T3S

Are We There Yet?

Summer 2010
Volume 21, Number 3

South Carolina Transportation Technology Transfer Service

In This Issue…

American Recovery and Reinvestment Act, Saving Lives on America's Highways

By Joe Toole, Associate Administrator for Safety

SOUTH CAROLINA has targeted run-off-the-road crashes by integrating safety into larger projects funded by ARRA. Fifty-four percent of South Carolina highway fatalities between 2004 and 2008 resulted from run-off-the-road crashes. This percentage translates into almost 2,800 lost lives. To reduce these deaths, the South Carolina Department of Transportation (SCDOT) has inserted safety improvements into Interstate projects. In addition, the state has placed a strong emphasis on safety throughout other projects.

South Carolina received $463 million in ARRA funds. Approximately $90 million of these funds is dedicated to 11 Interstate rehabilitation and upgrade projects that incorporate shoulder rumble strips to address run-off-the-road crashes. Raised profile pavement markings are included in many of the 60 non-Interstate resurfacing projects funded through ARRA. In addition, the State has also advanced ARRA funds to twelve stand-alone safety projects totaling $15 million that provide for guardrail, turn lanes, flattening of curves, and intersection improvements. Another $15 million is set aside for Interstate pavement marking projects, $3 million for signal upgrades and $14 million for more than 30 sidewalk projects to enhance pedestrian safety.

To complement its use of funds for rumble strips, the SCDOT launched a safety campaign with the Roadway Safety Foundation in August 2009 entitled *Recognize, React, and Recover: Using Rumble Strips to Prevent Run-off-Road Crashes*. To download copies of the *Recognize React Recover* radio and television PSAs or to order a copy of the DVD and other materials, visit www.roadwaysafety.org.

A run-off-the-road crash occurs in South Carolina every half hour, and one person dies in one of these crashes every day. Shoulder rumble strips have proven to be very effective in reducing run-off-the-road crashes and saving lives which why SCDOT is taking advantage of their use. The use of the shoulder rumble strips is expected to reduce total run-off-the-road crashes by over 75 percent at the 11 Intersection project locations.

Obtained from: http://safety.fhwa.dot.gov/newsletter/safetycompass/2010/spring10/

SCDOT

CLEMSON UNIVERSITY

The LTAP Center for South Carolina

Recycled Materials in Roadway Construction: The Many Ways of Going Green

From reclaimed asphalt pavement (RAP) to recycled concrete aggregate (RCA) and the reuse of such materials as fly ash, tire rubber, and shingles, incorporating recycled materials in roadway construction offers the benefits of going green while saving money and maintaining quality and performance. A recent Webinar sponsored by the Federal Highway Administration's (FHWA) National Highway Institute (NHI) and Highways for LIFE program showcased resources available to assist transportation agencies in expanding their use of recycled materials. Also featured were case studies of three successful project applications. Future Webinars will present information on additional applications.

"In an era of tight budgets and increased concern about the environment, the use of recycled materials can help agencies save money and demonstrate their commitment to environmental stewardship," said Webinar moderator Steve Mueller of FHWA.

FHWA's recycling policy, issued on February 7, 2002, and available online at www.fhwa.dot.gov/legsregs/directives/policy/recmatmemo.htm, asks agencies to "consider recycling first." The use of recycled materials should be considered early in the planning and design process. Options include the use of RAP and RCA, as well as both hot and cold in-place asphalt recycling, which takes an existing pavement and recycles 100 percent of it on site for use in the new pavement or base material.

"It is most cost effective to reuse materials on site, rather than hauling them away and using them elsewhere," said Rick Givan of the Recycled Materials Company, Inc. (RMCI), in Colorado. RMCI's projects include using a mix design with 75 percent recycled materials to pave a section of I-70 in Colorado, as well as a massive 10-year project to remove and recycle pavements from taxiways, runways, and aprons at Stapleton International Airport in Denver, Colorado. "We removed and recycled 6.5 million tons of concrete and asphalt, creating what we call 'the urban quarry,'" said Givan.

When measured on a tonnage basis, hot-mix asphalt (HMA) is among the most recycled materials in the world, amounting to nearly 73 million metric tons (80 million tons) in the United States alone. Materials such as fly ash, tire rubber, shingles, slag, and foundry sand can also be reused in roadways, resulting in enhanced performance and cost savings, in addition to benefiting the environment. The reuse of foundry sand in HMA, for example, can reduce the cost of sand as the fine aggregate by about 40 percent. Approximately 91,000 metric tons (100,000 tons) per year are now being used in HMA and for such purposes as structural fills and embankments. More information can be found in FHWA's publication, Foundry Sand Facts for Civil Engineers (Pub. No. FHWA-IF-04-004), which is available at www.fhwa.dot.gov/Pavement/pub_details.cfm?id=55.

