On the Road in NH:  
Subgrade Stabilization Using Portland Cement in Deerfield

By Chris Bourque, UNH T^2 Project Assistant & UNH Civil Engineering Student

Special thanks to Alex Cote, Deerfield Road Agent, for providing this information.

The Town of Deerfield has been experimenting with a new technology for road reclamation. This involves mixing portland cement with subgrade materials to obtain a stronger and more stable road base. This process is called full-depth reclamation with cement stabilization (FDRC).

Alex Cote, Deerfield Road Agent, knew of other towns using the technology and researched it for himself. He found the cost of stabilizing the reclaimed subgrade with cement to be comparable to the cost of standard full-depth reclamation (FDR).

Reclaiming involves using a pavement reclaimer (such as an Asphalt Zipper, Caterpillar RR-250, or Roadtec SX-7) to pulverize the existing pavement and base. This pulverized material is graded and compacted to be used as the subgrade for new pavement. A percentage by weight (usually 3 to 5 percent) of portland cement is spread over the reclaimed material in FDRC. The material is then roller compacted, watered, and shaped with a grader.

Advances have been made to improve the efficiency and quality of cement spreading. Rather than using a blower to distribute the cement, a hydraulic system was used in Deerfield to easily distribute the cement evenly.

Alex reports his crew has used FDRC on over four road miles, including Ridge Road and portions of Mt. Delight Road and Middle Road. He is impressed with the final product and intends to continue using it in future projects.

Though the cost of cement is fairly high, Alex says the cost is recovered with the time saved by using FDRC. The process was very quick for his projects, and he says the reduced time saved money on labor, machinery rentals, and traffic control.

It is too early for Alex to see the extension of pavement life for this project. However, he has noticed that the roads do not require a wearing course as quickly as other roads. Generally, a wearing course is applied about one year after paving a base course. It has been two years since Mt. Delight Road was reclaimed and Alex says that it still does not need a wearing course, despite drainage issues and troublesome clay soils.

For more information, contact Alex Cote, Deerfield Road Agent, 603-463-7736 or dfldroads@townofdeerfieldnh.com.
Master Roads Scholars

Master Roads Scholar—Ann Bedaw

Ann has been working for the town of Swanzey for 30 years. Ann wants to continue taking classes because “the world is always changing and it’s a great way to grow with it.” She enjoys spending time with her husband, children and grandchildren and likes to be outdoors.

Master Roads Scholar—David J. Desfosses

David J. Desfosses has been a project manager/engineering technician for the city of Portsmouth for 9 years. Prior, David was a civil consultant for a private engineering company. He wants to continue taking classes because he likes learning and sharing among his peers. David enjoys spending time with his wife Lori and snowmobiling.

Master Roads Scholar—Harold Fife

Harold Fife is the heavy equipment operator for the town of Northfield. Harold plans to continue taking classes because he “feels the trainers are very helpful with answering questions.” One of his favorite aspects of his job is dealing with the public. His advice for new public works employees or new Roads Scholars is to work hard and try your best. Harold’s favorite part of the Roads Scholar Program has been learning from the classes he takes and working with the UNH T² staff.

Master Roads Scholar—Carl Oehler

Carl is the assistant road agent for the town of Deerfield. Prior, he worked in the tree department and as a truck driver and snow plower for Union County in NJ. Carl wants to continue taking classes because of the ability to perform his job more efficiently and professionally. Carl has been married to Wendy for 20 years and has three teenage children. He enjoys fishing, hunting, snow mobiling, four-wheeling, and ice fishing. He would recommend T² classes for anyone and says that even if you walk away with only one thing, it was worth it.

Master Roads Scholar—Mike Summersett

Mike Summersett is the highway superintendent for the town of Northfield. He supervises 11 people who are “the best crew.” Mike says the classes are very beneficial for anyone in public works. His municipality is currently reclaiming 4500 feet of road including culverts and rebuilding a dam at Knowles Pond. Mike believes the Selectboard and most town residents support his department. He advises new public works employees to learn as much as they can. His favorite workshops in the Roads Scholar Program are Estimating Materials and Reconstruction Project Planning. Mike has been married for 32 years and has a daughter, a son, and two grandchildren. He has nine tractors and enjoys tractor pulling.

Master Roads Scholar—Sumner Weeks

Sumner Weeks is a truck driver and light equipment operator for the town of Northfield. He has been driving trucks for this department for 12 years. He enjoys learning new things and will continue taking classes. His municipality is currently working on some interesting projects, and he enjoys everything about his job. He advises new Roads Scholars and public works employees to do their best at work. Sumner enjoys every part of the Roads Scholar Program.

Master Roads Scholar—Craig Sykes

Craig Sykes is the maintenance foreman for the town of Raymond. He has worked with the town for twelve years. He began as a part-time plow driver. Craig believes “there is no end to how much you can learn.” Craig particularly enjoyed the OSHA Roadway Construction Training workshop. Craig likes to go camping and spend time with his wife Theresa.

