☐ Structures
- ☐ Roadside Maintenance
- ☐ Other
- ☐ Training Announcements
- ☐ Traffic Engineering
- ☐ Lighting
- ☐ Road Safety
- ☐ Traffic Control Devices
- ☐ Water
- ☐ Pavement

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