Also staying out of landfills and finding new uses in roadway applications are scrap tires. Tires are shredded to create tire-derived aggregate (TDA), which can be used as a substitute for gravel, sand, and other lightweight fill materials. Tire shreds are not only lightweight but have low earth pressure, good thermal insulation, and good drainage. "This is very beneficial where there is poor soil structure and can improve engineering performance," said Michael Blumenthal of the Rubber Manufacturers Association. The use of tire shreds can increase slope stability, reduce settlement, and stabilize potential landslides. TDA can also cost much less than other lightweight fill options. "Roadway applications include lightweight fill for highway embankments, retaining wall backfill, and insulation to limit frost penetration," said Blumenthal. Additional information is available at www.rma.org/scrap_tires.

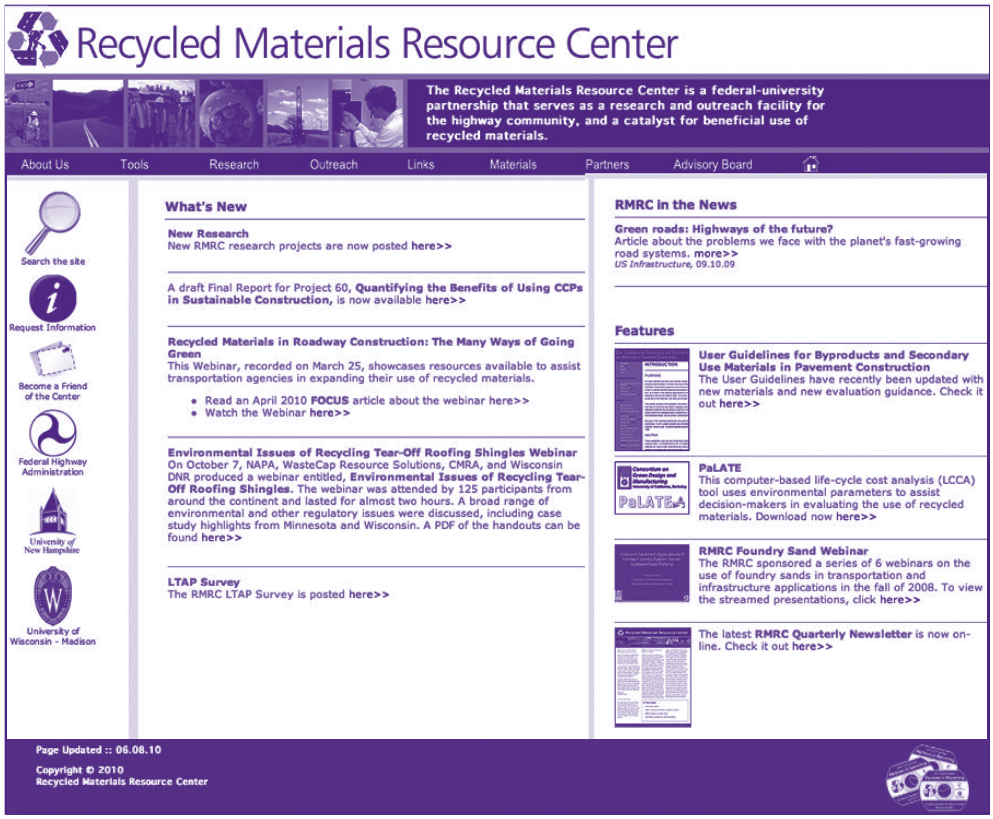
For more information on using recycled materials in roadway construction, visit www.recycledmaterials.org.

Reclaimed asphalt shingles (RAS) may also be coming soon to a roadway near you. The use of RAS in HMA can help States reduce costs, save landfill space, and improve the quality of their pavements. These recycled shingles are residential roofing shingles that have been processed to meet specifications. Debris is then removed and the RAS is ground to less than 1.27 cm (.50 in) in size for use in HMA. Made using high quality aggregate, the use of RAS in HMA can increase rut resistance and improve the high temperature performance of the asphalt.

The Missouri Department of Transportation (MoDOT) first allowed RAS in a roadway project for evaluation purposes in 2005. After the success of that project, MoDOT revised its specifications to allow the use of both RAS and RAP. As Missouri is not permitting any new

landfills to open in the State, the reuse of materials is now more important than ever. Seventeen materials processors and 13 HMA producers in Missouri are currently using RAS. For more information about RAS applications in Missouri, visit www.shinglerecycling.org.

