

# t r a n s p o r t a t i o n TRACKS

Technology Transfer Newsletter

Published by the Local Technical Assistance Program (LTAP)  
At the Institute for Transportation Research and Education, North Carolina State University

SPRING 2014

## Warm-Mix Asphalt Use Reaches New Heights

*New NAPA/FHWA Survey Finds Nearly One-Fourth of Asphalt Tonnage Produced in 2012 Used Energy-Saving Warm Mix; Increased Use of Recycled Materials Also Quantified*

Lanham, Md. — In the latest survey of the use of recycled materials and warm-mix asphalt usage by the U.S. asphalt pavement industry, nearly a quarter of all asphalt mixtures produced in the 2012 construction season were produced using warm-mix asphalt (WMA) technologies.

The survey, conducted by the National Asphalt Pavement Association (NAPA) under contract to the Federal Highway Administration (FHWA), found that the 1,141 U.S. asphalt plants queried produced about 86.7 million tons of WMA during the 2012 construction season. This marks a 416 percent increase in the use of warm mix since the survey was first conducted in 2009. A copy of the full survey is available at [www.AsphaltPavement.org/recycling](http://www.AsphaltPavement.org/recycling).

Because WMA is produced at a lower temperature than traditional asphalt mixes, it uses less energy to produce, reduces emissions, improves worker safety, and offers construction benefits. U.S. Secretary of Transportation Anthony Foxx commented in January during the 2014 Transportation Research Board Annual Meeting that the use of WMA is expected to save \$3.6 billion in energy costs alone by 2020.

Asphalt pavements also continue to use increasing amounts of recycled and reclaimed materials. The survey found that about 68.3 million tons of reclaimed asphalt pavement (RAP) and 1.86 million tons of recycled asphalt shingles (RAS) were used in new asphalt pavement mixes in the United States during in 2012. For the first time since the start of this survey in 2009, the amount of RAP and RAS used by producers exceeded the amount collected.

The use of RAP and RAS during the 2012 paving season translates to a savings of 21.2 million barrels of liquid asphalt binder, saving taxpayers some \$2.2 billion. When reclaimed asphalt pavement and shingles are reprocessed into new pavement mixtures, the liquid asphalt binder in the recycled material is reactivated, reducing the need for virgin asphalt binder. Using reclaimed materials also reduces demands on aggregate resources.

"Ensuring high performance roads at a cost-effective price has always been a goal for the asphalt pavement industry. It has spurred us to continue to look for new solutions and to put innovations into practice," said NAPA President

Mike Acott. "This survey reflects how the industry is rapidly putting sustainable innovations, such as warm-mix asphalt, to use to ensure that drivers get the smooth, dependable roads they want at a price taxpayers can afford."

Compared to previous surveys, conducted annually since the 2009 construction season, the use of recycled materials has continued to increase.

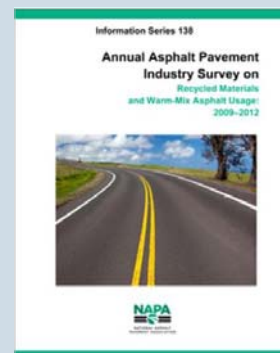
In 2012, RAS usage reached 1.86 million tons — a 56 percent increase over 2011, and a 165 percent increase since 2009. Since 2009, RAS usage has been reported in 37 states. RAS includes both manufacturer scrap shingles and post-consumer roofing shingles.

RAP usage also continued to climb, increasing to 68.3 million tons in 2012, a nearly 22 percent increase from 2009. More than 99 percent of asphalt pavement reclaimed from roads went back into new roads. In the survey, 98 percent of producers reported using RAP in their mixes.

The 2012 survey also asked for the first time about the use of ground tire rubber, steel and blast furnace slags, and other recycled materials. Although national estimates of these products' usage were not calculated, more than 1 million tons of other recycled materials was reported as being incorporated into asphalt mixtures.

The survey was conducted in mid-2013. Results from 213 companies with 1,141 plants in 48 states and Puerto Rico, along with data from 36 State Asphalt Pavement Associations, were used to calculate industry estimates for total tonnage.

