Greeneville’s Traffic Safety Committee Tackles Local Safety Concern

by Matt Cate, Technical Assistance Coordinator

On August 8, 2007, I attended a meeting with several officials from the Town of Greeneville. The purpose of our original meeting was to consider potential traffic calming measures for a single street. This location had been the subject of numerous complaints to both elected officials and town staff members. Residents complained of excessive speeds, high volumes, and the potential for traffic crashes. While this location did pose many legitimate safety concerns, the group could not assign this location a higher priority than other similar locations around town. In fact, they quickly realized that a systematic approach to traffic safety complaints would help the Town address future complaints in a consistent, orderly manner.

As a result of this first meeting, the group established an ad hoc traffic safety committee to study the town’s traffic crash history and develop goals and guidelines for future traffic safety activities. Initial membership in this group included: Ginny Kidwell, Alderman; Jim Warner, City Recorder; David Martin, Public Works Director; Terry Cannon, Police Chief; Brad Peters, Town Engineer; and Mack Jones, Police Chief (Retired).

It was immediately apparent that this group contained all of the elements necessary for a successful long-term approach to traffic safety. In this case, the highest hurdle had already been cleared by bringing the group together at the same table to discuss their traffic safety concerns and potential solutions. Over the next seven months, the group continued on page 4
RoadTalk is a publication of the Tennessee Transportation Assistance Program (TTAP). TTAP is part of a nationwide Local Technical Assistance Program (LTAP) financed jointly by the Federal Highway Administration (FHWA) and Tennessee Department of Transportation (TDOT). Its purpose is to translate into understandable terms the latest state-of-the-art technologies in the areas of roads, bridges, and public transportation to local highway and transportation personnel.

The views, opinions, and recommendations contained within this newsletter are those of the authors and do not necessarily reflect the views of FHWA and TDOT.

**From the Director**

Those of you who read this column regularly know that I always make some remark about the weather. It just seems to be appropriate for those of us whose lives follow the rhythm of the seasons. This time, I want to talk about a perfect storm that I fear we’re headed for, and I’m not talking about the weather.

As I write in late May, the price of regular gasoline is averaging $3.80 per gallon in Tennessee’s major cities, up from $3.00 per gallon a year ago—nearly a 27% increase. The corresponding price of diesel fuel is $4.65 per gallon. Prices for both fuels are even higher in rural areas.

Many prognosticators are predicting $200 per barrel crude oil in the near term. Record high demands worldwide, far exceeding the rate of supply increase, seem to be propelling these higher prices. Increasingly affluent consumers in China and India are acquiring motorized vehicles that consume petroleum based fuel. As these population segments grow, so does demand for the world’s oil. Based on projections, by 2020 the middle class of China alone could exceed the total population of the U.S. With these new consumers in the market, and absent major new oil sources, it’s hard to see fuel prices dropping.

Each time I visit the gas pump, with the ever rising prices, and get sticker shock, I resolve to drive a little less. Recreational driving is a thing of the past. I’d bet you’re all behaving in a similar fashion. According to the Federal Highway Administration, Americans drove 11 billion fewer miles in March 2008 than in March 2007, the first such drop in March travel since 1979 and the steepest on record. Total vehicle miles of travel for 2008 will certainly be less than for the previous several years, though how much remains to be seen.

What does this have to do with a storm? Well, with fewer expensive gallons consumed, we generate less motor fuel tax—the lifeblood of our highway programs. At the same time, prices are rising sharply for materials needed for construction and maintenance. Energy accounts for some of these increases, and worldwide demand is also a factor. Growing economies and worldwide demand seems to be propelling oil in the near term. Record high demands worldwide, far exceeding the rate of supply increase, seem to be propelling these higher prices.

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As always, please feel free to contact TTAP for technical assistance, training, or information. We look forward to serving you.
The structural features of perpetual pavements have been the most discussed issues over the past few years. It has been acknowledged that beginning with a solid foundation for construction and long-term stability, the pavement structure needs to consist of a thick cross section of hot mix asphalt with the layers engineered to resist specific types of distresses.

**Preventing fatigue cracking**

Fatigue cracking, which can be the most devastating form of failure, can be handled by first considering the level of traffic.