To learn more about the range of byproducts that can be used in pavements, download the FHWA Recycled Materials Resource Center's User Guidelines for Byproducts and Secondary Use Materials in Pavement Construction at www.recycledmaterials.org. With an advisory board that includes Federal, State, and industry representatives, the Resource Center serves as a recycling research and outreach facility for the world's highway community.



Information on using RCA, meanwhile, is available at the National Concrete Pavement Technology Center's Web site, www.cptechcenter.org. Resources include a new publication, Building Sustainable Pavements with Concrete. Also available at www.fhwa.dot.gov/pavement/t504037.cfm is an FHWA Technical Advisory that discusses using RCA as aggregate for new concrete pavements. RCA generally comes from portland cement concrete pavements, bridge structures and decks, sidewalks, curbs, and gutters that have been removed from service, had their steel removed, and have been crushed to a desired gradation. Commercial construction debris can also be used for RCA, provided that it is cleaned of material such as brick, wood, steel, and glass.

Looking ahead, FHWA and the National Concrete Pavement Technology Center are sponsoring an International Conference on Sustainable Concrete Pavements, to be held September 15–17, 2010, in Sacramento, California. The conference will present innovative processes for achieving sustainable concrete pavements throughout a pavement's life cycle. For more information, visit www.fhwa.dot.gov/pavement/concrete/2010acptpconf.cfm.

In addition to highway materials recycling, environmental benefits are being realized by the growing use of warm mix asphalt (WMA). Using this technology, the temperature at which asphalt is mixed and placed on the road can be lowered by 10 to 38 °C (50 to 100 °F), resulting in reduced fuel consumption and emissions. WMA projects have now been completed in 40 States. Boosting the advancement of the technology is a Warm Mix Asphalt Technical Working Group (TWG) that includes representatives from State transportation agencies, FHWA, National Asphalt Pavement Association, National Center for Asphalt Technology, and the American Association of State Highway and Transportation Officials. TWG members meet regularly to discuss WMA issues and share knowledge and best practices. For more information, visit www.warmmixasphalt.com.

A recording and presentations from the FHWA Webinar, "The Use of Recycled Materials in Roadway Construction," are available on the NHI Web site at http://fhwa.na3.acrobat.com/n1340832010march/.

For more information on recycling, WMA, and other environmental stewardship topics, visit www.fhwa.dot.gov/pavement/enstewardship.cfm. Information is also available by contacting Jason Harrington at FHWA, 202-366-1576 (email: jason.harrington@fhwa.dot.gov), or Steve Mueller at the FHWA Resource Center, 720-963-3213 (email: steve.mueller@fhwa.dot.gov).

Retroreflective Borders on Traffic Signal Backplates Increase Visibility

Intersection Safety Case Study Summary

Red-light running is estimated to cause more than 200,000 crashes, 170,000 injuries and approximately 900 deaths per year.[1] One of the reasons for the high number of crashes is driver inability or failure to see the traffic control device in time to comply. Research also demonstrates that the number and severity of crashes can be reduced by using simple, low-cost enhancements such as increasing the visibility of traffic signals (particularly during late-night/early-morning hours) using retroreflective borders on existing backplates to increase the level of driver compliance. The experience of the South Carolina Department of Transportation (SCDOT) demonstrates how transportation agencies can improve safety with this low-cost enhancement.

The SCDOT was concerned about the high number of crashes at some of its urban signalized intersections. Recognizing that poor signal visibility can cause crashes, the SCDOT decided to install retroreflective borders on existing signal backplates at three intersections in the Columbia area that were experiencing a high incidence of crashes, many with injuries.[2] The crash reduction averages in this report reflect the average percent reduction per year based on the difference between the total number of "before" and "after" crashes, observed over a minimum duration of 4 years at each intersection, between 2003 – 2007. The "before" period was 29 months and the "after" period was 25 months for all three intersections.

This article summarizes safety benefits the SCDOT achieved by applying retroreflective borders on existing signal backplates that reduced crashes at three urban signalized intersections in Columbia, South Carolina.

LOW-COST IMPROVEMENTS

The treatment involved adding a 3-inch yellow retroreflective border to the face of the existing signal backplates (see Figure 1) in June, 2005. The retroreflective border helps to increase the intersection's visibility during the day for drivers, and even more so at night or under limited visibility conditions.

1) Sumter Highway (US 378) with Lower Richland Boulevard (S-37)

Data showed that 33 crashes occurred before the improvement was made; 21 crashes occurred after the changes. The treatment resulted in an average crash reduction of 26.2 percent and reduced injury crashes by 31.8 percent per year at this intersection. The total number of late-night/early-morning crashes remained relatively stable.

