Setting Speed Limits for Safety

by Davey Warren, Guan Xu, and Raghavan Srinivasan

Engineering appropriate speed limits now is easier and more consistent, thanks to a powerful software tool called USLIMITS2.

Speeding—whether driving in excess of the posted speed limit or simply traveling too fast for road conditions—is a factor in an estimated one-third of all fatal crashes, according to the National Highway Traffic Safety Administration. Although agreement is almost universal on the relationship between speed and crash severity (the higher the crash speed, the more serious the resulting injuries and property damage), the relationship between speed and the probability of a crash is more complicated.

Continued on page 4

Organizing a “Touch a Truck” Event

by Rachel Beaudry, UNH T² Project Assistant

Who doesn’t want to climb aboard a fire truck? Sit in the seat of a huge bulldozer? Look inside an ambulance, without it being an emergency of course! “Touch a Truck” is just the event to
Letter from the Training Program Manager

As the days get shorter and shorter, the LTAP at the Technology Transfer Center is looking towards the winter months already. This fall the Roads Scholar Program offered more than 35 days of training in areas such as First Aid, Invasive Plants, Bucket Truck, Becoming a Supervisor, and Introduction to Computers. We had more than 700 people participate in our Roads Scholar program this fall! Please take a moment and thank your supervisors and town or city officials for making it possible for you to continue your professional development and education. The Technology Transfer Center was also able to participate in the Ken Ward Plow Rally where we were able to provide Roads Scholar credit for participating in educational stations. T² also volunteered time at the Construction Career days, showing nearly 1,000 high school students realize the many career opportunities construction has to offer.

The season of gratitude is upon us and I would like to take a moment and express my appreciation for public works and transportation departments. I start my day, like many, with running water to brush my teeth and I then get into my car and drive to work. And every week I bring my garbage to the town transfer station. Without Public Works, our lives would not be as “civilized” as they are today. The men and women who work tirelessly and most often without thanks, make our society what it is. Without well-maintained roads, transfer stations, and utilities, our world would be very different. They maintain healthy water, an environmentally sound way to discard of garbage, and provide safe transportation for individuals and businesses. I would personally like to take a moment and thank each and every one of you. Wishing you and yours a safe and happy holiday season to you and your families.

Sincerely,
Beth Hamilton
Training Program Manager
Technology Transfer Center
New Hampshire Roads Scholars

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.

| Roads Scholar I | Ryan Pike, Salem  
|                | Jason Rucker, Exeter  
|                | Roger Rumrill, Claremont  
|                | Ben Tatro, NHDOT  
| 25 training hours in the Roads Scholar Program | Dan Tobine, Rumney  
|                | Jay Vitale, Farmington  
|                | Keith Whitehill, NHDOT  
|                | Steven Williams, Lyme  
|                | Scott Derrington, NHDOT  
|                | Kelly Dole, Claremont  
|                | Todd Drew, Bow  
|                | John Emery, Wentworth  
|                | Bob Fanny, Pembroke  
|                | Joseph Giunta, NHDOT  
|                | Noel Gourley, Bow  
|                | Leland Gray, Jr., NHDOT  
|                | Arthur Hebert, Bedford  
|                | Walter Hodgdon, Newport  
|                | Brian Hubbard, Newport  
|                | Louie Jacobs, Canaan  
|                | Michael Kelly, Laconia  
|                | Randy Linscott, NHDOT  
|                | George McAllister, Exeter  
|                | Jeffrey Miller, Laconia  
|                | Dale Morse, Canaan  
|                | Andrew Nicoll, Lincoln  
|                | Patrick Nylen, Bow  
|                | Steven Perron, Pembroke  
|                | Rickard Perusse, New Boston  
| Roads Scholar II | 50 training hours and Roads Scholar II requirements  
|                | Eric Alley, Pembroke  
|                | Wayne Almon, Exeter  
|                | Mark Beal, Richmond  
|                | Peter Beede, Sr., Moultonborough  
|                | Jason Brown, Seabrook  
|                | Scott Brown, Colebrook  
|                | Scott DeCoteau, Claremont  
|                | Joe Feole, Salem  
|                | David Hooley, Croydon  
|                | William Lowney, Hampton  
|                | Todd Mason, Greenfield  
|                | James Nave, Moultonborough  
|                | Sumner Scott, Farmington  
|                | Andrew Wolanek, Moultonborough  
| Senior Roads Scholar | 75 training hours and Roads Scholar II requirements  
| Roads Scholar I | Ryan Pike, Salem  
| Roads Scholar II | Eric Alley, Pembroke  
| Senior Roads Scholar | 75 training hours and Roads Scholar II requirements  
| Master Roads Scholar | 100 training hours and Roads Scholar II requirements  
| Master Roads Scholar | Robert Buxton, Derry  
|                    | Kyle Fox, Merrimack  
|                    | Larry Gay, Merrimack  
|                    | Robert Gendron, Nashua  
|                    | Benji Knapp, Weare  
|                    | Louis Lapointe, Merrimack  
|                    | Michael Lockard, NHDOT  
|                    | Daniel Miller, Claremont  
|                    | Terry Miller, Claremont  
|                    | Paul Paradis, Rye  
|                    | Victor Ranfors III, Pembroke  
|                    | Harold Wood, Wood Engineering  
|                    | Marcelino Acebron, Bow  
|                    | Tony Albert, NHDOT  
|                    | Kevin Bartlett, Concord  
|                    | Bob Burley, Merrimack  
|                    | Ernie Butler, Hillsborough  
|                    | Almus Chancey, Bedford  
|                    | Peter Companion, Claremont  
|                    | Jan Hall, Concord  
|                    | Joshua Hamel, Exeter  
|                    | Kenneth Hamilton, Claremont  
|                    | Skip McEvoy, Exeter  
|                    | George Miller  
|                    | Kevin Minckler, Claremont  
|                    | Jim O’Donnell, NHDOT  
|                    | James Pacheco, Salem  
|                    | Robert Scott, Canaan  

