Production and placement of hot-mix asphalt (HMA) pavements in the United States has evolved over the last 130 years, from hand mixing and application to computerized facilities feeding highly automated equipment. During this time, engineers have learned that temperature control is crucial to aggregate coating, mixture stability during production and transport, ease of placement, compaction, density, and ultimately a pavement’s long-term performance. During construction, the temperature must be high enough to ensure the coating and workability of the mix, but low enough that asphalt binder draindown (when the liquid binder flows down through the mixture and pools at the bottom), aging, and hardening do not occur.
Letter from the Director

Climate change has certainly impacted more than just weather this past year. Hopefully it gave everyone a positive balance in winter maintenance budgets, a head start on spring cleanup and repair, and a need to prioritize summer road repair plans. T², with the encouragement of NHDOT, has a team of staff and students to assist highway departments in setting up asset management programs for road surface degradation, signage appearance, drainage network functionality, and ADA compliance.

Spring T² training courses are now being offered. Be aware that many programs are reaching full registration, so you will need to register as soon as possible. Courses for this season include Flagger Certification, Grader Operations and Safety, Green SnowPro Certification, and A Hard Road To Travel. See our complete training calendar at www.t2.unh.edu/training-calendar.

In other exciting news, center staff - as well as interested road agents, NHDOT and DES personnel - recently participated in two Legislative hearings. The first hearing was the second of two discussions regarding the certification for culvert installation that would allow municipal officials to perform routine maintenance on culverts up to 48” diameter without first filing a permit. Instead, certified municipal and state officials would perform work using best practices and file a quarterly work summary to DES. The hearing was regarding training and certifying winter maintenance contractors in salt reduction best management practices. We look forward to more progress on these fronts and will keep the public works community updated as we move forward.

Regards,

Dr. Charles Goodspeed
Build a Better Mousetrap Competition

Have you or a co-worker recently built an innovative gadget or developed an improved way to do a job? Well, now is the time to show off a project your agency is proud of in our Build a Better Mousetrap Competition!

We are looking for projects that you, your employees, or crew designed and built; it can be anything from the development of tools, equipment modifications, and/or processes that increase safety, reduce cost, improve efficiency, and improve the quality of transportation.

Submit entries to us here at the Technology Transfer Center, where we will pick a state winner. The winning entry will be submitted into a national competition where you will compete for fantastic prizes, and of course bragging rights!

To enter please visit our website and download the entry form and return to the Technology Transfer Center by June 15, 2012. You can email forms to e.hamilton@unh.edu, fax forms to 603-862-0620, or can mail to: Technology Transfer Center
33 Academic Way
Durham, NH 03079

For more information, please contact Beth Hamilton at 603-862-1362

The Federal Highway Administration sponsors the Every Day Counts initiatives. The Technology Transfer Center assists in bringing nationally broadcasted webinars to the locals of New Hampshire. These webinars are known as the Every Day Counts Exchanges, and two have been completed to date. T² encourages local municipal leaders, road managers, directors, selectman, employees, and local contractors to participate in these national discussions. There are still three Exchanges already scheduled for this year:

Exchange # 3   Flexibility in Right-of-Way   April 19, 2012
Exchange #4   In Lieu Fees / Mitigation Banking   June 21, 2012
Exchange #5   ASCT   August 16, 2012

These Exchanges are brought to you by FHWA and include first-hand experiences and testimonials from road managers around the country who have attempted the use of new technologies that could potentially save time and/or money. Check out T²’s online calendar for the upcoming Exchange and online registration at www.t2.unh.edu/training-calendar

For more information or to register for upcoming webinars, contact Beth Hamilton at 603-862-1362
From Hot to Warm

Modern performance requirements often dictate use of polymer-modified asphalt binders, strong angular aggregate, and greater in-place density of the HMA. Engineers typically use polymer modification as insurance against permanent deformation of a pavement at high surface temperatures on high-volume roads. But mixes made with polymer binders can be more difficult to work with than mixes with unmodified binders.

For higher traffic-volume pavements and surfaces courses in medium-traffic-volume pavements, specifications often mandate greater aggregate angularity. Such aggregate increases the internal friction of the material and makes it more durable, but greater angularity also increases the force required to mix and place the aggregate, especially in coarse gradations. Engineers often respond to this stiffness or lack of workability by raising temperatures for productions, placement, and compaction temperatures to reduce the viscosity of the binder and improve the mixture flow.