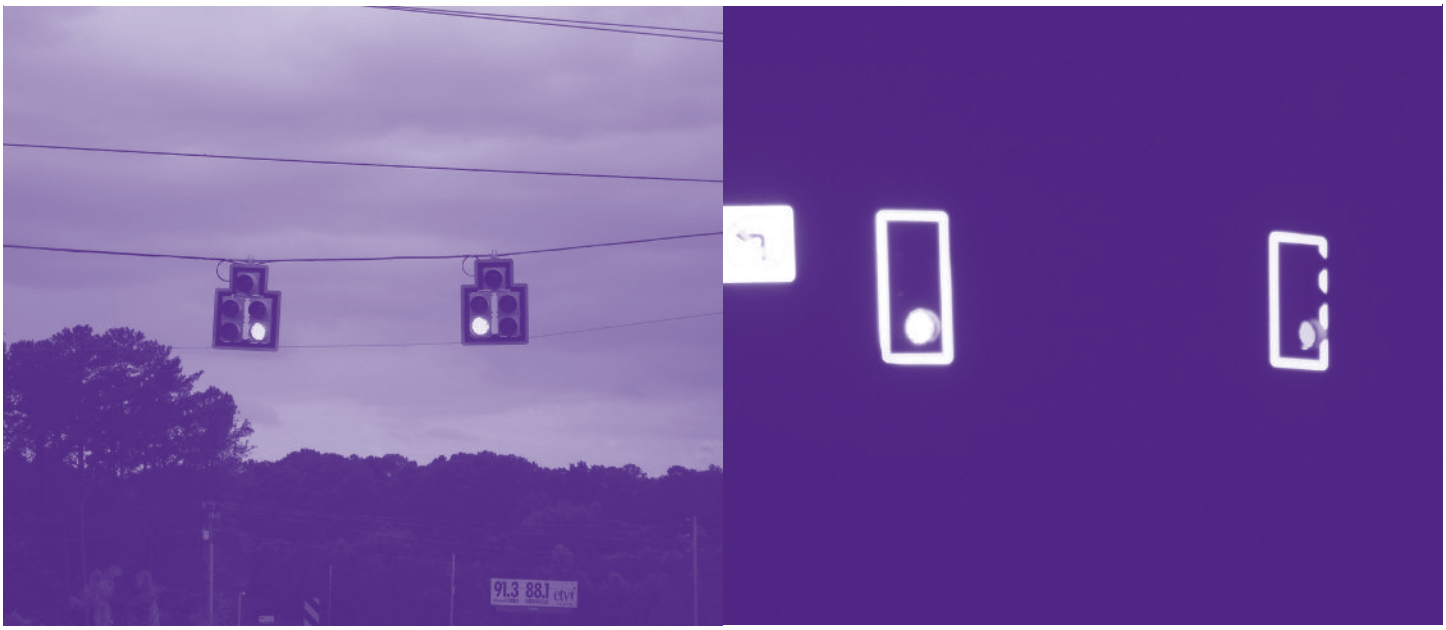


Figure 1: Retroreflective Borders Installed on Signal Backplates

2) I-26 Westbound (WB) with Piney Grove Road (S-1280)

Data showed that 13 crashes occurred before the improvement was made; 9 crashes occurred after the changes. The treatment resulted in an average crash reduction of 19.7 percent, reduced injury crashes by 76.8 percent per year, and also, reduced late-night/early-morning crashes by 85.5 percent per year at this intersection.

3) Piney Grove Road (S-1280) with Jamil Road (S-1791)

Data showed that 19 crashes occurred before the improvement was made; 10 crashes occurred after the changes. The treatment resulted in an average crash reduction of 38.9 percent and reduced late-night/early-morning crashes by 56.5 percent per year.

The Cost of Improved Safety

The SCDOT had no implementation issues with this countermeasure and the costs for implementing the enhancements were low: approximately $1,500 per intersection. The installation of the retroreflective border at each intersection was completed within two hours.

Figure 2: Retroreflective Backplate Border

The countermeasure installed at these Columbia signalized intersections cumulatively reduced total crashes by approximately 28.6 percent, injury crashes by 36.7 percent, and late-night/early-morning crashes by an average of 49.6 percent per year.

