Road Business

A University of New Hampshire Technology Transfer Center publication

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On the Road in New Hampshire

Fast Track Bridge

NHDOT and UNH researchers recently designed a 117 foot by 28 foot bridge for the Town of Epping. They integrated proven technologies to achieve construction speed and affordability. With demolition, using normal designs, the bridge would have been closed for over four months. This project closed the bridge for only 6 weeks. This article describes the innovative design features so others can apply them to their projects.

With conventional designs, building the bridge would have taken several months. With innovative design and coordination, the contractor erected the bridge in 8 days. Erection could have taken 7 days. However, two hurricanes delayed the contractor, R. M. Piper Construction Company. He had to add sand bags to stop flooding, repeat the dewatering process, and clean up silt.

The off-site fabricator cast the 48 inch wide by 36 inch deep box girders using a very high slump concrete mixture. Crews assembled reinforcement in the forms, used Styrofoam to create voids, and filed the forms with the high slump concrete.

The fabricator built footers, abutments, and wing walls off-site using self-consolidating concrete (SCC), which sped up fabrication and reduced costs. Because SCC does not require a vibrator, one person worked on each pour rather than the 3 to 5 needed for conventional concrete. On-site, excavation and pouring concrete subfooters, using flowable fill, took less than 3 days.

An abutment and the wing walls created a retaining wall. Reinforcement protruded out of the footers to fit into splice sleeves cast into the abutment and wing wall sections. This provided reinforcement continuity between the footers and the vertical sections. On-site, the contractor set abutment and wing components in channels on top of the footer sections. Cranes lowered abutment and wing wall sections onto the footers. The protruding footer reinforcement slipped into the splice sleeves. Crews then pumped grout into the splice sleeves to bond the footer to the abutment and the wing walls. Placement of vertical sections took less than a day.

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ALSO IN THIS ISSUE

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Read BEFORE Operating RSMS and SIMS Software

The RSMS and SIMS software works very well. Still, they have several features we'd like to change but cannot. Few users encounter difficulty with them, but several users have with the consequence that they have corrupted files.

Please distribute the following instructions to everyone who operates the RSMS or SIMS software, and provide it to people as they become operators.

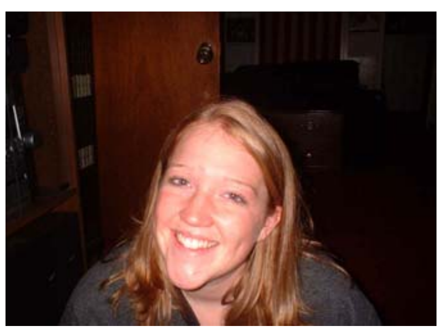
BEFORE operating the RSMS01 or SIMS02 software, everyone should read these instructions.

1. Skipping some steps while copying files between computers.
2. Exiting with the "X" in a window corner rather than a red door icon or a close button.
3. Deleting or replacing a lot of information without occasionally "packing and indexing" the files.

If users take any of the above actions, they can "corrupt" the data files. The affect can be that users will have to reload the program and reenter much, and perhaps all, of their data. Therefore, users must always

1. **Follow the Copying Data Instructions. (**The RSMS01 and SIMS02 *Manuals* contain "Copying Data" instructions.)
2. **Always Exit With the Red Doors or Close Buttons**
3. **Often click on "Utilities" in the Main Menu, click on "Pack and Index Files," and click "Yes" when prompted.**

Welcome Katy



Katy Claytor was hired this past summer as the UNH T² Center Project Assistant. Her responsibilities include course registration, video and publication librarian, and coordination of workshops and events.

Katy graduated this past May from Plymouth State University with a Bachelors Degree in Psychology and Law and a minor in Sociology and Anthropology.

Katy loves to spend time with her niece, Cloey, age 3, and nephew, Alec, age 5, and other family members. She is an active Court Appointed Special Advocate volunteer for the state of NH where she advocates for abused and neglected children in the NH courts. Her hobbies include chess, pool, reading, and writing in a journal.

Calibration of Spreaders

Crews should vary chemical spread rates as winter weather and road conditions change. Therefore, they must calibrate their spreaders, and record the rates for reference during storms. This article describes how to calibrate spreaders without automatic controls.

A calibration chart, such as shown below, enables easy record-keeping. From it, crews can prepare rate cards to use during storms. The UNH T² Center can provide table calibration charts.

Spreader Calibration Procedure

Spreader calibration provides the amount of salt discharged per lane mile for each control setting. The rate remains the same for all speeds. Different materials spread at different rates at the same setting. Crews must calibrate spreaders with the material they will use.

Crews with hopper-type spreaders must calibrate for specific gate openings. They should calibrate each spreader individually; even the same models can vary widely at the same setting. Also, they must calibrate for each control setting.

Crews will need the following equipment.

1. Scale for weighing.
2. Canvas or bucket/collection device.
3. Chalk, crayon or other marker.
4. Watch with a second hand.

The following are the calibration steps:

1. Warm the truck's hydraulic oil to its normal operating temperature with the spreader system running.
2. Put a partial load of material on the truck.
3. Mark the shaft end of the auger or conveyor.
4. Dump material on the auger or conveyor.
5. Rev the truck engine to its operating RPM.
6. Count the number of shaft revolutions per minute at each spreader control setting, and record.
7. Collect material for one revolution and weigh it, deducting the weight of the container. (For greater accuracy, collect salt for several revolutions and divide by this number of turns to get the weight for one revolution.) This can be accomplished at idle or very low engine RPM.
8. Multiply the shaft RPM (Column A of the Calibration Chart) by the discharge per revolution (Column B) to get the discharge rate in pounds per minute (Column C)
9. Multiply the discharge rate (Column C) by the minutes to travel one mile at various truck speeds to get pounds discharged per mile.