Density specifications also affect the workability of HMA. Engineers use density as a measure of pavement quality: The greater a pavement’s density, the lower its permeability to air and water and the better its long-term performance. If a mixture shows resistance to compression during compaction and therefore requires more effort to achieve the specified density, engineers typically respond by raising its temperature.

However, increasing production temperature is often expedient but not necessarily the most effective solution. The simple act of increasing the temperature can overheat the mixture and lead to accelerated aging in the short term and, ultimately, affect performance in the longer term. The adjustment also can result in greater fuel consumption, emissions, and odors at both the production plant and the paving site.

The Federal Highway Administration (FHWA) is continually exploring technological improvements that will enhance the performance, construction efficiency, resource conservation, and environmental stewardship of asphalt mixtures. One approach to achieving all these goals is to reduce HMA production temperatures—sometimes by as much as 100°F—and to this end engineers are exploring the concept of warm-mix asphalt (WMA). WMA processes and products use various mechanical and chemical means to either reduce binder viscosity at lower temperatures or reduces the shear resistance of the mixture at construction temperatures while maintaining or improving pavement performance.

### Warm-Mix Asphalt

The various asphalt mixtures are distinguished by the temperature ranges at which they are produced, and the strength and durability of the final product. Manufacturers produce cold asphalt mixtures at ambient temperatures, in the 68-122°F range. They produce HMA in the 284-338°F range. HMA has higher stability and durability than cold-mix asphalt, which is why cold mix is used in the lower pavement layers of low-volume roadways. Manufacturers typically produce
WMA in the 220-275°F range.

Relative to HMA, the immediate benefit of producing WMA is its lower energy consumption. HMA requires high heat to enable the asphalt binder to become fluid enough to coat the aggregate completely, have workability during laying and compactions, and retain durability during traffic exposure. With WMA’s lower production temperatures comes the additional benefit of reduced emissions from burning fossil fuels, and decreased fumes and odors.

The differential between a production temperature established for an original HMA design and an alternative design using WMA technology only partially determines the reductions that are achieved. The final production temperature depends on more than a simple decision and turning down a dial. Other factors include the production plant capabilities; the tuning of the burner that heats the mix (to provide complete fuel combustion at the reduced production temperature), binder, and mixture design; and the specific WMA technology used.

**WMA Technologies**

Since 2006, NCAT has documented more than 140 WMA projects in 43 states and the District of Columbia. In the same period, providers have introduced 21 named WMA technologies into the U.S. market. The technologies generally fall into three categories: material processing, mixture and binder additives (chemicals and waxes), and water foaming technologies. Some technologies also include such additives as surfactants or chemical antistripping agents. All of these technologies, introduced at some point or other in the production process, make it easier for manufacturers and crews to make and place WMA pavements, and facilitated the pavements’ performance and log lives.

FHWA is involved in evaluating and implementing these and other WMA technologies. The agency

Less emissions are given off from the WMA being distributed into the truck as shown by FHWA
is working closely with State and industry partners to develop and monitor demonstration projects and research, and to advance the knowledge and state of practice of WMA materials and technologies.

State agencies have requested the services of FHWA’s Mobile Asphalt Pavement Mixture Laboratory (Mobile Asphalt Lab) to support further research and validation through material sampling and performance testing on WMA projects. Experienced technicians and engineers travel with the mobile lab to pavement construction sites across the country to help transportation partners resolve national issues related to implementation of new pavement technologies.

**Lower Temperature, Increased Moisture Susceptibility?**

Reducing the production temperature of HMA without the additional implementation of materials handling and production best practices might lead to incomplete drying of the aggregate, which could lead to negative pavement performance. There is concern that HMA pavements might be more susceptible to moisture if the aggregate is not completely dry, and early rutting could occur due to reduced production aging of the binder.

Moisture damage is also possible in HMA mixtures, but it could be exacerbated in WMA due to production issues. Inadequately dried aggregates at lower production temperatures, plus the possible introduction of additional moisture (although small in amount, typically less than 1.5 percent of the weight of the binder) to the WMA from the various WMA foaming or emulsion technologies, creates a concern that moisture could displace asphalt in coating certain kinds of aggregate. This displacement could affect the asphalt binder-to-aggregate adhesion, increase asphalt stripping and moisture susceptibility, and generally reduce mixture performance.

