Delaware T² Center

TRAVEL-LOG

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Put Stop Signs Everywhere? Not So Fast! Consider Traffic Calming Instead

Written by: Alan S. Kercher, P.E.
T² Center Consultant

It is a constant cry at town meetings – "We Need More Stop Signs!" But are stops sign the answer to solving local traffic problems such as speeding and cut-through traffic in residential areas? More than likely the answer, to put it bluntly, is No!

Stop signs are one of the most effective types of traffic control devices that can be used to improve safety at intersections. These signs should only be used at intersections where it is necessary to assign right-of-way for safety purposes. If a traffic engineering study determines that a stop sign is necessary, proper placement of that stop sign will improve safety. For the safety of the traveling public, it is important that all drivers respect what a stop sign stands for – STOP.

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Superpave – QC/QA Specifications

Written by: Alan S. Kercher, P.E.
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*Several years ago, the Travel Log featured a three part series on hot mix asphalt designed with the Superpave (**Su**perior **Per**forming **Pave**ments) System. Part 1 explained common problems with traditional hot mix asphalt, Part 2 discussed how Superpave was developed to address these shortcomings, and Part 3 provided a brief overview of DelDOT's initial implementation.*

As a quick refresher, the Superpave hot mix asphalt system provides agencies with a new approach to specifying component materials, mixture design and analysis, and pavement performance prediction in order to consistently produce superior performing hot mix asphalt (HMA). In the past, a one-size-fits-all approach was used for the majority of HMA paving projects. Today, the Superpave system provides highway agencies with the tools to optimize the mix design in order to meet the specific needs of each individual project. This new system can be used for the mix design of new pavements or overlays used on rehabilitation projects, whether it's a low volume or high volume roadway.

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If local agencies use stop signs in an attempt to control speed, yes, there will be reductions in speed at the intersection. However, there will likely be an increase in mid-block speeds as some drivers will try to make up the "lost time" caused by having to stop unnecessarily at the intersection. Additionally, when stop signs are overused, drivers have a greater tendency to disregard the signs resulting in an increase in the amount of rolling stops rather than complete stops.

So what should local agencies do? Many agencies have turned to utilizing traffic calming techniques. The intent of traffic calming is to reduce speeds and or decreasing traffic volumes by discouraging the use of certain streets. Streets have traditionally been designed by highway engineers to be wide, straight and move as many cars as quickly and efficiently as possible. Traffic calming attempts to do the opposite.

After an engineering study has been performed to determine the nature of the traffic problems for the street or given area, one or more measures capable of solving or minimizing the identified problem is selected from the traffic calming toolbox. The following is a summary of Delaware's Toolbox of Traffic Calming Measures as set forth in the DelDOT Traffic Calming Design Manual.

Volume Control Measures

Device/Technique	Description	
Full Street Closure	Barriers placed across roadways to completely close through vehicle traffic – cul-de-sacs or dead ends.	
Half Closures	Barriers that block travel in one direction for a short distance on an two-way street.	
Diagonal Diverters	Barriers placed diagonally across an intersection, blocking certain movements.	
Median Barriers	Raised islands located along the centerline of a roadway and continuing through an inter section to block cross traffic.	
Forced Turn Lanes	Raised islands located on approaches to an intersection that block certain movements.	

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Speed Control Using Vertical Measures

Device/Technique	Description
Speed Humps	Rounded raised pavement devices placed across roadways to slow and/or discourage traffic. 
Speed Tables	Flat-topped speed humps often constructed with a brick or other textured material to slow traffic. 
Raised Crosswalks	A speed table marked for pedestrian crossing. 

Narrowings

Device/Technique	Description
Neckdowns	Curb extensions at intersections that reduce curb to curb roadway travel lane widths. 
Two-Lane Chokers	Curb extensions or edge islands at midblock locations that reduce curb to curb roadway travel lane widths. 
Center Islands	Raised islands located along the centerline of a roadway that narrow the width at that location. 