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.
Setting the Speed Limits for Safety

Higher speeds require longer stopping distances and thus possibly result in more crashes. However, crash risk also involves a multitude of other factors, including roadway and environmental conditions as well as driver attitudes and behavioral traits that are independent of speed.

Posting speed limits is the most widely used method for managing speed, yet they are only effective if set at the maximum reasonable and safe speed. The apparent subjectivity of the process of setting speed limits, however, can lead to inconsistencies in posted speeds within and between jurisdictions. This can also make it difficult to defend decisions on speed zoning when public pressure comes to bear.

In 2012, the Federal Highway Administration’s (FHWA) Office of Safety released an updated version of USLIMITS2, a Web-based software program designed to assist State and local agencies in setting appropriate--defined as safe, credible, consistent, and enforceable--speed limits. The following is a refresher on the science behind speed limits and a glimpse at how some States are using this software to improve their processes for setting speed limits.

Engineering Speed Limits

The FHWA’s Manual on Uniform Traffic Control Devices (MUTCD) is the national standard for all traffic control devices on roads open to public travel. The MUTCD recommends that agencies set speed limits within 5 mi/h (8 km/h) of the 85th percentile speed of free-flowing traffic. The 85th percentile speed is the speed that 85 percent of drivers travel at or below and is one of the best indicators of a reasonable and safe speed. According to FHWA’s report, Methods and Practices for Setting Speed Limits (FHWA-SA-12-004), motorists who drive faster contribute disproportionately to the risk of crashes. Setting a speed limit 5 mi/h (8 km/h) higher than the 85th percentile speed will make a few additional drivers legal, but setting it 5 mi/h (8 km/h) lower will make violators out of nearly half of all drivers.

The MUTCD also lists other risk factors that may be considered, including road geometry, the pace speed (the 10 mi/h, or 16 km/h, speed range at which the most vehicles are driving), roadside development, parking practices, pedestrian activity, and crash experience. However, it does not provide specific guidance on how to account for these variables.

In Methods and Practices for Setting Speed Limits,
prepared in cooperation with the Institute of Transportation Engineers, FHWA reviewed national and international practices and then described four of the following methods for determining an appropriate speed limit for a given roadway section. The four methods are called engineering approach, expert system approach, optimization approach and lastly the injury minimization or the safe system approach. More information on the methods can be accessed at: http://www.fhwa.dot.gov/publications/publicroads/13sepoct/02.cfm

**Expert Systems for Setting Speed Limits**

In 2003, FHWA released the first version of USLIMITS to assist practitioners in setting speed limits that are safe, credible, consistent, and enforceable. When used to determine appropriate speed limits, this Web-based expert approach provided a systematic, consistent method for examining and weighing factors in addition to vehicle operating speeds. ARRB Transport Research, headquartered in Melbourne, Australia, created the original version of USLIMITS by modifying a speed zone expert system developed for the Australian State road authorities. The researchers adapted the system logic developed by Australian experts to reflect practices in the United States, such as posting in 5 mi/h (8 km/h) increments.