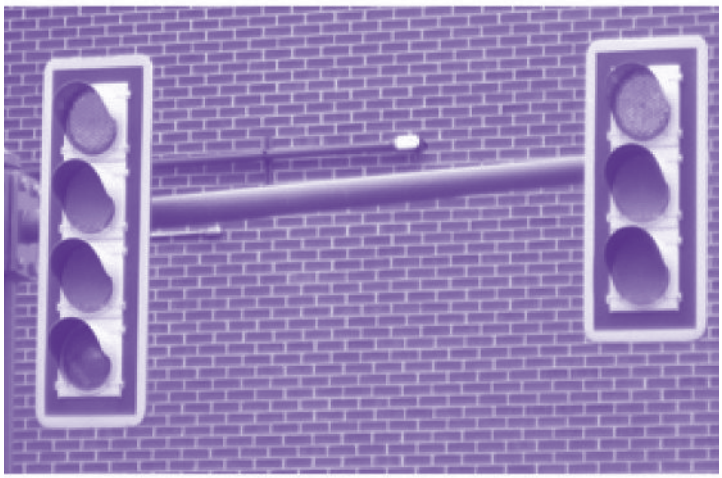


Figure 3: Retroreflective Borders Installed on Signal Backplates

As the SCDOT experience demonstrates, low-cost improvements can effectively improve safety and reduce traffic crashes and their resulting injuries. For more detailed data and results on this success story and other proven intersection safety treatments from across the country, please see the following website: http://safety.fhwa.dot.gov/intersection/. For more information, contact Ed Rice, Intersection Safety Team Leader, FHWA Office of Safety (ed.rice@dot.gov), or Joey D. Riddle, SCDOT (RiddleJD@dot.state.sc.us).

[1] Federal Highway Administration, Red-Light Running Web Site (2008), http://safety.fhwa.dot.gov/intersection/redlight/

[2] Existing intersections met minimum Manual on Uniform Traffic Control Devices (MUTCD) standards

Article from http://safety.fhwa.dot.gov/intersection/resources/casestudies/fhwasa09011/retro_article.cfm

Safety Edge Catches on as Life-Saving Technique

An asphalt paving technique called the safety edge is gaining momentum across the country as transportation officials strive to protect motorists from run-off-the-road crashes. The safety edge calls for the interface between the roadway pavement or paved shoulder and the graded shoulder to be paved at an optimal angle, to minimize vertical drop-off and provide a safer roadway edge. This means the edge of the pavement tapers down into the shoulder instead of dropping off vertically. The recommended angle of the taper is about 30 to 35 degrees from horizontal.

The Federal Highway Administration (FHWA) recommends that states use the safety edge technique particularly on two-lane roads with unpaved shoulders.

Illustrating the taper between the roadway pavement and graded shoulder. Photo courtesy of Gary Antonelli, President, Advant-Edge Paving.

Benefits of the Safety Edge

The safety edge is not an extra procedure. Instead it requires a slight change in paving equipment and has little impact on project costs. In addition, the safety edge improves the consolidation of the pavement near the edge, enhances pavement durability, and mitigates pavement drop-off until the worker can pull the graded shoulder up over the tapered edge.

The safety edge is the newest Highways for LIFE Vanguard Technology. This initiative uses dedicated teams, marketing techniques and designated funding to deploy high-payoff innovations quickly and broadly. The safety edge team is developing a marketing plan with goals, implementation tactics and communication tools to move the technology into mainstream use across the country. Other Vanguard Technologies are road safety audits, prefabricated bridge elements and systems, precast concrete pavement systems, and techniques for making work zones safer.

Fewer Fatalities

Crash data show that roadway departures account for 53 percent of fatal crashes. When a tire drops off a paved surface, sometimes just inches from the travel lane, a driver can have difficulty reentering the roadway if the pavement edge is nearly vertical, especially if the height difference is significantly more than 2 inches. When the driver drifts off the pavement and tries to steer back on, the nearly vertical edge can cause "tire scrubbing," a condition that may result in over-steering. The driver can then lose control of the vehicle and crash into oncoming traffic, rollover or hit a fixed object.

"We believe the safety edge is a focused solution that will reduce fatalities on rural two-lane roads where run-off-the-road crashes are most prevalent," said Chris Wagner, pavement and materials engineer at the FHWA Resource Center. "The safety edge also shows great promise in increasing the durability of the outside pavement edge, thereby increasing the service life of the pavement."

Wagner estimates that the safety edge has been used by about 15 state departments of transportation, including those in Alabama, California, Georgia, Indiana, Iowa, Missouri, New York, Texas, and Utah. "We recently completed a demonstration project in Iowa, and they now want to use it on two more projects," said Wagner. "And the Georgia DOT uses it on all their overlay projects."

