

TTAP Celebrates 20 Years

2006 marks the twenty year anniversary of the beginning of what is now the Tennessee Transportation Assistance Program (TTAP). TTAP marks its origin as the “Tennessee Transportation Assistance Program for Small Urban and Rural Areas,” jointly sponsored by the Federal Highway Administration and the Tennessee Department of Transportation. The program was established to enable the sharing of ideas and the dissemination of information among roadway and public transportation agencies in rural areas and small communities throughout the state.

In looking back over the years, we see that many notable people have been involved in TTAP operations. Initial TTAP leadership was provided by Co-Directors Dr. Steve Richards and Dr. Fred Wegmann. Dr. Richards is now Executive Director of the UT Center for Transportation Research and Associate Professor in Civil and Environmental Engineering. Dr. Wegmann recently retired from a stellar teaching career in the UT Department of Civil and Environmental Engineering, but is still actively teaching TTAP classes. The subsequent line of Directorship includes the late Bill Kervin, the late Don Jones

(2 terms), Zach Zacharia, and David Clarke. Zach is now Assistant Professor of Supply Chain Management at Texas Christian University in Dallas, TX.



In researching this article, we noticed that RoadTalk has gone through a few changes of its own. The logo and mastheads have changed several times, with the latest look debuting in this special color issue.

TTAP’s activities have greatly increased over the 20 year period. Training, for example, which started with just two instructors and a few workshops has now grown to over 50 annual workshops a year taught by nearly 20 instructors. The range of topics varies from trench safety to travel demand modeling using TransCAD. TTAP continues to provide direct technical assistance to cities and counties, intersection studies,

traffic data collection, traffic signal warrant analyses, signing and pavement markings, drainage and roadway safety reviews.

Over the years, TTAP has worked to fulfill the National Local Technical Assistance Program (NLTA) mission “to foster a safe, efficient, environmentally sound transportation system by improving the skill and knowledge of local transportation providers through training, technical assistance and technology transfer.”

We are proud to serve the cities and counties in Tennessee. Our mission at TTAP is to help you, so please contact us for technical assistance, training or technology transfer. We look forward to serving you

during the next 20 years.

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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.

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From the Director

It's been a great fall here in East Tennessee. The temperatures have been unseasonably warm so far, and we actually had enough rainfall to make the leaves show some nice color. Of course, with old man winter right around the corner, we can't rest easy. Though a lot of outdoor work halts for the winter, we need to be ready for winter weather. That means getting all of your snow removal equipment checked out and in shape, building up supplies of deicing chemicals, and making sure that everyone is checked out on procedures for addressing winter weather. Hopefully, being prepared will keep winter from hitting our area too hard. It seems to work that way, and if we do get an icy blast, things will go much more smoothly.

Other things we can keep an eye on during winter's lull include brush removal and cleaning of drainage ditches and culverts. I kind of prefer brush removal when the insect pests are dormant, and you do stay warm doing that kind of work. When it rains, you might drive around to inspect roadway drainage. At the least, you'll have a checklist of things to do when spring rolls around.

While you're out, always be on the lookout for potential safety problems, such as missing signs, vegetation blocking sight distance, unsafe slopes and ditches, and obstacles in the clear zone. TTAP has a new safety circuit rider program, and, if you call on us, we'll be happy to send him your way. This service is sponsored by the Tennessee Department of Transportation as part of an initiative to reduce severe crashes on local roads. We think this will be a great program.

As the year draws to a close, we're looking forward to the holiday season. It's been a good year, and there's a great deal to be thankful for. As another new year approaches, we are reminded again that time marches on. In fact, TTAP has now reached age 20, a milestone event highlighted in this issue of *RoadTalk*. We're pleased about that, and have enjoyed the many opportunities we've had to get to know the hard working people who maintain Tennessee's local roads. As the song says, it's been a long and winding road. We're sure having a good time on this journey, though, and we hope to ride along with you for years to come.

As always, our mission at TTAP is to help you. Please feel free to contact us for technical assistance, training, or information. Meanwhile, work safely and have a happy holiday season!