For more information, contact T. Carter Ross at [cross@asphaltpavement.org](mailto:cross@asphaltpavement.org)



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transportation TRACKS  
North Carolina Technology  
Transfer Center

Institute for Transportation  
Research and Education

NC State University's  
Centennial Campus  
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About The National Asphalt Pavement Association: *The National Asphalt Pavement Association (NAPA) is the only trade association that exclusively represents the interests of the asphalt producer/contractor on the national level with Congress, government agencies, and other national trade and business organizations. NAPA supports an active research program designed to improve the quality of asphalt pavements and paving techniques used in the construction of roads, streets, highways, parking lots, airports, and environmental and recreational facilities. The association provides technical, educational, and marketing materials and information to its members; supplies product information to users and specifiers of paving materials; and conducts training courses. The association, which counts more than 1,100 companies as members, was founded in 1955.*

# In harm's way

## Avert danger by knowing where moving equipment is at all times

**The accident:** A skid steer operator was backdragging a section of a concrete contractor's yard used for concrete testing. A cement truck driver approaching the construction trailer failed to use the sidewalk, instead walking through the area behind the skid steer. A coworker realized the skid steer operator could not see the driver, and called out to the driver to move from the path of the skid steer. The truck driver did not react to the warning, and the skid steer backed over him, killing him.

**The bottom line:** A post-accident investigation determined the skid steer operator thought the victim was inside the trailer and had not seen him walk behind the skid steer. Although the company had a written safety program, there was no formalized equipment training program. The investigation also found that employees had failed to wear safety vests.

### Alert and aware

When you're working around equipment that is in motion, always remain alert. Knowing what is in front of, behind you, beside you and above you is the best way to stay safe. Additionally, your employer will provide additional protection for you. Ask your foreman about the following:

**Barriers** – If you're working on a fixed worksite or in the yard, concrete barriers should be in place to separate machines from commonly-used walkways. Portable barriers are also helpful, as they are generally brightly colored and provide high visibility to both operators and workers on foot. Avoid walking on the wrong side of the barrier.

**High-visibility clothing** – The American National Standards Institute has a hi-vis guideline that, when



properly enforced, will increase the likelihood of an equipment operator seeing you. Ask your foreman to provide you with a high-visibility vest.

**Clearance policy** – Your employer should have a policy in place that dictates you maintain a safe distance from mobile equipment and use designated pathways. Learn this policy and follow it. Avoid unapproved pathways.

**Training programs** – Your comprehensive training program on heavy equipment operation will include backing procedures. If you're in the operator's seat, use an assigned spotter to help you ensure your path is clear.

**Backup alarms** – The equipment you use will have an audible backup alarm or may have electronic sensors installed. If you're on foot, keep your ears open for the sound of an alarm.

*Information for this Safety Watch is from an accident report and the Center for Disease Control's National Institute for Occupational Safety*

*and Health Fatality Assessment and Control Evaluation Program. It is meant for general information only.*

Asphalt Roller Operator Safety Training June 4, 2014 in Raleigh Entry level

<http://www.itre.ncsu.edu/LTAP/education/selection.asp#LTAP-ARO>

Backhoe Operator Safety Training June 5, 2014 in Raleigh Entry level

<http://www.itre.ncsu.edu/LTAP/education/selection.asp#LTAP-BHO>

## *New Intersections Move Traffic Efficiently and Safely*

### *INNOVATOR, Accelerating Innovation for the American Driving Experience*

*Issue 39 November December 2013*

Innovative intersection and interchange geometrics are gaining momentum across the country. The Federal Highway Administration is promoting them through its Every Day Counts initiative to accommodate traffic volumes more efficiently while enhancing safety for motorists, pedestrians and bicyclists.

These proven techniques increase the safety of intersections—where about half of the nation's severe crashes occur—by eliminating or relocating left-turn conflicts that can cause problems. FHWA recommends that highway agencies include these designs in their evaluation processes for intersection projects and use them where appropriate.

#### *Every Day Counts is focusing on four designs:*

The diverging diamond interchange eliminates the signalized left-turn phase at the two intersections in the interchange by shifting the cross-road traffic to the left side of the road between the ramp terminals. This enhances safety by reducing the number of traffic conflict points and improves traffic flow by decreasing the number of signal phases.

- ◆ The displaced left turn intersection enhances safety and operations by eliminating the main intersection conflict between left-turning vehicles and oncoming traffic. Left-turning traffic makes a coordinated signalized turn before the main intersection into left-turn bays on the opposite side of oncoming traffic.
- ◆ U-turn intersections are a family of intersection geometrics that share a similar strategy for using indirect left turns. Those promoted through Every Day Counts include the restricted crossing U-turn intersection, sometimes called a J-turn, the median U-turn intersection and the ThrU-turn intersection. These strategies boost safety and improve traffic flow by eliminating, relocating or modifying intersection conflict points.
- ◆ The modern roundabout is a circular intersection in which traffic travels counterclockwise around a central island and entering traffic yields to circulating traffic. It improves safety by replacing perpendicular crossings and opposing direction turns with low-speed merging and diverging maneuvers.