Reduced binder aging could reduce the cracking of pavement later in its life, although recent evaluations of in-place WMA pavements show they reach a similar aged condition as HMA pavements after 2 or 3 years in service. Another concern is that the reduced aging of WMA in the early stages of a pavement’s life could contribute to loss of stability in hot weather and increase susceptibility to rutting. However, approaches to materials and mix type selection may provide effective solutions.

Mixture design/selection strategies, such as increasing the high-temperature asphalt binder grade or selecting rut-resistant mixtures like stone matrix asphalt, are two strategies being explored. Use of more angular aggregate will provide greater internal friction to the mix, which in turn increases its shear strength without only relying on the cohesion of the binder. Using a higher high-temperature, performance-graded binder—essentially grade bumping—can counteract the effects of reduced plant oxidation during mixing if it is needed.

Test data on moisture damage and rutting performance often show contradictory results between the laboratory testing versus the field. Researchers have found that in the lab, WMA mixtures often fail to meet the Hamburg Wheel Tracking Device test criteria for maximum allowable rut depth when immersed in a condition water bath, yet moisture damage and rutting have not commonly been witnessed in the field.

Differences between laboratory test results and field performance suggest modifications to material preparation and/or test procedures might be required in the laboratory when evaluating WMA moisture damage and rutting susceptibility so that field conditions can be simulated properly. However, this issue raises some immediate questions. Should WMA mixture testing require different conditioning or test procedures than HMA mixtures when researchers expect that WMA should perform equal to or better than HMA? If researchers change testing protocols, are the modifications appropriate for countrywide adoption? Or should the researchers make regional modifications to reflect differences in climate, traffic, and virgin materials?
An Even Better Environment for WMA?

Current and pending regulations regarding greenhouse gas emissions are making the consideration of greater reductions on HMA productions temperatures more attractive.

Many environmental factors are driving development and implementation of WMA technologies globally. Nevertheless, for WMA to succeed in the United States, pavements must have equal or better performance compared to traditional HMA pavements. Engineers must be satisfied that WMA mixtures will be as strong and durable as current pavements. Further research is needed to measure the degree of environmental improvement, fundamental mix characteristics, and impact on performance of the new technologies.

Matthew Corrigan is an asphalt pavement engineer with FHWA's Office of Pavement Technology. He is FHWA's coordinator for investigation and implementation of WMA technologies, cochairman of the Warm Mix Asphalt Technical Working Group, and manager of the Mobile Asphalt Lab. Corrigan is a graduate of The Pennsylvania State University with a degree in civil engineering and is a licensed professional engineer in the Commonwealth of Virginia.

Dave Newcomb is the vice president for research and technology at NAPA. He is a licensed professional engineer in Minnesota.

Thomas Bennert is the senior research engineer at the Center for Advanced Infrastructure and Transportation at Rutgers, The State University of New Jersey. He is a member of the WMA working group and the Transportation Research Board's Committee AFK30: Characteristics of Nonbituminous Components of Bituminous Paving Mixtures.

For more information on Warm Mix Asphalt, contact Matthew Corrigan at 202-366-1549 or matthew.corrigan@dot.gov, Dave Newcomb at 301-731-4748, ext. 104, or dnewcomb@hotmix.org, or Thomas Bennert at 732-445-5376 or bennert@eden.rutgers.edu.

This article was reprinted with permission from the Federal Highway Administration from the July/August publication of Public Roads from 2010.

Completed WMA road in Yellowstone National Park
New Hampshire Roads Scholars

The Technology Transfer Center’s Spring 2012 Training Season has just begun and already we have achievements to celebrate! Since we have only had one full week of workshops, our list is small this time. Please be sure to check in summer edition of Road Business to see more achievements in the middle of our training season. We expect to have quite a few!

Master Roads Scholar is the fourth and highest achieving level of the UNH T² Center Roads Scholar Training Program. To be a Master Roads Scholar, the participant must have completed 100 training hours, including the requirements for Roads Scholar Level II. The third achievement level of the program is becoming a Senior Roads Scholar. Senior Roads Scholars have completed 75 hours of training including the requirements for Roads Scholar Level II. Roads Scholar Level II requires 50 hours total, including 25 hours in technical training, 5 hours of supervisory training, 5 hours of tort/liability or safety, and 5 hours dedicated to environmental training. The first achievement level is Roads Scholar Level I. To achieve Level I, participants must complete 25 hours of training. We congratulate all those who have reached new achievement levels and encourage further training in the future.