In Memoriam: Don H. Jones, P.E.

We sadly report the passing of former TTAP Director Don H. Jones, P.E. (ret.) on October 5, 2006. He was 73.

Many of you who have time in with the LTAP program met Don over the years. We will remember him as the consummate engineer, with the highest sense of ethics and professionalism. Don's extremely high standards made him a role model for many co-workers and students. He loved both to learn and to teach.

Don worked for UT for over 25 years and was one of the Transportation Center's first employees. Initially stationed in Nashville to work with the Tennessee Department of Transportation (TDOT), Don returned to the main office in Knoxville in the early 1980s, where he played a major role as manager of the TDOT research program and as an engineering researcher. Don also held an appointment as Associate Professor in the Department of Civil and Environmental Engineering. Prior to joining UT, Don worked for eight years at the Tennessee Department of Transportation in Knoxville.

During the early years of TTAP, Don was the program's Technical Director, providing engineering technical assistance to local roadway agencies throughout Tennessee. He assumed the role of Director, in addition to his other duties, from mid-1990 until the hiring of the late Bill Kervin as Director in September 1992. Following Bill's departure in November 1994 to become Engineering and Public Works Director for Knox County, Tennessee, Don again took the reins as TTAP Director. He served in this role until his retirement in August 1996. Following retirement, Don continued to serve TTAP in the technical role he loved so well.

A native East Tennessean, Don loved the mountains and ultimately made his home near them in a beautiful cabin in Sevier County. After his retirement, Don performed volunteer work in the Great Smoky Mountains National Park, where he received the "Frank Kirk Meritorious Service Award." In 2005, after volunteering over 3,000 hours, he also received the "Take Pride in America Volunteer Service Award."

Don earned the B.S. and M.S. in Civil Engineering from UT and was elected to Tau Beta Pi. He was a championship amateur wrestler, ultimately serving as an assistant wrestling coach at UT.

Don leaves his wife Shirley; daughters Donna and Rebecca and their families; stepchildren Donya, Scott, and Kellie and their families; and sisters Priscilla and Juli. In lieu of flowers, the Jones family requests that donations be made to:

Friends of The Smokies
c/o Don Jones Memorial Fund
P.O. Box 1660
Kodak, TN 37764.



TTAP Training

by Frank Brewer

We are near the end of our '06 training season and we wanted to let you folks know how we have done so far this year. To date, we have held 46 workshops that were attended by 914 participants. We have had a wide range of topics. Below are some of our most recent courses.

Drainage Rehabilitation was held in Chattanooga (April) and in Jackson (September). Our TTAP director, Dr. David Clarke, presented this course which discussed some techniques to clean our drainage ways as well methods to repair them. The bucket drag method proved to be a popular item of discussion.



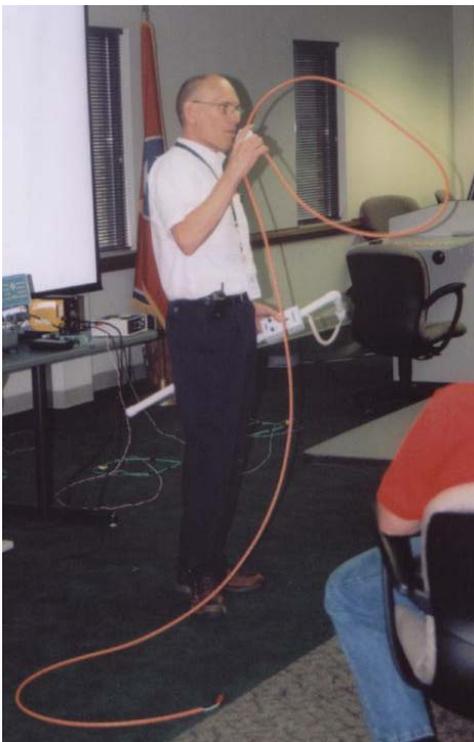
Tim Ard demonstrating the use of chain saw at a recent workshop.