*Missouri has more diverging diamond interchanges than any other state, including one in Maryland Heights at I-279 and Dorsett Road. (right) A restricted crossing U-turn intersection is enhancing safety on U.S. 53 and County Road B in Wisconsin's Douglas County.*

#### *State Leaders*

Examples of these geometrics abound, said Mark Doctor, safety and design engineer at FHWA's Resource Center. The Salt Lake City, Utah, area has the greatest concentration of the four designs: four diverging diamond interchanges, eight displaced left turn intersections, numerous roundabouts, several ThrU-turn intersection applications and more in the works.

Missouri has the most diverging diamond interchanges, with 10 in place and more in development, Doctor said. The state also has numerous roundabouts, several restricted crossing U-turn intersections and one displaced left turn intersection.

Maryland, another leader in implementing these designs, was an early user of the displaced left turn intersection. The state also has several restricted crossing U-turns along the U.S. 301 corridor, numerous roundabouts and a recently built diverging diamond interchange.

#### *FHWA offers support in implementing intersection and interchange geometrics:*

A workshop on Alternative Intersections and Interchanges (FHWA-NHI-380109) is aimed at state and local agency professional staff. It covers applicability criteria, safety performance, design, access management, pedestrian and other considerations. Details are at [www.nhi.fhwa.dot.gov](http://www.nhi.fhwa.dot.gov).

Technical assistance on analysis and design questions and peer reviews by experts involved with successful implementation are available. This on-call support for state and local agencies is handled mostly through email, conference calls and Web meetings.

Help with applying the designs is also offered through peer-based information exchanges, which are tailored to the interests of participating agencies. Various formats—in person, virtual or a combination—are possible to accommodate participants' travel needs, Doctor said. FHWA encourages holding a forum as part of an already planned event.

For information on obtaining technical assistance or scheduling a peer exchange, contact Mark Doctor at [mark.doctor@dot.gov](mailto:mark.doctor@dot.gov) or (404) 562-3732.

## How to Be a Good Manager: 8 Quick Tips

<http://workawesome.com/management/how-to-be-a-good-manager-8-quick-tips/>

Being a manager in any industry can be a fulfilling job, but it can also be a difficult one. You will need to find the right balance of friendliness and authority. You will need to create a good team atmosphere whilst achieving the bigger goals. So how do you strike that balance?

1. **Do Your Job:**  
First and foremost do your own job. Managing people isn't an excuse to let them do the work whilst you look on. Of course, sometimes your job may involve being more strategic but your staff will respect you for doing what needs to be done and being willing to pitch in like everyone else at times.
2. **Acknowledge The Positive:**  
See the positives in your staff and their work. Don't be one of those bosses who only sees what's missing rather than what's been achieved. Give feedback regularly and let them know that you see the good work they do.
3. **Be Vulnerable:**  
If you make a mistake, be big about it and apologize. It can be scary and seem like you are making yourself vulnerable, but your staff will appreciate your honesty. **No one expects a manager to be super human.** Everyone likes someone who takes responsibility for your actions. Being honest will help you create a culture of honesty.
4. **Be Real With People:**  
The way we work is changing. You don't have to be superhuman or untouchable. Be the real human being that you are. Let people at work know about your life and find out about others. If you let people know the "real you" it is much easier than having different personalities for your work and home life.
5. **Lead By Example:**  
If you want your staff to behave in a certain way (professional, good team players), then lead by example. It is not fair to expect your staff to do something if you are not doing it yourself.
6. **Be Self Aware:**  
Be aware of your moods and how you communicate. You may not realise how much of an impact you have on your team as a manager. You may know you are in a bad mood about the dog chewing your shoes this morning but staff may feel that they have done something wrong if they don't know this! Be aware of how and what you communicate. Your team will pick up on it.
7. **Have Fun:**  
Having fun at work can help make the work easier for everyone, forge positive relationships and strengthen your team. There is usually room for more fun in any work environment, but if the nature of your work makes that difficult, be sure to schedule fun activities when you can. Meeting for lunch or drinks after work can help build relationships and help your team to see you and each other in a new light. If you create a positive work atmosphere it also becomes easier to deal with challenges as they arise.
8. **Trust Yourself:**  
At the end of the day, there is no one right way to be a manager. Trust yourself and learn through your mistakes. Managing others is a great way to develop and enhance your leadership skills and create a positive work experience for yourself and others.