In high-volume facilities such as Interstate and primary highways, fatigue is best countered using a total HMA thickness that keeps the bending strain under the vast majority of heavy traffic loads below a threshold of about 70 microstrain. This will ensure that cracks do not originate at the bottom of the structure and propagate up to the surface. Thus, the need for full-depth patching or complete reconstruction of the HMA can be avoided.

For medium-volume roads, this may mean a minimum HMA thickness of about 11 inches, and for heavier trafficked roads, it could mean structures of 15 inches to 16 inches at the thickest. Of course, the thickness in a given situation depends upon the traffic, soil, foundation and climate.

In low-volume roads, heavy loads may be very infrequent. So it would not be cost effective to consider the same 70 microstrain criterion to resist fatigue. Instead, it would be better to consider the accumulation of damage and minimize the accumulation over a long period of time. Depending upon climate, support conditions and the particular traffic, this leads to low-volume road HMA thickness of 6 inches to 8 inches.

**Rut resistance**

In addition to designing against bottom-up fatigue cracking, it is also important to consider the possibility of deep rutting within the pavement structure.

This is controlled in design by the vertical compressive strain at the top of the subgrade. If this strain is high, more than 200 microstrain, it indicates that the pavement structure is weak and incapable of resisting permanent deformation deep within itself.

The rut resistance must start at the top with a high quality surface mix, followed by a binder and base courses that allow the aggregate structure to transmit the load to the pavement foundation. It may be a granular layer or a stabilized subgrade with sufficient thickness to minimize the effects of seasonal weakening.

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worked to assemble information, discuss options, and lay out a long-term strategy to improve roadway safety in the Town of Greeneville.

On March 4, Alderman Ginny Kidwell presented the group’s final report to the Board of Mayor and Aldermen. Included in this report were several key recommendations to future traffic safety activities, including:

- Establish a permanent traffic safety committee. The committee will meet on a monthly basis to discuss new and on-going traffic safety issues within the town. The Chief of Police will serve as the committee’s primary contact when interacting with members of the public.

- Maintain up-to-date crash maps. The police and public works departments will work to update the Town’s crash maps on a monthly basis, allowing all departments to track crash location trends as they occur. Additionally, completed 2006 and 2007 crash maps allow the Town to track recent crash patterns.

- Review all traffic control devices on a regular interval. The public works department has begun a traffic sign inventory program to remove unneeded signs, update non-compliant signs, and repair or replace damaged or deteriorated signs.
Establish guidelines for the application of traffic safety countermeasures. Included among these countermeasures are improved traffic signs and pavement markings, revised regulatory speed limits, installation of multi-way stops, and placement of traffic calming devices for residential local streets. The Public Works department has purchased traffic counting equipment so that they can collect speed and volume data critical to this decision-making process.

Integrate traffic safety considerations into the Town’s planning and codes enforcement activities.

Pursue location-specific traffic safety improvements. Included in these projects are improved or expanded overhead roadway lighting on West Andrew Johnson Highway and the US 70 Bypass and automated traffic signal enforcement for high-crash intersections on Andrew Johnson Highway.

While Greeneville’s Traffic Safety Committee’s efforts will be ongoing, their story can be an example for many other cities and counties. In many cases, the individual pieces of the traffic safety puzzle are already in place; it is simply a matter of fitting these pieces together in the proper way to complete the picture. By simply sharing information with other departments within your jurisdiction, you may be able to both identify traffic safety problems and implement low-cost solutions without committing additional time and funding. For more information on Greeneville’s Traffic Safety Committee, contact Matt Cate (1-800-252-7623 or mcate@utk.edu) or David Martin, Greeneville Public Works Director (423-638-6152).

This photo shows Hannah Street after the sign inventory. Unnecessary or repetitive signs were removed. Remaining signs were straightened to improve visibility and encourage respect from drivers.
Education and training opportunities are available through the University of Tennessee Center for Transportation Research (CTR), Southeast Transportation Center (STC), and Tennessee Transportation Assistance Program (TTAP). This listing of courses currently available includes both TTAP and TATE courses that are offered in conjunction with the University of Tennessee Department of Civil and Environmental Engineering and the Tennessee Section of the Institute of Transportation Engineers. Local roadway departments can benefit from all of the workshops. Because of this, we ask that you please share this listing with others who might be interested in our workshops. TTAP is always eager to meet your research and training needs. If you have a special course in mind or would like a course held on site especially for your employees, please contact Wilma Wilson at 1-800-252-ROAD.