Tim Ard of Forest Applications delivered a timely course on the safe use of chain saws in Jackson and Chattanooga. Tim demonstrated sharpening techniques, ways to determine the height of a standing tree, and how to fell a tree in the direction you want it to go. In both locations Tim was able to actually drop some trees. It was impressive. Once the trees were down, he showed the attendees the safest methods to cut them up. With the cold and windy weather coming this training should be quickly put to use.

Dr. Tom Urbanik, Professor and Goodrich Chair of Excellence with the Department of Civil and Environmental Engineering at UT, taught workshops on Signal Timing in Knoxville, Nashville, and Jackson. He presented students with information on the design and operation of traffic signals and systems.

We were able to also offer a course on Back Hoe/Loader operation and safety. Bevin Elliott presented the workshops in Jackson and in Chattanooga. The TDOT regional offices provided a piece of equipment to enhance the course delivery. The Back Hoe/Loader is a fundamental piece of equipment for all road, street, and highway agencies. Following the classroom presentation, the attendees (under the guidance of Bevin) were given the opportunity to demonstrate pre-trip safety steps prior to the operation of the equipment.

Alan Childers presented the Intersection Design course for the second time this year. Attendees were presented with alternatives to intersection design with an emphasis on



What is Dr. Tom Urbanik doing with a "lasso" in a Signal Timing Workshop?

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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.

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 one-time cost, which is reclaimed through cement stabilization and

Material sampling should include the asphalt surface, base course aggregate, and subgrade soil.

Thickness Design

Pavement thickness can be determined by using Portland



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

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.

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

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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.



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

Pulverization

Construction begins with pulverizing the existing asphalt pavement using equipment that resembles a large rototiller. 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.

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 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.



Core sample taken from FDR project.

Pavement Surface

The new pavement surface consisting of a chip seal, hot-mix 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

Retro-Reflectivity Pavement Marking

by Linda Capps

The Retro-Reflectivity Pavement Marking project has just finished its second round of quarterly pavement measurements. There are 138 sites in Tennessee with each of TDOT's four regions representing about 35 sites in each region. The data collected at these sites over a period of nearly two years will be used to evaluate the useful life cycle of many pavement marking materials in use by TDOT. This information will allow TDOT to replace markings before they become ineffective in nighttime or wet conditions. This project will also allow TDOT to determine which marking materials are more cost effective. Local agencies across Tennessee will also benefit from this research as they commonly use TDOT's material specifications and guidelines. TTAP will be sure to share the final results of this project as soon as they are available. The current completion date for this project is November 2007.

Measuring pavement markings isn't as simple as it may sound. Measurements can only be conducted after morning rush hour and before afternoon rush hour.

Work zones have to be set up for each direction of traffic flow on the site to be measured. The machine used for taking measurements has to be charged and kept from being over heated and water tanks have to be kept full at all times for taking wet measurements. The safety of the crew is, of course, the biggest priority and there are some sites that the crew needs the help of TDOT and local law enforcement officers. When interstate measurements are taken, the TDOT road crews come out and officially close lanes and, in some cases, police officers come to the site and park their cruisers with flashing blue lights to help the crew during measurements in high volume traffic areas.

We also have a new crew member who has been working on the project since July. His name is Zack Herman and this is the second project for TTAP that he has been a part of. Zack lives in Spring City.

On a personal side, Zack has a lot of interest in the music and recording field. As a matter of fact, Zack is in the process now of recording his own CD.

We welcome Zack to our Retro-Reflectivity Pavement Marking project and look forward to the beginning of the third round of measurements.



Wiley Dowlen (Right) and Shawn Brown (Left) from the Clarksville Police Department assisting in traffic control.



Zack Herman, TTAP crew member.

TDOT Snowbusters Ready to Battle Snow and Ice Across Tennessee

The Tennessee Department of Transportation's (TDOT) maintenance forces are committed to keeping the state's interstates, U.S. highways, and state routes clear during the upcoming winter season. Initial efforts will be focused on the most heavily traveled interstates and state routes and on vulnerable locations like hills, curves, ramps, bridges, and interchanges.