### Communicate

Let your staff know what's going on behind the scenes, as appropriate. If something will affect a member of staff, make sure they are included in the communication. This doesn't mean you have to let your staff know everything. Sometimes keeping communications back until the correct time can save panic and needless worrying. Communicate appropriately and consistently but be aware of how communication (or lack of it) can affect your staff.

### Don't Be Afraid to Manage

Things don't always go smoothly in any workplace. You are a manager, so you must be willing to manage. Some people find it hard to set boundaries or give feedback but it is important to get over that hurdle. If you need some help with this don't be afraid to ask your own boss for help or request training. It doesn't come naturally to everyone. You can make a work situation worse by not being clear with staff if you are hesitant about managing. People appreciate genuine leadership. Practice managing and making the tough decisions. These things get easier with practice but people will appreciate knowing where you stand and any changes they need to make.



Click on link below to see the video:

<http://www.equipmentworld.com/video-very-stuck-dump-truck-proves-to-be-a-challenging-rescue-for-this-excavator/?banner=iron-planet-newsletter#sthash.zBmbACpx.dpuf>

## Traffic Sign Retroreflectivity Compliance Date Fast Approaching

The delayed compliance date of June 13, 2014 is approaching quickly for public agencies to have an assessment or management method in place to maintain traffic sign minimum retroreflectivity as required by the Manual on Uniform Traffic Control Devices (MUTCD). This planned delay by the Federal Highway Administration has allowed roadway agencies the additional time to set up their program and coordinate their overall budget needs to meet these requirements.



Compliance with the MUTCD "...is achieved by having a method in place and using the method to maintain the minimum levels established in Table 2A-3. Provided that... a method is being used, an agency would be in compliance... even if there are some individual signs that do not meet the... levels at a particular point in time." The approved

methods are visual nighttime inspection, measured retroreflectivity, a management method, or a combination of the methods.



NC LTAP offers assistance in meeting the MUTCD requirements. The next scheduled **Traffic Sign Retroreflectivity Workshop is April 3, 2014**. For details on the workshop and to register please visit:

<http://www.itre.ncsu.edu/LTAP/education/index.asp>

## On the Web

### National RTAP Announces Launch of New Website and Support Center

<http://webbuilder.nationalrtap.org/Home.aspx>



National RTAP's new website design allows viewers to more easily access information and engage with National RTAP staff, services and products. With news, best practices, and resources changing regularly, visitors to the National RTAP website will find reasons to return to the site again and again! Specific improvements include an enhanced Resource Library, expanded Tribal Transit section, new State RTAP Manager directory, and dynamic homepage.

### Mobility Management Videos from the National Center for Mobility Management



<http://web1.ctaa.org/webmodules/webarticles/anmviewer.asp?a=3179&z=95>

### There's an app for that!



Pavement preservation just became more efficient, thanks to a free mobile application released by the Federal Highway Administration (FHWA). FHWA's Pavement Preservation Checklists are now available on smart phones that use the Android™ operating system and BlackBerry® phones. They will soon be available on iPhones®.

Or go online at <http://www.fhwa.dot.gov/pavement/preservation/ppcl00.cfm>



CODE	TITLE/DESCRIPTION	Download (no charge)
A-175	Recommended Performance Guidelines for Crack Treatment	<a href="#">A-175.pdf</a>



Welcome to the ITS ePrimer! The ITS ePrimer provides transportation professionals with fundamental concepts and practices related to ITS technologies. This online resource can help practicing professionals and students better understand how ITS is integrated into the planning, design, deployment, and operations of surface transportation systems. The ITS ePrimer is both a stand-alone reference document for the practitioner as well as a text for education and training programs.

A good resource for professionals and students.