For example, for 30 Shaft RPM and 4 lbs. discharged: 30 x 4 = 120 lbs/min. At 20 mph, the truck will cover 1 mile in 3 minutes: 120 lbs/min x 3.00 min.= 360 lbs/lane mile.

Calibrating Automatic Controls

Automatic controls vary the spread rate for various truck speeds. Factory calibration cards show the spread rate for each control setting. After some operation, many need calibration. The UNH T² Center can provide instructions to calibrate these spreaders.

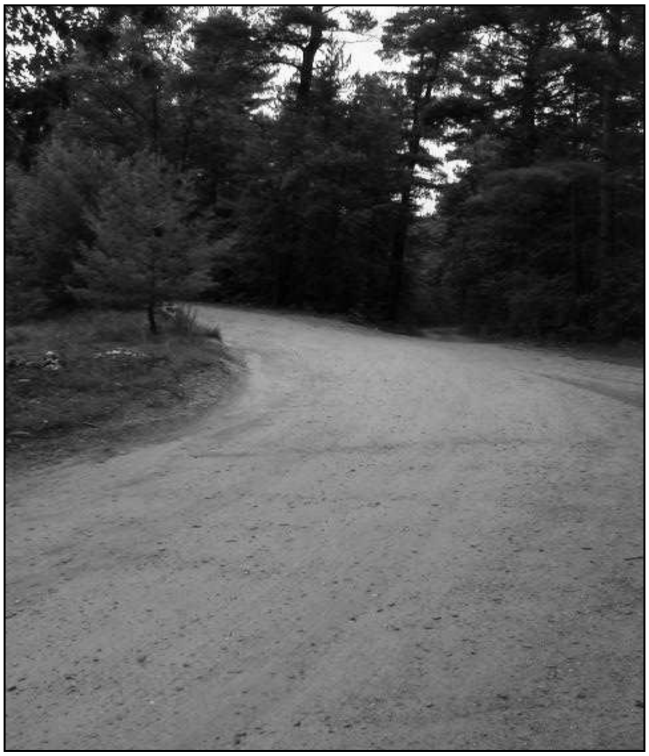
Source:
The Salt Institute Calibration Instructions:
http://www/saltinstitute.org/snowfighting/6-calib.html

Calibration Chart

Discharge By Gate Openings				POUNDS DISCHARGED PER LANE MILE					
	A	**B**	**C**						
Control Setting	Shaft RPM (Loaded)	Discharge Per Revolution (Lbs)	Discharge Rate **A** x **B** (Lbs/Min)	**5 mph** **C** x 12.00 (Lbs/LM)	**10 mph** **C** x 6.00 (Lbs/LM)	**15 mph** **C** x 4.00 (Lbs/LM)	**20 mph** **C** x 3.00 (Lbs/LM)	**25 mph** **C** x 2.40 (Lbs/LM)	**30 mph** **C** x 2.00 (Lbs/LM)
1									
2									

Legal Q&A, Class VI Roads and Maintenance Issues

By Susan Slack, Counsel, Local Government Center



Highway repair and maintenance projects are usually well underway at this time of year, prompting questions about maintenance of Class VI roads. There are lots of misconceptions about Class VI roads, so here are some reminders.

Q. What is a Class VI road?
A. In the state's highway classification system, which is defined in RSA 229:5, Class VI roads are "all other existing public ways," meaning public ways not otherwise classified as Class IV or Class V roads. Class VI roads include those that have been discontinued subject to gates and bars, as well as those that have "not been maintained and repaired by the town in suitable condition for travel" for five successive years or more. (See RSA 229:5, VII.) The two important keys to this statutory definition are that Class VI roads are *public* ways, and they are roads that the town has no duty to maintain. Note that the definition of a Class V road is one that the town does have a duty to maintain. (See RSA 229:5, VI.)

Q. Can the town appropriate money to maintain or repair Class VI roads?
A. RSA 231:59 authorizes municipalities to spend money to repair Class IV and V highways, not Class VI roads. One of the basic tenets of New Hampshire municipal law is that towns and cities have only that authority granted to them by the state legislature. Without a specific grant of authority, towns and cities do not have authority to act.

Q. Can private parties maintain or repair Class VI roads?
A. Yes, with permission of the municipality. RSA 236:9 prohibits anyone from excavating or disturbing the ditches, embankments or traveled surface of any town road, including a Class VI road, without the written permission of the municipality's governing body (board of selectmen or town/city council) or the road agent. RSA 236:10 provides that the municipality may regulate such private road work and may require a bond for the satisfactory restoration of the road. RSA 236:11 requires anyone who excavates or disturbs town roads to restore them to the satisfaction of the authorized local official.

Q. What happens if the municipality maintains or repairs a Class VI road?
A. There are several important reasons to avoid maintenance and repair projects on Class VI roads. First, municipalities enjoy protection from liability for damage or injury due to the condition of a Class VI road. RSA 231:93 provides that municipalities have no duty to maintain or repair Class VI roads. The highway maintenance duty established in RSA 231:90 through 92-a applies only to Class IV and V highways. A municipality that undertakes Class VI road maintenance exposes itself to the risk of liability for damage or injury resulting from that work. Second, performance of maintenance or repair work could result in stopping municipal arguments, meaning that in a lawsuit involving a landowner, a municipality may be barred from arguing that it is

not required to maintain a road due to its Class VI status. See *Turco v. Barnstead*, 136 N.H. 256 (1992). Third, a Class V road that attains Class VI status as a result of the lapse of maintenance will revert to Class V status again if the town maintains it for at least five consecutive years. The "illegal" maintenance and repair must be "regular" and "on more than a seasonal basis" so that the road is in "suitable condition for year-round travel." See RSA 229:5, VI.