Master Roads Scholar—James Shackford, Jr.

James Shackford, Jr. has become a Master Roads Scholar in the first week of training this spring. He is an Equipment Operator for the Town of Conway, where he has worked for twelve years. He began his involvement in Public Works for the simple love of the work and how it positively impacts people’s everyday lives. James enjoys the variety of the work and how each season brings a new type of project. In Conway, he is assisting in rebuilding roads this coming season.

James offers very few words of wisdom for new Public Works employees, but his choice in words says it all: patience. His advice hints towards patience with oneself, learning new techniques, and taking advantage of training.

James plans to continue furthering his education through the Roads Scholar program, even at his Master Roads Scholar level. He enjoys all aspects and types of workshops offered through T².

James and others who have achieved Master Roads Scholar in the past year should be anticipating receiving an invitation for the upcoming Master Roads Scholar Luncheon to celebrate their achievements with colleagues, family, and friends.

UNH T² Master Roads Scholar

<table>
<thead>
<tr>
<th>Roads Scholar I</th>
<th>Master Roads Scholar</th>
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<td>100 training hours and Roads Scholar II requirements</td>
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<tr>
<td>Wallace Daigneau, Moultonborough</td>
<td>James Shackford, Jr., Conway</td>
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</table>

Have a question about what level you have achieved or what workshops you have taken? Contact Beth Hamilton at 603-862-1362 or e-mail t2.center@unh.edu to request information regarding your Roads Scholar transcript.
Incorporating Safety Performance into Project Planning and Design

by Tim Harmon, Project Engineer, University of New Hampshire Technology Transfer Center
Continued from page 1

agencies to quantitatively predict and analyze highway safety. With the HSM, safety performance can now be integrated into project planning, scoping, design, operations, and evaluation alongside other factors such as capacity and environmental impact. Like the Highway Capacity Manual, the HSM is only a set of tools and guidelines that can aid in planning and design. It is not a standard, but it gives practitioners a better understanding of highway safety and helps agencies manage risk, as well as reach fatality and crash-reduction goals.

Why should you use the HSM?

The HSM includes tools to screen road networks, as well as prioritize sites with the highest potential for safety improvement based on geographic and geometric variables. Factors contributing to crashes can be examined, and patterns in crashes can be explored. For each site, users can compare the predicted crash-frequency and severity-reduction for selected design alternatives. Agencies can continually screen for sites with potential for improvement and evaluate sites that have been upgraded in order to assess the effectiveness of countermeasures. Consequently, the HSM saves both time and money, weeding out weaker alternatives. Funds can be spent on the countermeasures that show the best results and produce the highest benefit-cost.

Benefits of using the HSM

- State-of-the-art safety analysis tools to support planning and design decision-making
- Use tools calibrated to local data involving traffic counts, trends, and crash history specific to local roads
- Choose the most cost-effective solutions to safety-related issues and continue to benefit from the most economic options
- Proven methods to save lives by reducing crash frequency and severity

What are the sections of the HSM?

The HSM consists of four parts:

Part A: Introduction, Human Factors, and Fundamentals explains the purpose of the HSM and introduces the fundamentals of the statistical approach used throughout the rest of the manual.

Part B: Roadway Safety Management Process includes tools used for screening existing road networks and identifying needs, choosing sites for improvement, and evaluating safety and economic effectiveness of potential countermeasures. Road segments, intersections, and ramps can all be screened using Part B. The Empirical

AASHTO's Highway Safety Manual can be further explored at www.highwaysafetymanual.org
Bayes (EB) statistical approach allows nearly all characteristics of these sites to be evaluated by utilizing models with many independent factors.

Part C: Predictive Method provides Safety Performance Functions (SPFs) for calculating the expected average crash-frequency of a network or site. SPFs are regression models developed specifically to perform calculations using the EB method. The SPFs in the HSM were calibrated using data from the Highway Safety Information System (HSIS): a national database of safety information from nine contributing states. Using the HSM, agencies have the ability to calibrate these default SPFs to their own network for more accurate analyses. The first edition of the HSM includes SPFs for Rural Two-Lane roads, Rural Multi-lane Highways, and Urban and Suburban Arterials. Research is being done to include Freeways, Interchanges, 6+ Lane Arterials, and One-Way Roads in an extra chapter or a second edition.