Master Roads Scholar is the fourth and final achievement level in the UNH T² Roads Scholar Program. It requires completing 100 contact hours plus the requirements for Roads Scholar Two: 5 hours in basic road construction, 5 hours in supervision or personal development, 5 hours in environmental, 5 hours in tort liability or safety, and 20 hours in other technical areas.

UNH T² Roads Scholar Program: www.t2.unh.edu/training/rdsclcr.html
UNH T² Training Calendar: www.t2.unh.edu/training
Selling your Public Works Budget to Your Board and the Public

By Hank Lambert, former Director of VT LTAP & current NH LTAP instructor

In difficult economic times, successfully selling your public works budget to local elected officials and the public is even more critical than good times.

Develop a Concise Budget Summary:

A concise budget summary for informing the Board and involving the public is very valuable. There is no set format for this summary. It could include a transmittal letter, a budget message, an executive summary, and a budget-in-brief. However, a summary should do at least the following:

1. Summarize the major changes in priorities or service levels from the current year and the factors leading to those changes.
2. Articulate the priorities and key issues for the new budget period.
3. Identify and summarize major financial factors and trends affecting the budget, such as economic factors; long-range outlook; significant changes in revenue collections, tax rates, or other changes; current and future debt obligations; and significant use of or increase in fund balance or retained earnings.
4. Provide financial summary data on revenues, other resources, and expenditures for at least a three-year period, including prior year actual, current year budget and/or estimated current year actual and proposed budget.

Tips for Presenting the Budget:

Ask first: “Have I fully involved my staff in developing the departmental budget?”

1. Tailor your presentation to the situation, and what you want the Board (and the public) to decide. Begin with an overview of the presentation.
2. Revenue section:
   a. Explain key assumptions in developing revenue projections.
   b. Show anticipated revenues by source.
3. Expenditure section:
   a. Explain key assumptions: inflation rates, staff turnover, and anticipated increases.
   b. Show expenditures by program.
   c. Project changes in salaries and fringe benefits.
4. Program Section:
   a. Briefly explain new requirements.
   b. Give status reports on programs and success of new initiatives.
   c. Explain proposed new program initiatives and justification: pay for itself, will improve efficiency; will improve performance/safety/liability. Stress benefits to be achieved.
5. Focus on what interests members of the audience (support existing programs, new programs, effect on property taxes, and staffing).
6. Discuss implications of the budget (facilities, taxes, debt), show benefits if passed, and explain the consequences if the budget is reduced.

Reference: Reprinted from the CT LTAP Center Newsletter, Spring 2009, with permission on June 29, 2009.

UNH T² Budgeting workshop: 9-2-09 in Lincoln: www.t2.unh.edu/training/budgeting.pdf
Liability Checklist for Local Transportation and Public Work Agencies

If you can answer yes to the following questions, your agency is in a good position to defend itself against tort liability. If you have other concerns, add them to the list. Consider sharing this list with your council members and other elected officials.

Training

- Do all employees receive regular training for the work they perform and the materials and equipment they use?
- Do employees understand the importance of using reasonable care in performing their duties?
- Are employees instructed to report hazardous conditions and to solve them?

Signs and markings

- Do we have an up-to-date copy of the Manual on Uniform Traffic Control Devices (MUTCD) and other New Hampshire and federal governing documents? Are these available to all employees?
- Are employees familiar with the MUTCD and other governing documents?
- Are signs and markings adequate, properly installed, and well maintained?
- Do we have an up-to-date inventory of signs, signals, and markings and a plan for maintaining conformance with the MUTCD and other governing documents?
- Do we have and follow a plan for periodic day-and-night review of signs and markings?
- Are identified road hazards posted with appropriate warning signs based on the MUTCD and other governing documents?
- Are all bridges properly posted for weight restrictions and low clearance?

Roads, culverts, and bridges

- Do we have a current inventory of road, culvert, and bridge conditions and a plan for addressing deficiencies?
- Is the right-of-way for our roads properly established and recorded?
- Do we keep good records on agency activities including roadway conditions, crashes, and maintenance work?
- Do we use current versions of accepted guidelines in road design, construction, operations, and maintenance?

Administration

- Are all of our roadways inspected on a regular basis?
- Is our equipment in good repair and are employees instructed to report faulty equipment immediately?
- Do we follow objective procedures in setting priorities?
- Are our maintenance standards achievable with the resources available?
- Do we have an established procedure for receiving complaints, acting on them, and recording all actions?
- Do we meet periodically with our legal counsel to review the status of roadway-related claims filed against the agency?