Q. What if there are public safety reasons for occasionally repairing or maintaining Class VI roads?

A. If a municipality wishes to spend money on Class VI road, it should do so under the emergency lane statute, RSA 231:59-a, which was enacted in 1994. That statute authorizes municipalities to raise and appropriate money for the maintenance of any Class VI road (or private road) that is declared an emergency lane by the governing body. The procedures required for making this declaration include a public hearing and written findings "that the public need for keeping such lane passable by emergency vehicles is supported by an identified public welfare or safety interest which surpasses or differs from any private benefits to landowners abutting such lane."

Q. What kind of maintenance or repair of Class VI roads is authorized by the emergency lane statute?

A. RSA 231:59-a, I provides that such repairs may include "removal of brush, repair of washouts or culverts, or any other work deemed necessary to render such way passable by firefighting equipment and rescue or other emergency vehicles." The municipality can establish a capital reserve or trust fund for this purpose. Maintenance or repair of Class VI roads undertaken in accordance with the emergency lane statute does not create any duty or liability for the municipality. See RSA 231:59-a, IV.

Q. Can gates or fences be put up on Class VI roads?

A. Yes, but RSA 231:21-a, I requires gates or bars maintained by private landowners to be erected so as not to interfere with public use of the Class VI road. Such gates or bars must "be capable of being opened and reclosed by highway users." Municipalities are authorized to regulate these structures "to assure public use" and they have authority to have gates or bars removed if they have fallen into disrepair or if they interfere with public use of the Class VI road.

Q. What does the term 'gates and bars' mean?

A. Prior to 1903, a town could only discontinue a highway completely, meaning it was no longer a public way. Only after the state legislature enacted Laws of 1903, Chapter 14:1 could a town discontinue an "open" highway and subject it to gates and bars. The term "gates and bars" is not expressly defined by statute. Nevertheless, the term historically refers to an owner's right to enclose premises for his or her own benefit--usually to confine livestock. The owner required public travelers to open and close the gates or bars as a condition to travel. The term "gates and bars" first became associated with Class VI highways in 1925, when the legislature enacted Laws of 1925, Chapter 12:1, which provided that a town had no duty to maintain any highway that had been closed subject to gates and bars.

Q. Are there other ways in which municipalities may regulate Class VI roads?

A. RSA 231:21-a, which was enacted in 1999, provides that all Class VI roads--regardless of how they obtained Class VI status (by layout, discontinuance subject to gates and bars, or lapse of maintenance of Class V roads)--are deemed subject to gates and bars. The statute clearly authorizes municipalities to regulate their use under the provisions of RSA 41:11; RSA 47:17, VII, VIII and XVIII (highway ordinances); RSA 236:9 through 11 (excavation and disturbance); RSA 236:13 (driveway access); and RSA 231:191(weight limits).

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New Hampshire Town and City July/August 2004

Reducing Traffic Speeds

Speed Limits, Stop Signs, and Physical Road Alterations

Residents often complain that traffic speeds are too high. Lower speeds can reduce accidents, traffic noise, air pollution, and energy consumption. This article describes various ways to slow traffic on existing roads, and their affects.

Speed Limits

Lower Posted Speed Limits reduce traffic speeds only when accompanied by enforcement, speed watch programs, and/or portable speed display signs. Drivers generally ignore posted speed limits if, in their judgment, the speed is not reasonable.

Police Enforcement lowers traffic speeds when police consistently issue tickets. However, cities and towns must commit personnel for a long time. When enforcement ends, drivers will return to the prior speeds.

Residents support and encourage enforcement on "their" street. However, neighborhood speeders are usually the local residents. Community opinion can turn negative when police cite residents.

Speed Watch Programs rely on volunteers to use a radar unit, and record speeds. Some neighborhoods set maximum speeds. Police send letters to those whose speeds exceed these maximums.

Speeds typically go down during the watch, but rise when it ends. Residents often find that no significant problem exists. Even though speeders are usually local residents, they usually perceive these programs positively.

RSAs 262 and 263 restrict a governing body's authority to set speed limits. Within those restrictions, a speed watch might be a low cost initial phase to slow speeders. Later phases can be the physical road alterations described below.

Portable Speed Display Boards show the speed limit and the driver's travel speed. Studies show small speed decreases when the device is present. A few studies show increases as the device challenges some drivers to speed. Recorded data can help police target enforcement times.

STOP Signs

Some towns install STOP signs as an immediate, tangible, and inexpensive response to residents' safety concerns. However, officials should note that STOP signs have some negative affects on safety. Speeds usually decrease only within about 100 feet before and after STOP signs. Drivers reach normal or higher speeds by midblock. While accelerating they take longer to stop for an emergency, such a child running into the street.

STOP Signs tell drivers where they must stop. Drivers tend to roll through "speed control" STOP signs. Many traffic engineers conclude that this disregard for STOP signs carries over to important STOP controlled locations.

For these and other reasons, the MUTCD recommends STOP signs only where engineering judgment indicates certain conditions. In Section 2B.05 it states "STOP signs should not be used for speed control."