Part D: Crash Modification Factors lists Crash Modification Factors (CMFs) that are being used in models to adjust the base conditions of a model to the proposed or existing condition. CMFs have been developed for a vast amount of variables - such as roadway geometry, roadside features, intersection traffic control, pedestrian and bicycle features, and many more. These CMFs can be directly applied in evaluation of design alternatives for any site for which CMFs and SPFs have been developed.

**What tools are available to assist in using the HSM?**

Several tools have been developed in support of the HSM tools:

- SafetyAnalyst provides software tools that can programmatically screen a road network, diagnose sites, select countermeasures, and appraise countermeasure alternatives. SafetyAnalyst is AASHTOWare and a license is required to use the software (http://www.safetyanalyst.org). The tools in SafetyAnalyst support Part B of the HSM.

- Interactive Highway Safety Design Model (IHSDM) is a set of software tools used to evaluate safety and operational effects of specific geometric designs. Not only does the IHSDM predict and compare the safety performance of design options, but it can also check designs against relevant policy values. The IHSDM also contains a Calibration Utility to assist in calibrating models to local data. This tool can be downloaded free-of-charge (http://www.ihsdm.org) and supports Part C of the HSM.

- Crash Modification Factors Clearinghouse (http://www.CMFClearinghouse.org) is a catalog of known CMFs that have been developed and verified in past research projects. It explains how each CMF can be applied, as well as the reliability of each CMF. This tool can be used in conjunction with Part D of the HSM.

**What are some things you can do with the HSM?**

- Determine locations with the highest observed crash-frequency relative to the number of expected crashes

- Calculate the cost-effectiveness of widening a shoulder, milling rumble strips, adding a guardrail, or other countermeasures based on safety performance of the upgrade to the site

- Compare the predicted crash-frequency and severity-reduction (or increase) of installing a roundabout or traffic signal at a currently stop-controlled intersection

- Determine potential countermeasures to reduce crashes at a site experiencing a high frequency of one type of crash, such as head-on or broadside (T-bone) crashes

- Analyze the effectiveness of a countermeasure that has been implemented and whether it has met crash-reduction expectations

*For more information on the Highway Safety Manual please visit www.highwaysafetymanual.org*
The Technology Transfer Center has been more involved than ever in tracking NH State Legislation on behalf of the Public Works community. T² has been heavily involved in bills pertaining to culvert and winter maintenance certifications. These certifications would expand on existing T² courses and provide numerous benefits to certified individuals. Below, in italics, are updates on legislation that was highlighted in the Winter 2012 edition.

**Senate Bill 247** would authorize the Department of Environmental Services (DES) to develop a voluntary certification for municipal and state culvert maintainers in partnership with the UNH Technology Transfer Center. Individuals who attend the course and pass the written exam will be qualified for certification from DES. Certified municipal and state employees would then be allowed to perform routine maintenance in accordance with best practices on culverts up to 48” in diameter without prior notification to DES. A quarterly work summary must be filed in place of the notification.

*Senate Bill 247 has been passed by the State Senate with amendments made to the original draft of the document. It would authorize the Department of Environmental Services to develop the certification program in conjunction with the Technology Transfer Center. Currently, the House is reviewing it. Their decision will be made by April 19, 2012.*

**House Bill 1716** is relative to the State’s 10-year Transportation Improvement Program. The bill would authorize continuation of a number of highway projects including: deleting the Salem to Manchester project of the I-93 widening from the deferred list and adding it to the ten year improvement plan, makes New Hampshire’s portion of the funding for the Sarah Mildred Long Bridge contingent on the center span being long enough to accommodate new larger cargo ships, and clarifies the management and disbursement of donations for the public works memorial.

*House Bill 1716 has been passed by the House with revisions, and is currently being reviewed by the Senate. Subsequently, the 10-year Transportation Improvement Plan has been approved.*

**Senate Bill 386** is relative to authorizing the State Treasurer to issue bonds for highway construction.

*Senate Bill 386, which would authorize the State Treasurer to issue bonds for highway construction, is currently being reviewed.*

**Senate Bill 265** is relative to the definition of stormwater to change to “water from precipitation that results in runoff, snowmelt runoff, and surface runoff and drainage, together with debris, chemicals, sediment, or other substances that may be carried along with the water.”