<http://www.pcb.its.dot.gov/ePrimer.aspx>



## Let Us Know . . .

To update your mail information, add a colleague to the database  
or obtain information about the Roads Scholar Program,

Fax this sheet to 919-515-8898 or

email to Linda Collier [linda\\_collier@ncsu.edu](mailto:linda_collier@ncsu.edu)

Your Name: \_\_\_\_\_

Company/Organization: \_\_\_\_\_

Address: \_\_\_\_\_

City: \_\_\_\_\_ State: \_\_\_\_\_ Zip: \_\_\_\_\_

Phone: \_\_\_\_\_

Fax: \_\_\_\_\_

email: \_\_\_\_\_

Check Appropriate items:

- Add/update to the NCLTAP listserv NCTROADS
- Send information about Roads Scholar program
- Send schedule of Training opportunities



### ***NCTROADS: A listserv that works for you!***

NCTROADS, the NC LTAP listserv, is an informal network for the exchange of news about current research, discussion of problems and solutions, request for advice and assistance, and announcements of upcoming conferences, events and training opportunities for transportation personnel.

Once you are subscribed, you can send a message all the listserv members at [NCTROADS@lists.ncsu.edu](mailto:NCTROADS@lists.ncsu.edu)



***To Subscribe:***

Send a email to [linda\\_collier@ncsu.edu](mailto:linda_collier@ncsu.edu) and ask to be added to NCTROADS

***To Post A Message (after you subscribe):***

Send an e-mail message to: [NCTROADS@lists.ncsu.edu](mailto:NCTROADS@lists.ncsu.edu)

Check out the online video library

<http://www.itre.ncsu.edu/LTAP/techAssist/videolibrary.asp>

**Registration Form**

**North Carolina Local Technical Assistance Program**

**March - April 2014**

Register by Mail: Fill out a copy of this form and mail with a *check payable to NC State University*

By Email: ITRE/NC State, Attention: Bill Woods, Campus Box 8601, Raleigh NC 27695-8601  
 Online: [bill\\_woods@ncsu.edu](mailto:bill_woods@ncsu.edu)  
[www.itre.ncsu.edu/itremain/education/training\\_list.html#LTAP](http://www.itre.ncsu.edu/itremain/education/training_list.html#LTAP)

Sign Me Up	Date	Class Title	Location	RS/ARS	Cost
	March 6	Construction Math for Transportation Personnel	Raleigh	RS	\$99.00
	March 7	Plan Reading for Transportation Personnel	Raleigh	RS	\$69.00
	March 10	Basic Work Zone Safety Training	Raleigh	RS	\$99.00
	March 11	Intermediate Work Zone Safety Training	Raleigh	RS	\$125.00
	March 12-14	Work Zone Traffic Control Supervisor	Raleigh	RS	\$345.00
	March 19	Management and Supervisory Skills for Experienced Supervisors	Charlotte	ARS	\$99.00
	March 20	Management and Supervisory Skills for First Time Managers	Charlotte	RS	99.00
	March 25	Flagger Training	Raleigh	RS	\$69.00
	March 26	Flagging Instructor Recertification	Raleigh	ARS	\$125.00
	March 27-28	Flagging Instructor Training	Raleigh	ARS	\$175.00
	April 1	Road Safety 365	Durham	RS	\$99.00
	April 2	Risk Management and Tort Liability	Raleigh	ARS	\$99.00
	April 3	Traffic Sign Retroreflectivty /Pavement Marking	Raleigh	ARS	\$99.00
	April 4	Effective Public Speaking for Local Governments (using Presentations)	Raleigh	ARS	\$99.00
	April 14-15	OSHA 10 Hour Safety Training	Raleigh	ARS	\$150.00
	April 29	Asphalt Pavement Maintenance	Charlotte	RS	\$99.00
	April 30	Soils Fundamentals	Charlotte	RS	\$99.00

Confirmation letters with class detail will be **emailed** 2 weeks prior to the class. Dress is casual.

Name: \_\_\_\_\_ Department: \_\_\_\_\_  
 Title: \_\_\_\_\_  
 Agency: \_\_\_\_\_ Address: \_\_\_\_\_  
 City: \_\_\_\_\_ State: \_\_\_\_\_ Zip: \_\_\_\_\_  
 Phone: \_\_\_\_\_ Fax: \_\_\_\_\_  
 Email: \_\_\_\_\_  
 Supervisor's Name: \_\_\_\_\_ Title: \_\_\_\_\_  
 Confirmation email should be sent to: \_\_\_\_\_



**Registration Form**  
**North Carolina Local Technical Assistance Program**  
**May - June 2014**

Register by Mail: Fill out a copy of this form and mail with a *check payable to NC State University*

By Email: ITRE/NC State, Attention: Bill Woods, Campus Box 8601, Raleigh NC 27695-8601  
 Online: [bill\\_woods@ncsu.edu](mailto:bill_woods@ncsu.edu)  
[www.itre.ncsu.edu/itremain/education/training\\_list.html#LTAP](http://www.itre.ncsu.edu/itremain/education/training_list.html#LTAP)