Community reaction is usually mixed. Some view STOP signs as a safety improvement. Others view them as limiting movement where they most frequently drive. In addition, air quality worsens, and fuel consumption and noise increase near STOP signs.

Physical Road Alterations

Street Narrowing is the real or apparent reduction of the pavement width. Towns can narrow a road in several ways.

- <u>Removing pavement surface</u> lowers speeds only where there is a large width reduction. In some areas, reducing widths to less than 28 feet has increased accidents.
- <u>Chokers</u> are curb bulbs or median islands that narrow a street. They lower speeds in their immediate area. After passing them, drivers accelerate to normal speeds. Chokers can increase snow removal costs.

Special Pull-Out Section

The 2004 New Hampshire Directory of Roads Scholars

University of New Hampshire Technology Transfer Center

ROADS SCHOLAR I

This is the first Roads Scholar level. To achieve this level the Scholar has participated in at least thirty contact hours, or six one-day workshops.

Name	Affiliation
Marcelino Acebron	Bow
Charles Bailey	Bow
Robert Bain	Plymouth
Ken Baldwin	Chesterfield
Ken Barton	Hopkinton
Ron Basha	New Boston
Dave Bellamy	Amherst
Thomas Bircher	Hanover
Allan Bolduc	Meredith
Lenny Bolduc	Hanover
Naomi Bolton	Weare
Jimmy Boucher	Plymouth
Henry Brooks	Keene
James Brown	Salem
Nathan Brown	Bradford
Scott Brown	Amherst
Ernest Butler	Hillsborough
David Cantor	Salem
Almus Chancey	Bedford
Ed Chase	Merrimack
Mark Chase	Lyndeborough
Durwin Clark	Surry
Hugh Clark	Surry
Reagan Clarke	NHDOT
Gene Coburn	Manchester
James Coffey	Hillsborough
John Collins	Nashua
Carl Coulombe	Stark
David Crosby	Alstead
Gene Cuomo	Fitzwilliam
Bud Currier	Bow
Janusz Czyzowski	Londonderry
David Desfosses	Portsmouth
Chuck Dill	Durham
Donald Dow	New Hampton
Thomas Dutton	Keene
Timothy Elder	Lebanon
Billy Eldridge	Ossipee
Shaun Elliott	NHDOT
Gordon Ellis	Epsom
Joseph Fagnant	Plymouth
Kenneth Fanjoy	Portsmouth
Hazen Fisk	New Ipswich
Donald Foss	Pelham
Richard Frizzell	Concord
Scott Frost	Madison
Tyler Frost	Goffstown
Peter Furmanick	Holderness
Dan Garlington	Plaistow
Larry Gaskell	Washington
Larry Gay	Merrimack
Lawrence Gilpatrick	Bridgewater
Larry Glidden	Newport
Doug Glover	Sugar Hill
Roger Godwin	Andover
Philip Gordon	Pittsfield
Terry Gordon	New Boston
Paul Goundrey	Lebanon
Chuck Grassie	Stratham
Dennis Grenon	Bedford
Corey Hall	Whitefield
James Hanson	Claremont
Robert Havey	NHDOT
David Herlihy	Amherst
Wayne Hewes	Waterville Valley
Richard Hollins	Boscawen
Dean Hooper	Claremont
David Howard	Lempster
Judy Huckins	Northfield
Steven Jessemen	Laconia
Peter Jewell	Charlestown
Kim Kercewich	Alstead
Michael Kercewich	Alstead
Carl Knapp	Weare
Joe Kopacz	Alstead
John LaHaye	Hanover
Bill Lancaster	Hanover
Andrew Landry	Nashua
Roger Landry	Brentwood
Arthur Lane	Portsmouth

Name	Affiliation
Russell Lebrecht	Springfield
Richard Lefavour	NHDOT
Jason Lemere	Lempster
Robert Levesque	Durham
Ray Long	Amherst
Steve Lucier	Bradford
Donald Lussier	Croydon
William MacDuffie	Salisbury
James Maclean	Walpole
Richard Malasky	Newmarket
Henry Malo	Pembroke
Jason Marro	Whitefield
David Maudsley	Eidelweiss
Nancy Mayville	NHDOT
Kevin McKinnon	Colebrook
Douglas Mellon	Hampton
Greg Messenger	Strafford
Mark Morrill	NHDOT
David Morrison	Mason
Paul Moynihan	Laconia
Tracy Nash	Walpole
Clarence Nason	Milton
Todd C. Nason	NHDOT
Robert Nicol	Northfield
Keith Noyes	Exeter
Richard Page	Farmington
Paul Paradis	Rye
Steve Parkinson	Portsmouth
Robert Payette	Raymond
Jay Perkins	Exeter
Richard Perkins	Concord
Clayton Philbrick	Francestown
Rick Plankey	Keene
Scott Pollock	Nashua
Calvin Prussman	Newbury
Ed Richards	NHDOT
Thomas Richter	Portsmouth
John Riendeau	New Boston
Robert Ripley	Portsmouth
Dale Robie	Alexandria
Wayne Robinson	Brentwood
Steve Rougeau	Milford
William Ruoff	Milford
Robert Rutherford	Haverhill
Kenneth Salisbury	Amherst
Ralph Sanders	NHDOT
Jeffrey Sarette	Goffstown
Stanley Sawyer	Walpole
Mary Shaw	Somersworth
Kevin Sheppard	Manchester
John Silva	Gilford
Scott Simons	New Durham