In 2012, the team updated the user interface and moved the expert system to a server at FHWA. USLIMITS2 now can be accessed at http://safety.fhwa.dot.gov/uslimits.

The software employs a risk-based set of decision rules using roadway, traffic, and crash data input by the user to determine an appropriate speed limit for a specific segment of roadway. USLIMITS2 is applicable to all types of roads, from two-lane rural roads and residential streets to multilane urban freeways. Currently, however, USLIMITS2 is not designed to address speed limits in work zones, school zones, or other areas with variable speed limits.

USLIMITS2 provides recommended speed limits based on site characteristics, which include such variables as access density, pedestrian activity, roadside hazards, operating speed, and crash history. It also provides relevant warnings in a summary report that can suggest actions for addressing areas of concern.

**Indiana: County Road 500/510 South**

Changes in development along County Road (CR) 500/510 South in Tippecanoe County, IN, and complaints about the 55 mi/h (89 km/h) speed limit on a segment of the roadway prompted the county highway department and sheriff’s department to reevaluate the existing speed limit. CR 500/510 South is a two-lane roadway with 12-foot (3.7-meter) lanes and 6-foot (1.8-meter) grass shoulders. Roadside hazards such as telephone poles are located 15 feet (4.6 meters) or more from the edge of the road.

The study section is located south of the Lafayette city limits but is on the fringe of urban development. Over the years, the surrounding area gradually has transitioned from a rural undeveloped area to a mix of rural and residential development. The section of the road used in the study had fewer than 30 access points per mile (19 per kilometer), and carried an average of 4,200 vehicles per day. The median speed was 43 mi/h (69 km/h) and the 85th percentile speed was 49 mi/h (79 km/h). Police reported 29 crashes—six of which involved personal injury—over a 3-year period.

Because of CR 500/510 South’s varied characteristics, engineers used USLIMITS2 to evaluate the road under both undeveloped and developed scenarios. For the undeveloped scenario, the roadside hazard risk was rated a 3 based on guidance provided by USLIMITS2. The roadside hazard rating is a composite measure of roadside conditions, including shoulder width, side-slope, clear zone distance, and fixed object hazards. USLIMITS2 considers a rating of 3 or less to indicate...
good roadside conditions and low risk. For the developed scenario, both pedestrian activity and parking were negligible. According to USLIMITS2, the crash rate for the study section of 373 per 100 million vehicle miles was considerably above average for similar roads and above the critical rate. The injury crash rate of 77 per 100 million vehicle miles was near the average for similar roads in urban areas and above the average but below the critical rate for rural areas.

USLIMITS2 recommended a speed limit of 45 mi/h (72 km/h) for both scenarios. The program also recommended that the county undertake a comprehensive crash study to identify engineering or traffic control actions that could mitigate the crash problem. Based on the engineering investigation, the county engineer recommended—and the county council approved—reducing the speed limit to 45 mi/h (72 km/h).

The management of speed through appropriate speed limits is an essential element of highway safety. Speed limits are an act of the State traffic law system and need to be reasonable, safe, and enforceable.

According to Michael Griffith, director of FHWA’s Office of Safety Technologies, “The USLIMITS2 Web-based application provides State and local agencies with a tool for determining appropriate speed limits for specific roadway segments. It is easy to use and should be a part of any speed limit review. Engineers should collaborate with law enforcement and other stakeholders before a speed limit change is made. Enforcement is needed to ensure compliance with speed limits.”

For situations where the community desires, or a safe system approach suggests, a speed limit lower than that recommended by USLIMITS2, the solution is not to simply lower the speed limit. Studies show that setting speed limits lower than the prevailing speed without changing the road environment will have little effect on speed and might increase crash risk. Instead, agencies should consider alteration of the road layout and other engineering countermeasures to reduce speeds to a level that would support the lower limit. Engineering countermeasures for reducing speeds and improving road safety will be explored further in a future issue of Public Roads.