Distracted Driving Creates Dangerous Situations

Driving large municipal trucks and special purpose vehicles, including cars, can be challenging enough even when full attention is given to the road and potential hazards. It only takes a second for a crash to happen. Distractions occur when drivers concentrate on something other than operating their vehicles—such as engaging in cell phone conversations. NHTSA (National Highway Traffic Safety Administration) estimates that 25% of all crashes involve some form of driver distractions. National surveys show that most drivers at least occasionally engage in behaviors that draw some of their attention away from their driving task. The most common of these behaviors include such general activities as;

- Talking or texting on a cell phone;
- Talking with passengers;
- Changing radio stations or CD's
- Eating or drinking while driving

Operating municipal trucks is unique. The fact that most of the trucks have special equipment requires more attention to detail, leaving no room for distractions.

Driving is a full-time job, and operating snowplows, trash pick-up trucks, fire engines, etc while using a cell phone, reading a road map, or talking to fellow employees is potentially dangerous.

- Make adjustments to vehicle controls such as radios, air conditioning, or mirrors before beginning to drive or after the vehicle is no longer in motion.
- Don't reach down or behind the driver's seat, pick up items from the floor, open the glove compartment, clean the inside windows, or perform personal grooming while driving.
- You should not eat or drink while driving, but if you do, get something that is not messy and that you can hold in one hand. Set your food up next to you before you take off and make sure you use a cup holder for your drink.
- Know where you are going and how to get there before you start out.

For more than 10 years studies have been conducted which focus on the risks associated with various types of distractions. There clearly is ample information to believe a distracted driver is at an increased risk of a crash.

Your complete attention to driving is not only in the best interest of you and your passengers but can clearly save lives as well as reduce serious injuries.

Texting is a Major Distracter

The National Safety Council estimates that 80% of Americans admit to using cell phones, and 20% admits to texting while driving. That amounts to about 100 million drivers.

Driving while using a cell phone incurs a 4 times greater risk of crashing, which is equivalent to driving while drunk (with a 0.08 blood-alcohol level.) For texters, the risk is eight times greater.

Talking on a cell phone while driving slows down the reaction time of even the most experienced driver.

All drivers of municipal vehicles must be committed to reducing serious injuries and deaths on our roadways.

This all starts with your commitment to not become a distracted driver.

A List of Common Distracters:

- Use of cell phones
- Eating/drinking/smoking
- Texting and emailing
- Personal hygiene
- Changing radio stations/CD's DVD's
- Sight seeing/gawking
- iPods
- In car information screens
- Adjusting mirrors/heat/AC
- Searching for items
- GPS
- Unsecured objects
- Reading maps/directions/books/ magazines/newspapers

Local and Rural Road Safety Peer to Peer Safety Program

Federal Highway Administration Office of Safety has launched the Local and Rural Road Safety Peer to Peer Safety Program (LRR P2P). This new Peer-to-Peer (P2P) Program has been established as a form of technical assistance for local and rural highway agencies to resolve safety problems on the roads they own and maintain.

In order to reduce fatalities and serious injuries on our Nation's road network, local and rural highway practitioners have to routinely integrate safety in their projects and programs. The majority of the nation's roadway are owned, operated and maintained by numerous small agencies and it is the aim of this program to provide access to road safety information, knowledge and resources needed to address safety issues these practitioners face.

The LRR P2P is a free volunteer-oriented program that will provide peer assistance through several venues. Assistance can be in the form of phone calls, email exchanges, general instruction or site visits depending on the agency's needs. Experts with knowledge in various local and rural road safety issues have volunteered their time to provide assistance to their peers requesting help.

Guidance can be provided on determining locations that need immediate attention; on low cost safety improvements that can be installed quickly to address specific safety needs; and on various funding options available for safety improvements on local and rural roads to name a few. More information on this P2P program is available on the FHWA Safety website http://safety.fhwa.dot.gov/local_rural/training/fhwasa10014/_where a brochure can also be downloaded. A limited number of hard copies are also available for distribution.

The first step in initiating this free resource is contacting the P2P coordinator. This can be done by phone, fax or e-mail. The coordinator will analyze specific needs and determine the best peer based on those needs.

For general information on the Local and Rural Road Safety P2P program please contact:

Rosemarie Anderson
Office of Safety Programs
Federal Highway Administration
202-366-5007 (v)
rosemarie.anderson@dot.gov

Safety Zone

Planning a Crew Safety Meeting? Here is Help.

By Lisa Harris

Are you looking for materials to use at your regular safety meetings? Iowa LTAP has created six training modules that might just be the ticket.

The modules, collected in a 476 KB PDF, cover the following topics:

- Hard hats
- Lifting and carrying
- Shop safety
- Work site safety
- Safe vehicle operation
- Snow and ice operations

These modules have easy-to-use, customize-able training materials for conducting worker safety training sessions. You can use these modules in any order and you can use them to train new employees or review safety topics with more experienced employees.