*Upon the bills passing, other wastes will refer to “garbage, municipal refuse, decayed wood, sawdust, shavings, bark, lime, ashes, oil, tar, chemicals, and any waste substance which is harmful to human, animal, fish or aquatic life, other than sewage or industrial wastes.” Senate Bill 265 has been passed by the Senate and is currently under review of the House.*

**Senate Bill 315** will legally require motorists to give wide berth to both stationary and moving highway maintenance vehicles that are displaying amber warning lights. The Senate has passed the bill, and the House will have made its decision by May 10, 2012.

**Senate Bill 378** allows municipalities to remove snow from private roads and driveways, as well as class VI highways. The Senate has passed this bill, and the House has until April 19, 2012 to make a decision.

**House Bill 108** will give municipalities jurisdiction over trees situated within the limits of town public ways, village commons, parks, cemeteries, and other public grounds.
Motorcycle Safety for Spring

by Megan Boyle, UNH Technology Transfer Center

As the temperature rises and the trees begin to bloom, more and more motorcycle enthusiasts will be dusting off their favorite vehicle for a leisurely Sunday drive. But with the excitement and thrill of joyriding on a warm spring morning comes inevitable danger motorcyclists face on the roads.

Across the board, motorcycles account for only 5 percent of all motor vehicle fatalities. From 1997 until 2005, the fatality rate of passenger car operators dropped dramatically. In contrast, motorcyclists’ fatality rate more than doubled during that same time frame (see chart below). As usual, a large number of those deaths were males between 18 and 27 years of age. However, the large jump in fatalities could be attributed to the growing population of middle-aged men and women buying and riding motorcycles. In 2009, these older drivers accounted for more than half of all motorcyclists’ fatalities.

In 2009, 58 out of every 100,000 motorcyclists were involved in a fatal crash, whereas passenger car operators had a 13 out of 100,000 chance. However, many of these fatalities were influenced by negative, dangerous driver behavior such as alcohol use, speeding, and driving without a license. Motorcyclists can easily save their own lives (as well as the lives of others) by simply being smart, safe, and protected drivers.

In 2009, 29% of riders involved in a fatal crash had a blood alcohol content of 0.08 or higher. Those who died in crashes at night were almost three times more likely to be legally drunk than those who were killed during the daytime, and the riders who were most likely to drink, drive, and die were in their 40s. Riding drunk is not only clearly dangerous for the operator of the motorcycle; it is dangerous for anyone on the road. How much lower would these fatality statistics be if riders had the sense not to drink and drive?

Usually, motorcyclists separate from their vehicle during a crash. Subsequently, protective gear that is attached to the rider, rather than the motorcycle, is imperative to rider safety (like a helmet). In one study of 900 crashes, it was found that “helmeted riders show significantly lower injury frequency in all types of lesions” (Hurt 1981). Another study throughout six states found that motorcyclists who wore helmets had a 35% less chance than dying, and a 67% less chance of having a brain injury as a result of a crash. Not surprisingly, a helmet can save a rider’s life.

<table>
<thead>
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<th>FIGURE 1</th>
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<td>Fatality Rate per 100 Million Vehicle Miles Traveled (VMT)</td>
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</table>

FHWA’s Motorcycle Fatality Rates

Demonstration of proper attire for motorcycle safety
Although brain injuries and fatalities are dramatic repercussions of motorcycle crashes, the most frequent injuries are abrasions. An easy way to prevent this common wound is for motorcyclists to protect themselves with leather. Not only does this material prevent simple scrapes, it also prevents severe, deep abrasions.

Motorcyclists aren’t the only ones who need to take preventative measures to lower crash and fatality rates. In most motorcycle accidents, there is also an automobile driver involved. Research has shown that drivers who also ride motorcycles, as well as automobile drivers whose family or friends operate them, are significantly less likely to collide with motorcycles on the road. These drivers have been inadvertently trained to look for motorcycles while they are driving.

Nevertheless, there are also visual problems that plague motorists regardless of whether they know motorcyclists personally. For example: Automobiles have blind spots that easily hide motorcycles and riders. Excessive precipitation, glare, and mounds of cargo also can impair a driver’s view. Small cars are difficult enough to see in these conditions - motorcyclists are even harder.

Also, because of their small size, motorcycles can look further away than they actually are, making it problematic for car and truck drivers to judge how fast they are moving. All drivers on the road should never underestimate how close a motorcycle is or how fast they are moving (also keeping in mind that not all motorcyclists are speeding out of control).