TDOT is able to monitor roadway conditions across the state using 37 Roadway Weather Information System (RWIS) stations. The RWIS stations monitor a variety of weather related factors including air temperatures; dew-point information; wind speed/direction; precipitation types and rates; and asphalt temperatures. This system alerts TDOT maintenance supervisors when freezing conditions are imminent.

TDOT has a statewide budget of over 11 million dollars for its winter maintenance program which utilizes state-of-the-art technology along with proven snow and ice removal techniques to keep winter roads clear. During a typical snow event, crews begin by first applying anti-icing brine to roadways. Sand, salt and calcium chloride may then be used to remove any accumulating snow and ice.

Salt brine is a salt and water mix that is sprayed onto roadway surfaces before snow and ice begin to fall. The liquid salt brine solution helps prevent snow and ice from bonding to the road surface. The solution is more cost effective and reduces the amount of sodium released into the environment.

Calcium chloride, when mixed with water, creates a heated liquid which can melt ice at temperatures as low as 5 degrees. When salt is sprayed with calcium chloride, the heat released also helps speed up rock salt's melting capacity.

For more information about winter maintenance supplies by TDOT district or for road condition information, go to the TDOT web site at www.tennessee.gov/tdot. Motorists are reminded that they can access valuable real-time information about road and weather conditions, including traffic incidents, by dialing 511 from any mobile or land-line phone or by logging onto www.TN511.com.

For more information on winter maintenance, including anti-icing/deicing strategies, chemicals, and equipment, visit the FHWA Road Weather Management Program's Snow and Ice page at http://ops.fhwa.dot.gov/weather/weather_events/snow_ice.htm.

FHWA Issues New Final Rule on High Visibility Clothing

On November 24, 2006, the Federal Highway Administration issued a new final rule (23 CFR Part 634) regarding the use of high-visibility safety apparel by workers within highway rights-of-way. The rule states, "All workers within the right-of-way of a Federal-aid highway who are exposed either to traffic (vehicles using the highway for purposes of travel) or to construction equipment within the work area shall wear high-visibility safety apparel." As defined by the new federal rule, high-visibility safety apparel refers to protective clothing which meets the requirements of ANSI performance class 2 or 3. Furthermore, the term "workers" in this rule is defined to include "people on foot whose duties place them within the right-of-way of a Federal-aid highway, such as highway construction and maintenance forces, survey crews, utility crews, responders to incidents within the highway right-of-way, and law enforcement personnel when directing traffic, investigating crashes, and handling lane closures, obstructed roadways, and disasters within the right-of-way of a Federal-aid highway." The final rule applies to all workers on any Federal-aid highway and has a compliance date of November 24, 2008. For more information on this rule, visit the FHWA's MUTCD website at <http://mutcd.fhwa.dot.gov/>.

National Work Zone Awareness Week (April 2-6, 2007)



Know the Zone - Five Key Points

RECOGNIZE THE SIGNS — ORANGE & BLACK MEAN WORK ZONES

When you see an orange sign when you travel, it's alerting you that something is different ahead. Be cautious and give your full attention to the road. Orange and black signs designate work zones across the United States – not just in Tennessee.

SLOW DOWN

Slow down in work zones to allow more time to react. Sometimes the speed limit is reduced and law enforcement officers may be present. You could pay up to \$500 for speeding in a work zone and possibly be charged with reckless driving, which can mean jail time. Don't try to pass others in work zones either. The time you might save isn't worth the risk to you, other motorists, or highway workers.

PAY ATTENTION

It's very important to look and pay extra attention to everything around you when traveling through work zones. Watch for and follow the special signs and pavement markings, flaggers, barrels and cones. All of these tell you how to drive through the work zone safely. Each work zone is different. Also, the work zone you go through frequently might have changed since the last time you went through it. Don't be distracted by other things when traveling through a work zone!

LEAVE PLENTY OF SPACE BETWEEN VEHICLES

Unexpected stops happen often in work zones. Following too closely is one of the leading causes of work zone crashes. Remember the three-second rule – leave more distance between your car and the one ahead of you than you can travel in three seconds – it's farther than you think.