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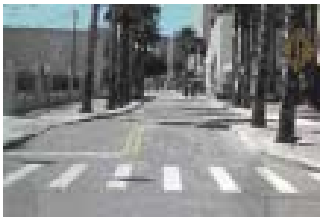
Speed Control Using Horizontal Measures

Device/Technique	Description
Mini-Traffic Circles	Raised islands, placed in intersections around which traffic circulates 
Roundabouts	Barriers placed in the middle of an inter section, directing all traffic in the same direction. 
Lateral Shifts	Curb extensions on otherwise straight streets that cause travel lanes to bend one way and then bend back the other way in the original direction of travel. 
Chicanes	Curb extensions that alternate from one side of the street to the other forming s-shaped curves. 
Realigned Intersections	Changes in alignments that convert T-intersections with straight approaches into curving streets meeting at right angles. 

Obviously, the traffic calming techniques listed in DelDOT's Traffic Calming Design Manual do not provide a magic toolbox that will fix all traffic problems. Traffic calming will help to reduce traffic speeds and/or volumes in many different situations, however, it must be pointed out that not all streets are suitable for traffic calming. Additionally, where traffic calming is warranted, there will be some situations where trade-offs will have to occur such as turning movements for larger vehicles and slower response time for emergency vehicles. Part 2 of this series will discuss the types of traffic calming in more detail along with advantages and disadvantages, as well as, the process of selecting appropriate methods.

Note: DelDOT's Traffic Calming Design Manual, dated August 2000, is available on the Department's Website: www.DelDOT.net.

Superpave – QC/QA Specifications

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Superpave Constructability Issues

Several years ago DelDOT went to a full implementation of the Superpave system. With this implementation came some potential problems. HMA produced in accordance with the Superpave requirements contain a higher percent of larger, coarser aggregate that is more angular in order to increase stone-on-stone contact (higher internal friction creates better stability). This high degree of larger, more angular aggregate produces a strong, structural framework that is necessary to resist rutting. Also, the use of polymer-modified asphalt cement may be required to increase stiffness of the mix. That's great news from an engineering design standpoint. However, these modifications to the mix design methodology have resulted in HMA mixtures that can be more difficult to construct. This is not to say that pavements designed using the Superpave system can't be constructed properly, just that these materials can create more of a challenge. In simple terms, Superpave materials are typically less tolerant of poor production and construction practices than traditional HMA. As such, highway agencies need to be proactive with regard to specifications, testing and inspection.

Picture 1 shows pavement deformation in the wheel paths (rutting) due to inadequate compaction. Picture 2 shows "checking" cracking in a newly constructed pavement due to problems with the production of the asphalt material, as well as, excessive compaction during construction.

Pictures 1 and 2 shown below are only two of several recently placed Superpave projects that the T2 Consultant has been called on to investigate. It is not because Superpave could not be constructed properly, but rather, the failures were due to poor production and construction practices. In each case (as with most failed paving projects), the municipality had utilized vague specifications and on-site quality control/quality assurance activities were non-existent during construction. The agencies took a good faith approach, hoping that the contractor would do a good job. It is the T2 Center consultant's opinion that all agencies must utilize some type of QC/QA specifications to ensure that they receive a dollars worth of goods for each dollar spent. Money spent to fix roads is just too hard to find to allow it to be wasted because of poor construction.

Picture 1
Pavement deformation in the wheel paths (rutting) due to inadequate compaction

Picture 2
"Checking" cracking in a newly constructed pavement due to problems with the production of the asphalt material.

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Implementing QC/QA Superpave Specifications

In the past, most agencies including DelDOT utilized method (recipe) specifications for specifying and accepting HMA pavements. Typically, if the inspector "decided" that all work was satisfactorily completed, the contractor would receive the full 100 percent payment. However, if the project was considered to be "out of specifications" for whatever reason, payment penalties were subjectively determined by the inspector or engineer. Over the past 10 to 20 years, the FHWA has been pushing for more objective quality control/quality assurance (QC/QA) specifications.