Sign Me Up	Date	Class Title	Location	RS/ARS	Cost
	May 1	Maintenance and Repair of Utility Cuts	Charlotte	RS	\$69.00
	May 2	Excavation Safety	Raleigh	RS	\$99.00
	May 6	Asphalt Pavement Maintenance	Raleigh	RS	\$99.00
	May 7	Soils Fundamentals	Raleigh	RS	\$99.00
	May 8	Maintenance and Repair of Utility Cuts	Raleigh	RS	\$69.00
	May 21	Computers: Introduction to Reports and Presentations	Raleigh	RS	\$99.00
	May 22	Advanced Computers: Practical Applications	Raleigh	ARS	\$99.00
	June 4	Asphalt Roller Operator Safety Training	Raleigh		\$125.00
	June 5	Backhoe Operator Safety Training	Raleigh		\$125.00
	June 10	Flagger Training	Raleigh	RS	\$69.00
	June 11	Flagging Instructor RECERTIFICATION	Raleigh	ARS	\$125.00
	June 11	Writing Skills for Transportation Personnel	Charlotte	RS	\$99.00
	June 12	Flagging Instructor Training	Raleigh	ARS	\$175.00
	June 24	Basic Work Zone Safety Training	Raleigh	RS	\$99.00
	June 25-27	Work Zone Traffic Control Supervisor	Raleigh	ARS	\$345.00

Confirmation letters with class detail will be **emailed** 2 weeks prior to the class. Dress is casual.

Name: \_\_\_\_\_ Department: \_\_\_\_\_  
 Title: \_\_\_\_\_  
 Agency: \_\_\_\_\_ Address: \_\_\_\_\_  
 City: \_\_\_\_\_ State: \_\_\_\_\_ Zip: \_\_\_\_\_  
 Phone: \_\_\_\_\_ Fax: \_\_\_\_\_  
 Email: \_\_\_\_\_  
 Supervisor's Name: \_\_\_\_\_ Title: \_\_\_\_\_  
 Confirmation email should be sent to: \_\_\_\_\_

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**2014 NC LTAP Advisory Board**

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 Chris McGee, City of Raleigh



LTAP Links on the Web	
NC LTAP	<a href="http://itre.ncsu.edu/LTAP/">http://itre.ncsu.edu/LTAP/</a>
National LTAP/TTAP	<a href="http://www.ltapt2.org/">http://www.ltapt2.org/</a>
Federal Highway Administration (FHWA)	<a href="http://www.fhwa.dot.gov/">http://www.fhwa.dot.gov/</a>
Institute of Transportation Engineers (ITE)	<a href="http://www.ite.org/">http://www.ite.org/</a>
U.S. Department of Transportation	<a href="http://www.dot.gov/">http://www.dot.gov/</a>
NCSITE (NC Section of Institute of Transportation Engineers)	<a href="http://www.ncsite.org/NCSITE.html">http://www.ncsite.org/NCSITE.html</a>
North Carolina Department of Transportation (NCDOT)	<a href="http://www.ncdot.org/">http://www.ncdot.org/</a>
NCDOT Safety & Loss Control	<a href="http://www.ncdot.org/doh/safety/">http://www.ncdot.org/doh/safety/</a>
School of Government	<a href="http://www.sog.unc.edu/">http://www.sog.unc.edu/</a>

Transportation Tracks is published quarterly by the North Carolina Technology Transfer Center at the Institute for Transportation Research and Education (ITRE), North Carolina State University (NCSSU), in cooperation with the North Carolina Department of Transportation (NCDOT) and sponsored by the Federal Highway Administration (FHWA) through its Local Technical Assistance Program (LTAP). Center staff include: James B. Martin, P.E., Director; Linda Collier, Assistant Director and Newsletter Editor; and Bill Woods, Program Assistant.

To be added to the mailing list or to submit articles for the newsletter, contact the center at ITRE: NCSU Centennial Campus, Box 8601, Raleigh, NC, 27695-8601. Phone: (919) 515-8899. Fax: (919) 515-8899. Web site: [www.itre.ncsu.edu](http://www.itre.ncsu.edu). Address correction requested. Any opinions, findings, conclusions, or recommendations expressed herein are those of the author(s) and do not necessarily reflect the findings, policies, or procedures of ITRE, NCSU, NCDOT, or FHWA.

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