Each module includes a handout for employees and a guide for the trainer. The handout provides employees with an outline of important information on the module topic. The trainer guide includes training activities, training goals, and tips for supervisors. See box at right for a sample lesson plan on hard hats that really hits home!

The modules are online at www.ctre.iastate.edu/pubs/worker_safety.

Adapted with permission from Technology Exchange, Minnesota LTAP, Fall 2006, Vol 14, No. 4.

Sample lesson plan on hard hat safety

1. Show video and discuss. (6 min.)
2. Pass around a bad hard hat. Ask learners to shout out the defects. If they don't identify all the flaws, point them out. (3 min.)
3. Pass around a hard hat that's been left in the sun too long. Ask learners if they can see anything wrong with it. Explain that ultraviolet rays make the hat weaker and that it's best to store hard hats out of direct sunlight. (3 min.)
4. Show the inside of a good hard hat and pass around a few good ones. Explain the importance of the suspension, how it works, and how to adjust it to fit properly. (3 min.)
5. Explain your agency's policy on when to wear a hard hat. Ask several "what if" questions that require learners to think about different work situations and whether a hard hat is required. (4 min.)
6. Ask learners to grab a hard hat and adjust it for their own wear. Check to make sure they're doing this properly. (5 min.)
7. Spread out a tarp or plastic sheeting (preferably outdoors to avoid a mess). Place a poor-fitting hard hat on a melon and smack the hard hat with the sledgehammer. Ask for a volunteer to adjust a hard hat to fit another melon. Ask for additional volunteers to drop objects on it and finally to smack it with the hammer. (7 min.)
8. Ask learners to explain the benefits of wearing a hard hat. (2 min.)

Reprinted with permission from the Winter 2010 issue of the Kansas LTAP Newsletter. http://www.ksltap.org.

Checklist for Worker Safety at the Yard and Shop

This checklist is adapted from one designed by Region 1 of the Environmental Protection Agency (EPA) to help public works facilities achieve and maintain compliance with environmental, health and safety requirements. It is based on federal regulations as well as nationally recognized fire codes, and is edited here to show the tasks most relevant to safety.

This checklist is designed to help identify issues that may need further attention. It does not substitute for review of actual state and federal regulations.

Walk-around of the yard and shop
Be alert for the following good safety practices as you conduct a walk-around:

Yard

- Waste materials abandoned on the property or that have been picked up are identified, stored according to hazard, and disposed of properly.

Building

- Employees have been trained in the use of fire extinguishers.
- Aisles and emergency exits are clear, and exit signs are posted over doors.
- Smoking is prohibited near volatile fluids.
- Electrical receptacles have no open grounds or reverse polarity.
- Circuits are labeled and the circuit box is closed. Access to the circuit box is clear within 5-10 feet.
- Electrical outlets have cover plates. No wires are frayed, damaged, or taped off.
- Wiring is enclosed in electrical metallic tubing or rigid metal pipe.
- There is adequate central ventilation and adequate local ventilation for carbon monoxide from tailpipe exhaust systems.

Materials and waste storage and management (including oils, solvents, antifreeze and gasoline)

- Drums, tanks and other containers are labeled with the name of the material they hold (for example, waste oil) and the type of hazard they present (e.g., flammable).
- Waste containers are labeled with the date when contents were first added.
- Lids are tight-fitting and sealed, and bungs are closed.
- Waste storage area is labeled.
- There are no leaks or excessive spillage in chemical or waste storage areas, including around solvent sinks, pumps, pipes, hoses, and valves.
- Flammable (flash point <140°F) materials are stored in an area (such as an air-tight metal cabinet) approved by the local fire department.
- Flammable and hazardous liquids are stored in containers that are either approved by the U.S. Department of Transportation or by the State Fire Marshall, or listed and labeled by the National Registration and Testing Laboratory (UL-listed).

General equipment

- Lifts have operable safety locks; are tested and serviced monthly.
- Wheel grinders have properly adjusted tongue guards and work rests.
- Placard overhead storage with approved load limits and install guard rails.
- Electrical cords are intact and have grounding prongs.

Health and safety

- The shop has written contingency plans for fire prevention, emergencies, and spill control, posted near phones and potential sources of spills.
- Spill control materials are available on-site.
- Materials Safety Data Sheets (MSDSs) are available for all chemicals.
- Eyewash and showers providing 15 minutes of continuous flush are available in areas where acids and bases are used.
- Employees are trained in chemical hazard, safety, and emergency preparedness.

Vehicle fluids

- Oily shop rags are placed in sealed, labeled metal containers and laundered by a licensed facility.