<table>
<thead>
<tr>
<th>Factors Used in USLIMITS2 Speed Limit Recommendations</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Road Type</strong></td>
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<tr>
<td>Limited-access freeway</td>
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<tr>
<td>Site Characteristics</td>
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<tr>
<td>Operating speed: 50th and 85th percentile speed</td>
</tr>
<tr>
<td>Crash statistics</td>
</tr>
<tr>
<td>Interchange spacing</td>
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<tr>
<td>Annual average daily traffic</td>
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<tr>
<td>Transition to a non-freeway</td>
</tr>
<tr>
<td>Terrain</td>
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<tr>
<td>Presence/absence of adverse alignment</td>
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<tr>
<td>Road section in undeveloped area</td>
</tr>
<tr>
<td>Operating speed: 50th and 85th percentile speed</td>
</tr>
<tr>
<td>Crash statistics</td>
</tr>
<tr>
<td>Presence/absence of adverse alignment</td>
</tr>
<tr>
<td>Roadside hazard rating</td>
</tr>
<tr>
<td>Transition to developed area</td>
</tr>
<tr>
<td>Number of lanes and presence/type of median</td>
</tr>
<tr>
<td>Road section in developed area</td>
</tr>
<tr>
<td>Operating speed: 50th and 85th percentile speed</td>
</tr>
<tr>
<td>Crash statistics</td>
</tr>
<tr>
<td>Extent of pedestrian/bicyclist activity</td>
</tr>
<tr>
<td>Presence/usage of on street parking</td>
</tr>
<tr>
<td>Access density: driveways and unsignalized intersections per mile</td>
</tr>
<tr>
<td>Signals per mile</td>
</tr>
<tr>
<td>Area type</td>
</tr>
<tr>
<td>Presence/absence of adverse alignment</td>
</tr>
</tbody>
</table>

Figure 4: Factors used in USLIMITS2 speed limit recommendations.
Organizing a “Touch a Truck” Event

accomplish these goals. A “Touch a Truck” event could accomplish just this! “Touch a Truck” doesn’t just have to be your classic fire trucks, emergency response vehicles or public works departments, invite local companies with big vehicles too. Have some limos and box trucks, invite the local gas company and construction services, antique cars and delivery vans, food trucks and four wheelers invite them all! Here are some handy hints on how to start.

• Most “Touch a Truck” events benefit a cause, so a portion of the proceeds go to a charitable organization.
• Inviting bands to play live and local restaurants to show case their food is a good way to keep things local.
• Plan the event the same weekend as an annual town event, the 4th of July, Memorial day or Labor Day weekend.
• Creating a Facebook event that is linked to a Town’s page is a great way to spread the word to the community, people young and old have Facebook!
• Have raffles and prizes, or create a pre-sale swag bag for people who pre-buy their tickets, full of coupons and stickers, advertising the event.

Here are some local towns have that done it right!
April 6, 2010

Attn: Local Businesses and Community Members

An exciting project is about to transform the Epping Recreation’s Community Basketball Court at the corner of Main and Cate Street in Epping, and we need your help.

Outdoor recreation produces healthy, respectful and sociable children, and provides a safe place for children to grow. However, keeping up with our community facilities is not free. Our basketball court improvement project calls on the entire community to participate. We hope to see that the fundraising events we have planned and the improvement project itself will unite people and forge a connection within our community. We are planning a special event to assist in the funding of this effort.

Touch-A-Truck is a fun family event to be enjoyed by kids of all ages! Where kids can rub elbows with their hometown heroes who own & operate their favorite construction trucks, fire engines, police cars, etc. This event will be happening on Sunday, May 2nd from 11am – 3pm.

We are asking for your help!

We think you have a cool truck or vehicle we would like to display at our event!

Please contact Andrea Loving today at (603) 724-2826 to participate or for more details!

We think this will be a fun filled day that will be long remembered in the community. This event & the upcoming improvement project stresses community involvement and produces visible, tangible, unifying outcomes that you and your employees can be proud of for years to come. Remember that this community event will have long-term, positive repercussions in the neighborhood where your customers live and work.

Thank you in advance for helping to make this event become a reality.

Sincerely,
Friends of the Epping Recreation Commission

Figure 3: “Touch a Truck,” Epping, NH. This is an example of a donation form, asking for local businesses to bring their vehicles to the “Touch a Truck” event.
You’re Also a Teacher

by Dr. Rockie Blunt, reprinted from Mass Interchange

You’re busy every day doing your scheduled jobs, learning new ones, and switching off to other ones that come up suddenly and have to be done right away. There’s always something to do.