*CEU and PDH credit hours available.

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Perpetual Pavements Last Decades Without Major Reconstruction, continued from page 3

Per Road (version 3.0) can be used to design perpetual pavements for low to high traffic volumes. It is available for free download from the Asphalt Pavement Alliance at www.asphaltallicance.com.

Life-cycle costs

Not completely divorced from the pavement design is the issue of economy.

If one compares a typical rural interstate highway pavement design using the 1993 AASHTO Pavement Design Guide for a 25,000 ADT 4-lane facility, a conventional design might be 8 inches of HMA over 10 inches of granular base material versus a perpetual pavement consisting of 14 inches of HMA over 6 inches of granular base.

Assuming a typical surface for the conventional design and a high-quality SMA for the perpetual pavement, with the initial overlay intervals of 15 years and 18 years respectively, the conventional HMA section might need to be replaced in 35 years whereas the perpetual section would only need periodic resurfacing.

The perpetual pavement would require 25 percent less aggregate and 20 percent less liquid asphalt. This is a significant savings of resources that can be used elsewhere.

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Glossary of Pavement Coating Technology

The following basic terms give a good grasp of pavement coating technology.

**Alligator cracking** A series of interconnecting cracks in an asphalt pavement surface forming a pattern that resembles an alligator’s hide or chicken wire. In its early stages, alligator cracking may be characterized by a single longitudinal crack in the wheel path. The cracks indicate fatigue failure of the surface layer often caused by repeated traffic loadings. Hence, the term fatigue cracking is also used.

**Bond breaker** Any material used to prevent bonding or to separate adjacent pavement layers. Thin bituminous layers are often used as bond breaker layers between a concrete pavement and an unbounded concrete overlay.

**Break** The process in the curing of an asphalt emulsion by which globules of asphalt become separated from the water. The color of the emulsion will change from brown to black during the break process.

**Cape seal** A surface treatment that involves the application of slurry seal to a newly constructed surface treatment or chip seal. Cape seals are used to provide a dense, waterproof surface with improved skid resistance and ride quality.

**Chip seal** A surface treatment in which the pavement is sprayed with asphalt (usually emulsified) and then immediately covered with aggregate and rolled. Chip seals are used primarily to seal the surface of a pavement with non-load associated cracks and to improve surface friction. They also are commonly used as a wearing course on low-volume roads.

**Emulsified asphalt** Minute globules of asphalt are suspended in water by using an emulsifying agent. These globules are either anionic (negatively charged) or cationic (positively charged).

**Fog seal** A light application of slow-setting asphalt emulsion diluted with water and without the addition of any aggregate applied to the surface of a bituminous pavement. Fog seals are used to renew aged asphalt surfaces, seal small cracks and surface voids or adjust the quality of binder in newly applied chip seals.

**Microsurfacing** A mixture of polymer modified asphalt emulsion, mineral aggregate, mineral filler, water and other additives properly proportioned, mixed and spread on a paved surface. Microsurfacing differs from slurry seal in that it can be used on high volume roads to correct wheel-path rutting and to provide a skid-resistant pavement surface.
We are always looking for your comments, ideas and suggestions to help make the TTAP Program more useful to you. Please fill out and fax the form below to TTAP at (865) 974-3889 or mail to TTAP; Suite 309 Conference Center Building, Knoxville, TN 37996-4133.

1. Please send me more information on the following articles mentioned in this newsletter.
   __________________________________________  __________________________________________
   __________________________________________  __________________________________________

2. Please list any additional training workshops you would be interested in attending.
   __________________________________________  __________________________________________
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3. Please list topics for videos you would like TTAP to obtain.
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4. Please list any other ideas or suggestions on how TTAP could assist you.
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5. Please list your name and organization to verify for TTAP’s mailing list.

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