Name	Affiliation
Glen Smith	NHDOT
Patrick Smith	Milton
Robert Smith	Walpole
Marc St. Pierre	Rochester
Douglas Starr	Jaffrey
Charles Staples	Westmoreland
Dennis Stevens	Sutton
Eric Stevens	NHDOT
Ken Stocker	Plainfield
Clark Stoddard	Alton
Robert Sullivan	Merrimack
Buddy Sweeney	Claremont
Allan Swiadas	Bedford
Craig Sykes	Raymond
Michael Tarr	Nelson
Bruce Thomas	Manchester
Wayne Thomas	Walpole
William Tourville	Hanover
Ed Trask	Merrimack
Roger Trempe	Hancock
David Trudell	Dover
Gerard Turco	NHDOT
Don Vachon	New Durham
Bart Wappes	Whitefield
Karen Welch	New London
Larry Wiggins	Newport
Bruce Williams	Ossipee
Thomas Willis	Rochester

Instructors, Gus Lerandeau and Maurice Nelson, at the Reconstruction Project Planning Workshop.

ROADS SCHOLAR 2

This is the second Roads Scholar Level. To achieve this level, the Scholar has participated in a least 50 contact hours or 10 one-day work shops and has covered a set of minimum subject areas. These include road design and construction basics, other technical, tort liability or safety, and supervision or personal development.

Name	Affiliation
Richard Abbott	Gilford
Bruce Adler	Chesterfield
Albert Anderson	Hancock
Edwin Betz	Peterborough
Dan Bissonnette	Whitefield
Scott Brooks	Freedom
Michael Clarke	New Durham
Alex Cote	Deerfield
Clark Craig	Hancock
Douglas Deporter	NHDOT
Dennis Desrochers	Hooksett
Margueritte Dumont	Nashua
Donald Dunlap	Bow
David Duquette	Charlestown
Gregg Eastman	New Ipswich
Robert Eaton	NHDOT
Rick Forcier	Jaffrey
William Fralick	NHDOT
Henri Frechette	Claremont
Everette Kern	Portsmouth
Dan Lavoie	Nashua
Pete Lavoie	Dover
David Leel	New Ipswich
Robert Lovering	Merrimack
Randall MacDonald	Hanover
Jim Major	Concord
Dennis Marquis	Nashua
Christopher McCormack	Plymouth
Warren Miner	Concord
Mark Ober	Ashland
Dan Phillips	Rochester
Jim Plante	Chesterfield
Carl Quiram	Goffstown
Birney Robbins	Keene
L. Patrick Roberts	Bartle
Randall Smith	Sullivan
Timothy Smith	Lebanon
Michael Sousa	Enfield
George Sturgis	Exeter
Steve Swain	Northfield
Wayne Thompson	Bridgewater
Paul Wallace	Nashua
Donna Walton	Nashua
Dave Wholley	Salem
Larry Young	Hooksett

SENIOR ROADS SCHOLAR

This is the third Roads Scholar Level. To achieve this level, the Scholar has participated in at least 70 contact hours or 14 one-day workshops and covered the range of topics required for Roads Scholar II.

Name	Affiliation
Ernie Ball	NHDOT
Bart Bevis	Chesterfield
David Blanchard	Derry
Harold Blanchette	Hopkinton
William Byrne	Keene
Ralph Carter	Sanbornton
Jonathan Champagne	Andover
Mike Chase	Hanover
Richard Clark	Northfield
Reggie Cleveland	Henniker
David Cook	Mason
Carlton Currier	Hooksett
Perry Day	Amherst
Roger Deboisbriad	Nashua
Charles Dylyn	HDOT
Dennis Eastman	New Ipswich
Wayne Elliott	Gilford
David Foster	Somersworth
Peter Goewey	Rindge
Kevin Hammond	Raymond
Ronald Hansen	Eastman Community Village
Larry Jackson	Littleton
Jean Marie Kennamer	Derry
Earl Labonte	Lebanon
George Leel	NHDOT
David Lent	Merrimack
Ken Louzier	NHDOT
Sharon Lucey	Dover
Joe Maguire	Merrimack
Charles Moore	Bridgewater
Dennis Patnoe	Lancaster
David Quint	Dover
Douglas Sargent	Laconia
Richard Smith	Lebanon
Randy Stevens	Lee
Jeff Strong	Merrimack
James Terrell	Walpole

Name	Affiliation
Edward Thayer	Washington
Paul Vlasich	Dover
William Willey	Lincoln

MASTER ROADS SCHOLAR

This is the final Roads Scholar Level. To achieve this level, the Scholar has participated in at least 100 contact hours or 20 one-day workshops and covered the range of topics required for Roads Scholar II. Once someone has achieved this level, they may become an advisor to the UNH T^2 Center offering his/her advice to the training schedule of the Center.