But every now and then there’s one more thing you are called upon to do, and it’s an important one: you need to teach someone else how to do something that you know how to do. Yes, you’re called upon to be a teacher. You may feel confident when you do it, or maybe not, but take heart. It’s easier than you think because 1) you don’t have to be a college professor to teach someone how to do something, and 2) there’s a simple four-step process of communicating information to a coworker in a limited amount of time. I call it “training on the fly.”

**Step 1: Prepare the Learner.**

Yes, there is a step before the actual teaching, and it’s an important one: helping the person receive the learning that is about to follow. This is done by explaining what the goal of the learning is. Sometimes even experienced teachers forget to begin by outlining what is to be covered and why it is important. The learner needs to know what he or she will be able to do once the task is mastered. Asking them if they’ve ever attempted this kind of work before will tell you if you need to start explaining things at the very beginning or at a more advanced level. It is also important to help the person relax. Explain that you are not expecting perfection the first time, and encourage him or her to ask questions if they are confused. It is crucial to treat all questions with respect. If you criticize someone for asking a question, that’s the last time they’ll let you know they don’t understand something.

**Step 2: Deliver the Lesson.**

Whether they need to gain new knowledge or learn how to perform a new task, this is when you do the teaching. Remember to break down the task, step by step, and try not to talk too fast. If you have been doing a particular activity for years and you know it inside out, you might find yourself explaining it very fast. The learner, though, is new to the information and needs to hear it more slowly. Furthermore, avoid using jargon, buzzwords, abbreviations or acronyms when describing processes or equipment; these special terms are familiar to you but not necessarily to the inexperienced employee.

**Step 3: Have the Learner Perform the Operation or Repeat Back the Information.**

Once you have taught the trainee, ask them to teach it back to you. Whether it’s a physical operation or a set of information, build in some practice time, encouraging the individual to explain what they’re doing while they’re doing it. Assure them that they may not get it perfectly the first time, and that you’ll be patient with them. Anything you can do to help people feel relaxed while learning will help make them faster, more confident learners.

**Step 4: Evaluate Their Performance.**

After they have demonstrated what they have learned, give them specific feedback. If the person gets the hang of it the first time, a compliment is in order. But if the results are mixed, I strongly suggest you deliver the feedback this way: plus-minus-plus. Tell them what they have done well (plus), point out areas that could be improved (minus), and give them positive guidance on how to reach that improvement (plus). Let them know you have confidence in them, and that you will be available for them as they continue to practice what they have learned.

Please keep in mind that even though there are four steps to this method, going through the entire process can take as little as ten or twenty minutes. The key is to devote as much time as necessary to each step, depending on the complexity of the material to be learned as well as the learner’s prior experience with the task.

Above all, the important thing is not to show the other person how much you know, but to help them increase what they know. Keep the focus on them. That’s what the best trainers do — even those who do “training on the fly.”

Dr. Rockie Blunt, president of West Boylston-based Blunt Consulting Group, has worked with municipal and state agencies for many years.
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 UNH T² website today!

www.t2.unh.edu

- Access to the most up-to-date calendar
- Register for workshops online
- Access to NH Road Salt Database
- See important announcements
- Access to the UNH T² Facebook page

NH LTAP is on Facebook & Twitter!

Want to stay informed of our activities? Want to connect with other professionals who attend our training? Want to look at pictures from our training classes and other events? Then “like” us on Facebook or “follow” us on Twitter to stay connected! We are posting information daily on our activities, new programs, training, local news, and services.

www.facebook.com/nhltap
www.twitter.com/nhltap
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

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Across
1. This was one of the criteria that the FHWA released USLIMITS to meet
2. USLIMITS provides this in the summary report too
3. Proceeds from “Touch a Truck” can _______ a local cause
4. This “Touch a Truck” _____ is from Beverly, MA.
5. “You’re Also a _______”

Down
1. “Touch a _______”
2. The rural road pictured in “Setting Speed Limits for Safety”
3. A person would need 50 hours in of different training types
to become this level in the Roads Scholars program
4. Web-based program released by the FHWA
5. The last name of the director of the FHWA’s Office of Safety Technologies
6. _______statics
7. Number of stops to the teaching method
### Fall 2013 Training Calendar

Spring dates to be announced in coming months!

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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<th>Location</th>
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