Solvents parts cleaning

- Lid of solvent parts cleaner is closed.
- Parts cleaner is labeled with material name and hazard type.
- If flammable solvent (flash point <140°F, <200°F in R.I.) is used, the parts cleaner has a fusible link that locks shut in the case of fire.
- Parts cleaner filters are handled as a hazardous waste.

Source:

- Checklist for Public Works Facilities: Complying with Environmental, Fire, and Health & Safety Regulations. Region 1 Office, Environmental Protection Agency. http://www.epa.gov/ne/municipalities/checklist.html.

Reprinted with permission from the Winter 2010 issue of the Kansas LTAP Newsletter. http://www.ksltap.org.

Information Request and Address Change Form

Videos and publications from our library are available on-line at www.clemson.edu/t3s.

The videos and publications are free to individuals employed by any city, county, or state government agency in South Carolina. You can obtain a free single copy of most publications, or borrow a copy of one of our "for loan" publications and videos.

Transportation Technology Transfer Service

Civil Engineering Department
Clemson University, Box 340911
Clemson, SC 29634-0911

Phone: 864-656-1456
Toll free: 888-414-3069
Fax: 864-656-2670

Name: _____

Title: _____

Address: _____

Phone: _____ Fax: _____

☐ *This is a new address*

☐ *Please add my name to your mailing list*

Publications

☐ *Preventive Maintenance Intervals for Transit Buses,* TCRP Synthesis 81. This synthesis studied preventive measures taken by a sampling of transit agencies to ensure buses are on time, protect taxpayer investments, and promote passenger satisfaction and public safety.

☐ *Soil and Water Road- Condition Index (SWRCI)—Field Guide,* USDA, US Forest Service, FHWA. This guide was developed to provide a road assessment tool for watershed-and project scale analysis. SWRCI is intended to be a rapid-assessment tool for soil scientists and hydrologist to identify effects of roads on soil quality and function, as well as impacts to water quality and downstream values.

☐ *Soil and Water Road- Condition-Desk Reference,* USDA, US Forest Service, FHWA. This is a companion document to the SWRCI Index that: provides a description of each road attribute (road-surface shape), identifies the questions the attribute addresses for a project or watershed, and identifies related indicators and the usefulness of the attribute in identifying road impacts to soil and water resources with referenced research findings.

☐ *Recommended Performance Guideline for Micro Surfacing,* International Slurry Surfacing Association. An outline to assist user agencies in establishing their particular project specification (understanding geographical areas vary as do the availability of materials).

☐ *Recommended Performance Guideline for Emulsified Asphalt Slurry Seal,* International Slurry Surfacing Association. An outline to assist user agencies in establishing their particular project specification (understanding geographical areas vary as do the availability of materials).

☐ *Stabilization Selection Guide for Aggregate- and Native Surfaced Low Volume Roads,* USDA, US Forest Service. The purpose of this guide is to facilitate the selection of modification/stabilization agents and techniques for aggregate surfaced and native/unsurfaced low volume roads.

FHWA Exploratory Advanced Research Program Fact Sheets

☐ *Seeing in the Dark*—Improving Understanding of Driver Visibility Requirements at Night

☐ *Next Generation Smart Traffic Signals*—RHODES^{NG} With Intellidrive^{SM} the Self Taught Traffic Control System

☐ *Real-Time Measurement of Soil Stiffness During Static Compaction*

☐ *Crack Resistant Concrete*—Maximizing the Service Life of Transportation Infrastructure

☐ *Integrated Urban Systems Modeling*—Designing a Seamless, Comprehensive Approach to Transportation Planning

Are We There Yet? is published by the South Carolina Transportation Technology Transfer Service (T^3S) for the benefit of county and municipal government agency personnel in South Carolina. T^3S, administered by the Clemson University Civil Engineering Department, is the Local Technical Assistance Program (LTAP) center for SC. T^3S is part of a nationwide network of LTAP centers established by the Federal Highway Administration (FHWA) in cooperation with state transportation agencies. T^3S is jointly funded by FHWA and the South Carolina Department of Transportation (SCDOT). The views, opinions, and recommendations contained in the newsletter do not necessarily reflect the views of the FHWA or the SCDOT.

How to Contact Us

SC Transportation Technology Transfer Service
Civil Engineering Department
Clemson University—Box 340911
Clemson, SC 29634–0911
Phone: 888-414-3069 Fax: 864-656-2670
E-mail: t3s@clemson.edu
Web: www.clemson.edu/t3s

Director:	Jim Burati	864-656-3315
Program Manager:	Sandi Priddy	864-656-6141

Transportation Technology Transfer Service
Civil Engineering Department
Clemson University
Box 340911
Clemson, SC 29634-0911

Presort Standard
U.S. POSTAGE PAID
Clemson, SC
Permit No. 10