Name	Affiliation
Ernest Allain	Berlin
Carter Ames	Somersworth
Jeffrey Babel	Hollis
George Bachelder	Pittsfield
Brian Barden	Dublin
Doug Barnard	Concord
Peter Beard	Deering
Brian Beers	Durham
Paul Belanger	Bedford
Robert Bennett	Belmont
Anthony Bergeron	Sunapee
Michael Bernard	Hooksett
Bruce Berry	Amherst
Marty Bilafer	Wolfeboro
Greg Bowen	Loudon
Allan Brown	Warner
Mark Bucklin	Bristol
Ralph Carter	Sanbornton
Scott Clarke	Hollis
Leighton Cleverly	Bow
George Conkey	Dorchester
Alan Côté	Derry
John Cote	Dorchester
Albert Cross	Northfield
Ken Daniels	Enfield
Dan Davis	Wakefield
Richard Davia	Raymond
James Dicey	Troy
Ronald Dubois	Peterborough
Lee Dunham	Swanzey
Michael Faller	Meredith
John Fernald Jr.	Nottingham
Timothy Fiske	Temple
Jay Fitzgerald	Lebanon
Christopher Flagg	NHDOT
Mark Fuller	New Durham
Kurt Grassett	Hancock

Name	Affiliation
Clark Hackett	Farmington
Nate Hadaway	Bow
Greg Hatfield	Whitefield
Mike Hillhouse	Goffstown
Frank Hoye	Keene
Scott Keddy	Raymond
Walter Kiblin	Bennington
Robert Kline	Lebanon
Ken Knowlton	Franconia
Ron Lavoie	UNH
Arthur LeBlanc	Hollis
Richard Lee	New London
Norman Litalien	Nashua
Ray Mardin	Campton
John Margeson	Henniker
Dennis McCarthy	Raymond
Theresa McGinnis	Hampton
Fraser Michaud	Newport
Bruce Moreau	Merrimack
Sheldon Morgan	Gilford
Gary Paige	Francestown
Peter Paris	Sharon
Paul Parker	Sutton
Thomas Plourde	Francestown
Peter Prentice	Sandwich
Mike Reifke	NHDOT
Ken Roberts	Alton
Carl Somero	Milford
Richard St. Hilaire	Kingston
John Starkey	Seabrook
Edward Stewart	Atkinson
Robert Strout	North Hampton
Timothy Sweeney	Bow
Frank Swift	Hampton
Bruce Tatro	Keene
George Turcotte	Franklin
Glen Tuttle	UNH
Rick Washburn	Middleton
Gary Webster	Hudson
Keith Weed	Charlestown
James Wilson	Northwood

- Pavement markings indicate narrower than actual travel lanes. They rarely reduce speeds. Where pavement marking better defines the travel way, speeds have increased

Pavement removal and chokers are costly. Some towns include them in street beautification projects. Increased streetlights, landscaping, and activity also tend to slow motorists. Improved crossing point visibility and shorter street crossing time might improve pedestrian safety.

Speed Bumps, Humps, and Tables are raised areas in the roadway surface across the roadway. Speed bumps are 3 to 6 inches high with a length of 1 to 3 feet. Speed humps are 3 to 4 inches high and typically 12 feet long. Speed tables are essentially flat-topped speed humps, usually 22 feet long.

They all slow traffic. However, speed bumps can cause vehicle damage and loss of control. Traffic engineers strongly recommend AGAINST SPEED BUMPS.

Traffic engineers recommend speed humps only on streets where speed limits are 30 mph or less. Nationwide, agencies use speed tables on roads with less than 40 mph speed limits. In some places, fire departments have objected to speed humps, but found speed tables acceptable.

Both affect vehicle speeds along the road length when appropriately spaced. (See ITE, 1999, p. 63) If spacing is too far apart, speed decreases only in the immediate vicinity of the hump or table.

However, speed humps and tables often divert traffic, especially large trucks, to alternate routes. They can be uncomfortable for transit and school bus riders. Because humps and tables slow traffic, they reduce air quality impacts and energy use.

Most people living in the area initially favor speed humps and tables, but some tire of the inconvenience. Some cities require resident petitions and have a clear criterion for speed humps. (See Riverside CA. 1998., pp. 31-33)

Speed humps and tables are geometric design features. Officials should have engineers design their profile and spacing. Properly designed, they have minimal affect on snowplowing and street sweeping.

Introducing Curves on previously straight alignment can take two different forms:

1. Reconstruct the street with a curved centerline alignment and a uniform roadway width;
2. Introduce chokers or barriers on alternate sides of the street to create a serpentine travel path.

Speed changes little at curves if widths are uniform. There is some reduction near chokers and barriers. The closer the spacing the greater the speed reductions.

Engineers should design curves, chokers, and barriers. Vehicle flow and visibility issues can be complex. Pedestrian and bicycle traffic complicates design. Landscaping, often desired in such projects, can create visibility problems.

Speed Reduction and Costs

Police enforcement reduces traffic speeds, but can be expensive. Speed watch programs and display boards are relatively inexpensive but produce mixed and temporary speed reductions. STOP signs are cheap but reduce speeds only near the signs. The MUTCD and traffic engineers discourage their use for speed control.

Even though low cost, street narrowing by pavement marking is ineffective. Chokers and removing pavement surface have mixed effect on speeds. They have more affect when part of a street beautification project.

Properly designed speed humps and tables reduce speeds and have only initial significant cost. Introducing curves are usually even more expensive, and speed reduction depends on many factors.

Sources:

Clark, David E. 2000. *All-Way Stops Versus Speed Humps.* ITE Annual Meeting Compendium. Institute of Transportation Engineers. http://www.ite.org/traffic/documents/AB00H1902.pdf

ITE. 1999. *Traffic Calming: State of Practice.* Institute of Transportation Engineers.