Car and truck drivers should also be aware that occasionally, when motorcycles are slowing down, there will be no brake lighting. Oftentimes, riders slow down by downshifting or simply rolling off the throttle – no brake light is activated for either of these. All vehicle drivers should give themselves a following distance of at least four seconds when driving behind a motorcycle.

Another feature on most motorcycles that differentiates them from cars and trucks are self-canceling turn signals. Unlike other vehicles, most motorcycles do not have these. Inevitably, some drivers will forget to turn them off. When sharing the road with a motorcycle, keep this in mind. His/her blinker may be from three turns ago. Before making any commitments on the road, make sure that a motorcycle’s turn signal is for real.

All in all, the most succinct and valuable advice about sharing the road with motorcyclists is this: When a motorcycle is on the road, don’t think of it as a vehicle. Think of it as a person.

Sources


New Hampshire Public Works Mutual Aid

With record storms, flooding, and most recently Hurricane Irene and the October Noreaster, the need for mutual aid is ever increasing. In times of crisis, a mutual aid agreement allows neighboring communities to provide assistance in the form of labor and equipment to help each other through the disaster. Mutual aid is a FEMA-approved contract and will make the assisting municipality eligible for federal reimbursement.

Mutual Aid is available for only $25 per year and the benefits are innumerable. For more information, visit the T² website at www.t2.unh.edu/ma or contact Beth Hamilton at 603-862-1362.

Retroreflectometer Loan Program

NH LTAP has three retroreflectometers available to rent to NH municipalities. The retroreflectometers are able to accurately measure the retroreflectivity of road signs from a distance. Use one to meet the MUTCD Retroreflectivity Standards by loaning one today!

The fee for the equipment loan is $25, and municipalities may keep the retroreflectometer for up to six weeks (additional time may be requested).

For more information
www.t2.unh.edu/retroreflectometer
t2.center@unh.edu
603-862-2826

Visit the new UNH T² website today!

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• Register for workshops online
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**Crossword Puzzle**

Be the first to complete this crossword and fax it (603-862-0620) to win a FREE T² workshop!

**NAME**

**AFFILIATION**

**E-MAIL**

**PHONE**

**ACROSS**

2. After completing 100 hours of training and meeting Roads Scholar II requirements, you can become a ___ Roads Scholar.

3. How many parts are there in the Highway Safety Manual?

4. Warm-mix asphalt can be as much as ___ degrees cooler than Hot-Mix Asphalt.

7. Senate Bill 265 legally defines ___ and waste.

8. Between 1997 and 2005, the fatality rate of motorcyclists ___.

9. One of the benefits of using Warm-mix Asphalt is the reduction in ___ consumption.


**DOWN**

1. A piece of equipment that could save your life in a motorcycle crash.

2. T² is hosting a contest call Build Better ___.

5. When liquid binder flows down through an asphalt mixture and pools at the bottom, this is called ___.

6. This fabric makes it easy for motorcyclists to protect their skin from abrasions.
**Spring-Summer 2012 Training Calendar**

More dates to be announced soon!

Check out our website for the most up-to-date calendar

[www.t2.unh.edu/training-calendar](http://www.t2.unh.edu/training-calendar)

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<th>Date</th>
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<td>Backhoe Operation &amp; Training</td>
<td>5 Safety</td>
<td>5</td>
<td>Plymouth/Rumney</td>
<td>$150/$300</td>
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<td>4/25/2012</td>
<td>Green SnowPro Certification</td>
<td>5 Environmental</td>
<td>5</td>
<td>Derry</td>
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<td>5/8/2012</td>
<td>Flagger Certification</td>
<td>5 Safety</td>
<td>5</td>
<td>Groton</td>
<td>$60/$120</td>
</tr>
<tr>
<td>5/9/2012</td>
<td>Lines, Levels, &amp; Layouts</td>
<td>5 Technical</td>
<td>5</td>
<td>Moultonborough</td>
<td>$60/$120</td>
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<tr>
<td>5/22/2012</td>
<td>Culvert Installation &amp; Maintenance</td>
<td>5 Technical</td>
<td>5</td>
<td>Weare</td>
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<td>Grader Operation &amp; Training</td>
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<td>5</td>
<td>Whitefield</td>
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<tr>
<td>6/19/2012</td>
<td>Know Before You Dig</td>
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<td>5</td>
<td>TBA</td>
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