ACTIONS HAVE CONSEQUENCES

Driving a vehicle is a great responsibility, and not driving it safety can lead to consequences such as: killing/hurting a worker, killing/hurting yourself, fines that are increased in work zones, totaling your vehicle, increased car insurance, etc. Remember, statistics show that work zones are more dangerous to you than to us.

FIND THE ZONES

Find active Work Zones in Tennessee through TDOT SmartWay for online traffic information resource:

<http://www.tdot.state.tn.us/tdotsmartway/>



MATERIALS AVAILABLE



TTAP regularly receives CDs and publications from a variety of sources. As part of TTAP's mission to provide information on the latest materials and techniques being used in the transportation field, we make these materials available to you, the city and county transportation officials of Tennessee. We have multiple copies of some materials, while others can only be loaned for short-term use. A complete listing can be found on our website <http://ctr.utk.edu/ttap/> If you have an interest in any of the materials listed below, please call 1-800-252-ROAD (7623) or (865) 974-5255.

DVD Title	Source	Date
Highway Safety and Trees: The Delicate Balance	FHWA	2006
Publication Title		
Covered Bridge Manual (Publication No. FHWA-HRT-04-098)	FHWA	2005
Evaluation of Safety, Design, and Operation of Shared-Use Paths (Final Report)	FHWA	2006
Field Observations and Evaluations of Streambed Scour at Bridges (Publication No. FHWA-RD-03-052)	FHWA	2005
Identifying Incompatible Combinations of Concrete Materials: Volume 1 - Final Report (Publication No. FHWA-HRT-06-079)	FHWA	2006
Innovation Intersection Safety Improvement Strategies and Management Practices: A Domestic Scan	FHWA	2006
Rubblization: Design and Construction Guidelines on Rubblizing and Overlaying PCC Pavements with Hot-Mix Asphalt (Information Series 132)	NAPA	2006
Shared-Use Path Level of Service: Calculator (A User's Guide)	FHWA	2006

TTAP Training, *continued from page 4*

cient operations and increased safety. Traffic circles and roundabouts were included in the course. These intersections are gaining interest across Tennessee. Their unique characteristics and design features provide safer intersections by reducing the number of potential conflict points and reduce crash severity.

The Work Zone/Flagging course continues to be a popular topic. We have literally been across the state with this course. If you are unable to attend one of the regularly scheduled courses, please let us know. We can discuss scheduling a class for your agency in your facility.

TTAP is putting together its calendar for 2007. If you have any suggestions for course titles please let us know. We can be reached by phone at 865-974-5255 or 800-252-ROAD (7623). We look forward to hearing from you.



Attendees at a Work Zone/Flagging Workshop

TTAP Technical Assistance Coordinator Matt Cate met with coordinators from each of Tennessee's twelve Rural Planning Organizations (RPOs) at a training retreat held at Fall Creek Falls State Park on November 8. Matt and TTAP Training Coordinator Frank Brewer attended the session to share details of TTAP's services and programs with the RPO staff members. To learn more about the Rural Planning Organizations and their mission, visit TDOT's RPO Section homepage at <http://www.tdot.state.tn.us/longrange/rpo/>.



TALK TO TTAP

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.

3. Please list topics for videos you would like TTAP to obtain.

4. Please list any other ideas or suggestions on how TTAP could assist you.

5. Please list your name and organization to verify for TTAP's mailing list.
 Name _____
 Address _____
 Title _____
 Organization _____
 Phone _____ Fax _____
 Email _____
- Are you currently on TTAP's mailing list?
 ___ yes ___ no
- Do you wish to be on the mailing list?
 ___ yes ___ no



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**RESERVE THESE DATES
 MAY 13-15, 2007
 11TH SOUTHEAST
 LOCAL ROADS CONFERENCE
 ORANGE BEACH, ALABAMA**

For additional information, contact the
 Alabama Technology Transfer (T2) Center
 Tel: 334-844-4370