MUTCD. 2003. *Manual of Uniform Traffic Control Devices.* FHWA. http://mutcd.fhwa.dot.gov/

NCHRP 504. 2003. *Design Speed, Operating Speed, and Posted Speed Practices*. Transportation Research Board. http://trb.org/publications/nchrp/nchrp_rpt_504.pdf

North Central ITE. 1994. *Neighborhood Traffic Control.* http://www.ite.org/traffic/documents/Tcir0365a.pdf

Riverside CA. 1998 *Neighborhood Traffic Control Program.* http://www.ite.org/traffic/documents/tcir0364.pdf

Anti-icing Improves Levels of Service

The Need for Higher Service Levels

Municipal officials and residents are usually aware of costs to keep roads clear of snow and ice. They see budget line items for the personnel, equipment, contracts, and chemicals necessary for winter operations. Less obvious are the costs if road crews do not keep roadways open and safe. Businesses close, which results in lost profits and wages. Several studies have shown that lost wages, lost retail sales, and lost local, state and federal taxes dwarf snow removal costs.

The public demands mobility for many reasons:

- Nearly all New Hampshire workers commute to work in personal vehicles.
- Population growth has drastically increased traffic densities on local roads.
- Access to retailers, service establishments, and other businesses often depends on personal vehicles.
- School consolidations have resulted in reliance on motor transport of students.
- "Just-in-time" manufacturing practices depend on predictable schedules for delivery of materials to maintain economic efficiency and competitiveness.

Snow and ice covered roads create havoc for travelers. Driving becomes stressful and dangerous, crashes multiply, and businesses close. These costs and motorist expectations dictate a high level of snow removal services. The public expects bare pavement immediately after a storm. Increasingly, motorists expect bare pavement during a storm. Over the past decade, highway agencies have developed "anti-icing" techniques that provide these high levels of service.

Anti-icing

Traditionally, snow and ice control operations begin with plowing after snow has accumulated. The result is usually a compacted snow layer tightly bonded to the pavement surface. "Deicing" the compacted snow, and often ice, is then necessary after the storm. Crews often have to spread large quantities of chemical to penetrate the pack to the snow-pavement interface, and to destroy or weaken the bond. Deicing often provides less safety, at higher cost, than anti-icing.

Anti-icing involves applying chemical onto a highway pavement before or at the start of a winter storm. The chemical inhibits the development of a bond between the snow or ice and the pavement surface. Periodic chemical reapplications during the storm continue this effect. It enables a manager to maintain roads in the best conditions possible during a winter storm, and to do so efficiently.

Anti-icing provides higher service levels, such as maintaining bare pavement throughout a storm. At minimum, anti-icing results in bare pavement as soon as possible following a storm. Many highway agencies in the United States have used anti-icing practices for years. They have achieved high service levels and saved money.

Anti-icing can provide increased traffic safety at the lowest cost. To achieve these benefits, road managers must adopt an anti-icing program that includes the following actions:

- Use of analysis and judgment in making decisions,
- Methodically utilize available information sources, and
- Anticipate the necessary actions, and promptly execute them.

The UNH T² Center Anti-icing Manual

This manual provides information for a successful and effective anti-icing program on local New Hampshire roads. It describes the significant factors that managers should understand and address in an anti-icing program.

In recent UNH T² Center workshops, participants received this manual. Others can acquire it online at http://www.t2.unh.edu/pubs/anti-icing-man.pdf. They can also order it on the Publications page of this newsletter.

Publications

University of New Hampshire Technology Transfer Center
Road Business, Fall 2004, Vol. 19, No.3

Copies of the following publications are available through the UNH T^2 Center for free. Consult the website at www.t2.unh.edu for the most current list of publications and to place a request. To request by mail, use the instructions below; by telephone, call 603-862-2826, or in NH, 800-423-0060; by fax, 603-862-2364; or e-mail, t2.center@unh.edu. When requesting an item with a charge, please include a check made out to *University of New Hampshire*, with your order form.

___**Accessible Sidewalks and Street Crossings**. An informational guide to designing appropriate and safe structures for pedestrians with disabilities.

____**Anti-icing of Local Roads.** This manual provides information for a successful and effective anti-icing program on local New Hampshire roads. It is intended for use by public works managers and road agents as well as their crews.

____**Calcium Chloride Package**. A package of articles and pamphlets explaining the benefits of deicing with calcium chloride.

____**Nonpoint Source Pollution, 2004.** A guide for citizens and town officials describing the causes of nonpoint source pollution, and suggestions on ways that NPS pollution can be prevented.

____**Road Salt and Water Quality**. Environmental Fact Sheet discusses road salt management, alternatives to road salt, and the DOT Reduced Salt Pilot Program.

____**Snow Disposal Guidelines**. Environmental Fact Sheet with recommended NHDES guidelines for snow disposal.

____**The Salt Storage Handbook**. A practical guide for handling deicing salt. Published by the Salt Institute.

____**The Snowfighter's Handbook**. A practical guide for snow and ice control before, during, and after a storm. Published by the Salt Institute.

____**Things to Know Before You Buy a New Plow**. This article describes recommended guidelines for snow plow trucks.

____**United States Pavement Markings**. An informative double-sided poster illustrating the meaning of pavement markings.

____**United States Road Symbol Signs**. An informative double-sided poster illustrating the meaning of symbols on signs. A must for every work environment concerned with road safety and repair.

____**Vegetation Control for Safety**. A guide for street and highway maintenance personnel. Explains site clearance and safety operations for vegetation control.

To Request Material by Mail

Check the items you would like to receive. Fill out this form and include a check in the envelope, if necessary. Cut out this page and mail to the UNH T^2 Center.