As DelDOT was implementing Superpave, the transportation agency was also converting to QC/QA specifications. This change shifted the majority of the responsibility to the contractor for quality control of all construction activities from production of the material through final compaction of the finished mat. Contractors must be constantly monitoring all processes to ensure the aggregate gradation is correct, the mixture has the proper asphalt content, and that the material is properly placed and compacted. Contractors normally prefer QC/QA specifications because it provides them with the opportunity to have more control over their own destiny. Other benefits stated by contractors include improved record keeping, better trained personnel and a more thorough working knowledge of how the production plants are functioning on a daily basis. DelDOT is now responsible for the QA portion of the specifications which entails assuring that the work has met the acceptance criteria. Through the use of random sampling, testing and statistical analysis, DelDOT bases the payment on sliding-scale pay factors tied to the percent of work completed within certain specified limits (known as percent within limits – "pwl").

The T2 Center Can Help

After briefly reading about this new QC/QA methodology, it probably sounds somewhat complicated and possibly confusing, and it can be to the untrained person. Most municipalities do not have someone who has experience in specifying Superpave and utilizing QC/QA specifications. In an effort to assist small municipalities, the T2 Center has recently developed a program whereby the T2 Consultant will assist municipalities with properly preparing contract documents for Superpave paving projects. Also, he will assist with the quality assurance activities to determine contractor compliance. DelDOT's Materials and Research division has agreed to assist small municipalities with needed testing.

For municipalities interested in learning more about Superpave and the QC/QA process, the Delaware T2 Center is holding a one-day training course in April. An announcement will be sent out in the very near future.

Roadway Management Conference

The 13th Annual Roadway Management Conference will take place on March 30 – April 1, 2005, at the Hershey Lodge and Convention Center in Hershey, PA. The T^2 Centers in DE, MD, PA, VA, and WV jointly sponsor this conference that offers workshops, product demonstrations, and other activities for state and local transportation agency employees. It's a great time to renew old acquaintances, make new friends, and discuss common work related issues.

You will shortly receive a brochure loaded with full conference details. Until then, if you have any questions, call Kim Ferroni at PennDOT. Her telephone number is 717-214-8685. Her email is kferroni@state.pa.us.

Other Upcoming Events

Distinguished Speaker Series

Joseph S. Toole
Associate Administrator
Federal Highway Administration

Mr. Toole is in charge of developing strategies and plans for recruiting and retaining the staff of local, state, and federal transportation agencies. Among his other duties, he oversees the national T2 program and the National Highway Institute. He will discuss current staffing issues and innovative ways to make sure you have a productive workforce now and in the future.

Date: Friday, March 4, 2005 Time: 10:00 am - 12 noon
Rodney Room, Perkins Student Center
University of Delaware

There is no fee or pre-registration for this program. Parking is available at the garage adjacent to the student center

T^2 Center Request Form

____ Please add my name to the T^2 Travel-Log mailing -- subscriptions are free

____ I have an idea for a future newsletter article on the topic of _____

____ I would like to submit a newsletter article, please contact me.

____ Please consider these topics for future training sessions

_____

Name: _____
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Please return this form to:
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Delaware T² Center

The Technology Transfer (T²) Program is a nationwide effort financed jointly by the Federal Highway Administration and individual state departments of transportation. Its purpose is to interchange the latest state-of-the-art technology into terms understood by local and state highway or transportation personnel.

The Delaware T² Center Travel-Log is published semi-annually by the Delaware Technology Transfer Center at the University of Delaware. T² Center articles also appear semi-annually in the TransSearch - the newsletter of the Delaware Center for Transportation. Any opinions, findings conclusions or recommendations presented in this newsletter are those of the authors and do not necessarily reflect views of the University of Delaware, Delaware Department of Transportation, or the Federal Highway Administration. Any product mentioned in the newsletter is for information purposes only and should not be considered a product endorsement.

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