Name: ____

Position: ____

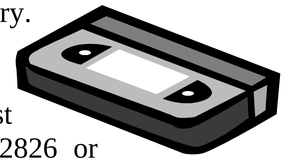
Organization: ______________________________________

Ship to Address: ____________________________________

City/Town: ____________________State/Province: __________ Zip/Postal Code: __________

Videos

University of New Hampshire Technology Transfer Center
Road Business, Fall 2004, Vol.19, No.3



The following videos are available for loan from the UNH T² Center Video Library. Consult our website for the most current list of videos and/or to place a request at http://www.t2.unh.edu. You can borrow five videos for up to two weeks free of charge. To request by mail, check the videos you would like to borrow (up to 5), fill out the mail request form, staple closed, affix stamp, and mail. To request by telephone, call (603) 862-2826 or (800)423-0060 (in NH); email, t2.center.unh.edu; or fax, 603-862-2364.

____**DC-261, Accessible Sidewalks: Design Issues for Pedestrians with Disabilities,** 40 min**.** Illustrates the hazards and obstacles faced by pedestrians with disabilities and recommends engineering and maintenance solutions to eliminate them. *U.S. Access Board.*

____**M-223, Cleaning and Clearing of Bridges,** 13 min. Discusses 8 easy steps to clearing bridges, what tools are involved, and repairs that may be needed in the future. *FHWA.*

____**ST-247, Installation, Inspection, and Maintenance of Work Site Control Devices,** 14 min. Goes over the importance of safely using work zone devices, the correct way to put up signs for motorists to see, and good use of barriers. *IRF Job Safety*.

____**M-243, Plow Power,** 15 min. Illustrates modern techniques for efficient plowing in towns and cities. Techniques are discussed on a variety of applications using wing blades, tandem blades, reversible blades, and more. *New England Ch. APWA.*

____**DC-243, Plows of the Future,** 8 min. Improvement of snow plows and how SHRP is researching them. Snow Scoop is featured. *SHRP*.

____**M-205, Potholes: Causes, Cures, and Prevention,** 11 min. Discusses how potholes develop, how they should be properly repaired, and how to develop a pothole repair program along with some preventive techniques. *CRREL.*

____**PA-217, Safety Restoration Snow Removal Guidelines,** 25 min. Presents anti-icing safety hazards and methods for correcting them. Importance of snow and ice removal management plans and implementation methods are also discussed. *USDOT/FHWA.*

____**M-242, Snow Plow and Spreader Operation Parts 1, 2, and 3,** 50 min. Part 1 explains the equipment needed for demonstration on using a snow plow/spreader and instructions for installing a snow plow and tailgate spreader. Part 2 describes the importance of daily checks, inspections, and servicing the equipment. Part 3 shows techniques of plowing. *Nebraska DOT*.

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Milestones:

Stephen Gray retired from the NHDOT.

Mike Pillsbury was promoted to Highway Maintenance Engineer at the NHDOT.

Vic Richards, Town Administrator in Atkinson passed away in July.

Alan Swan retired from Derry.

Websites:

EPA NOI Website. Use the search features to view stormwater notices of intent (NOIs) for construction projects seeking coverage under EPA's Construction General Permit.
http://cfpub1.epa.gov/npdes/stormwater/noi/noisearch.cfm

Kansas Workplace and Equipment Safety Sheets
http://www.kutc.ku.edu/pdffiles/WorkplaceFS.pdf

National Transportation Library
http://www.ntl.bts.gov/

Signage for Business
http://www.sba.gov/starting/signage/

Traffic Calming *http://www.trafficcalming.org/*

PW.NET

Want to know what is happening in other towns? Learn the very latest in regulations? Need a place to ask questions of other public works officials? Want to be the first to receive notifications of UNH T2 Center workshops? Then, subscribe to PW.NET. It's free. Send an email message to: kathy.desroches@unh.edu

In the body of the message type:

Add pw.net your name

For instance: Add pw.net John Doe

continued from page 1

Each abutment and wing wall section took three quarters of an hour to grout.

The backfill was a well-graded crushed rock mixture compacted to 98%. The high quality backfill shorten this task to about one day.

Cranes placed the seven, 117 foot, 65,000 pound box girders. They were post-tensioned together and full depth shear keys were grouted. This took about a day and one-half. A 3½ inch wearing surface completed the bridge.

The bridge opened 8 minutes short of 8 days. Over a hundred residents traveled on horseback, in antique cars, and convertibles to participate in the Town sponsored ribbon cutting celebration.

This FHWA demonstration project was a joint effort of

- The NH Department of Transportation
- The Northeast Region of the Precast Concrete Institute Technical Committee
- The University of New Hampshire

The project demonstrated ways to construct bridges faster money. For more information, contact Prof. Charles Goodspeed at 603-862-1443.

Road Business

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Calendar

		September		
13	14	15—Lines, Levels, and Layout, Raymond	16—Lines, Levels, and Layout, Moultonborough	17
20	21—Project Planning, Littleton	22	23—Gravel Roads, Keene	24—Gravel Roads, Lincoln
27	28	29—Winter Operations, Manchester	30—Winter Operations, Lincoln; PR for PW, Concord	1—Winter Operations, New London
		October		
4	5—Culvert Installation, Manchester	6—Basics of a Good Road, Manchester	7—Culvert Installation, Lincoln	8
11	12	13—Basics of a Good Road, Lincoln	14	15
18	19—Roadside Design, New London	20	21—ICS for PW, Nashua	22—ICS for PW, Nashua
25	26—Road Standards, New London	27	28—Repair Treatments, Keene	20
		November		
1	2	3	4	5
8—Erosion Control, New London	9	10—Erosion Control, Rochester	12—UNH Closed	13
15	16—All About Asphalt, Lincoln	17	18	19—All About Asphalt, Manchester
		December		
6	7	8	9—Tort Liability, Manchester	10