Reference: This article has been adapted and reprinted from the NE LTAP Center with permission on June 29, 2009. The original article had input from Dr. Ron Eck, PE, FL LTAP Center instructor for Tort Liability and Risk Management, and from articles appearing in Lone Star Roads, Mar/Apr 2004, Nuggets & Nibbles, Fall 1996, and Technology News, Nov/Dec 2004.
Workplace Safety Tips

Good Housekeeping Habits

From Bob Perry, Loss Control Consultant, League Association of Risk Management (LARM)

Good workplace housekeeping involves much more than sweeping up at the end of the day. Developing good housekeeping habits will prevent accidents for you and your co-workers! Begin immediately by scheduling time for housekeeping during the workday and at the end of the day.

Here are some ideas:

- Evaluate your workspace before starting work. Look for hazards such as slip, trip and fall hazards or fire, machine and cut hazards.
- Remove those hazards before starting work. Clean up spills immediately. Put away tools and electrical cords when not in use. Close drawers. Clean up waste materials and dispose of them properly.
- Don’t leave equipment running or in the “on” position when not needed. Turn it off and clean it so it is ready for the next time it’s used.
- Clean up as you go along. Put away equipment throughout the day. Waiting until the end of the day exposes you and others to potential hazards all day.
- Finally, take responsibility for hazards even if you didn’t create the hazard or it’s not in your work area. Eliminate and/or report all hazards you find immediately.


3M Sign Grants for Locals

3M Traffic Safety Systems is offering grants for local officials to help with the compliance of the new federal regulations on minimum night-time traffic sign retroreflectivity.

Grants are available for replacing underperforming signs with ones made from higher performance prismatic reflective sheeting. Local and state agencies are eligible for one grant to purchase 3M prismatic reflective sign sheeting to replace signs made with engineering or super engineering grade sheeting.

Grants are also available to agencies interested in upgrading signs from high intensity sheeting to “full cube” 3M™ Diamond Grade™ DG³ Reflective Sheeting. Grants may be used to purchase both fabricated signs and/or roll goods, either direct from 3M and/or through participating independent sign fabricators.

For more information or to apply for a grant, www.3MSignGrants.com

Reference: www.3MSignGrants.com, accessed on June 25, 2009

UNH T² Center, Road Business, Summer 2009, Vol. 24, No. 2

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UNH T² Sign Inspectors workshop on 10-6-09 in Manchester:
www.t2.unh.edu/training/sign_retro_inspect.pdf
New Hampshire Roads Scholars

We are pleased to announce those who have achieved the following levels in the UNH T² Center Roads Scholar Training Program since the summer of 2008.

**Master Roads Scholar:** Requires 100 training contact hours and coverage of Roads Scholar II topics.
- Ann Bedaw: Swanzey
- Michael Clarke: New Durham
- Gene Cuomo: Fitzwilliam
- David Desfosses: Portsmouth
- Harold Fife: Northfield
- Harold Johnston: Lebanon
- Michael Kerczewich: Alstead
- Richard Lefavour: NHDOT

**Senior Roads Scholar:** Requires 75 training contact hours and coverage of Roads Scholar II topics.
- Brian Eldredge: Pittsfield
- Hazen Fisk: New Ipswich
- Rob Greene: Bradford
- Christopher Guay: Amherst
- Wayne Lombard: Merrimack
- John Meisel: Manchester
- Greg Messenger: Strafford
- Robert Meunier: Nashua
- Richard Nunziato: Raymond
- Robert Payette: Raymond
- Andy Smith: Conway
- Douglas Starr: Jaffrey
- Dean Stearns: Merrimack
- Dean Truax: Dover
- John Trythall: Merrimack
- Shawn White: Whitefield

**Roads Scholar II:** Requires 50 contact hours and coverage of specific subjects: technical, road design and construction basics, tort liability and safety, and supervision or personal development, and environmental.
- Duane Abbott: Sunapee
- Kevin Clement: Lisbon
- Steve Curtis: Merrimack
- Benjamin Daley: Raymond
- Alan Dews: Dover
- James Gove: Bradford
- Chris Hall: NHDOT
- Leon Holmes Jr.: Fremont
- Matthew Kimball: Deerfield
- Asa Knowles IV: Seabrook
- Shawn Littlefield: Dartmouth Hitchcock
- Russell Nickerson: Hampton
- Gary Russell: Bennington
- Steven Smith: Laconia
- Edwin Wakefield: Moultonborough
- Kirk Young: Gilmanton

**Roads Scholar I:** Requires 30 training contact hours.
- Ralph Barrett: Pelham
- Don Beaulieu: NHDOT
- Greg Blecharczyk: Merrimack
- Darrell Bradley: Hooksett
- Shaun Brooks: Sandown
- William Byrne: Hillsdale
- John Campbell III: Derry
- Jonathan Charlonne: Hancock
- Kevin Coakley: Dover
- Jerry Douglass: Maine LTAP Center
- Bill Dow: Moultonborough
- Craig Dunn: Moultonborough
- Robert Duverger: Gilford
- Frank Ferreira: Pelham
- Rex Fisher: Lisbon
- Matt Gordon: Hooksett
- Bruce Hautanen: Jaffrey
- Mike Heath: Plymouth
- David Horne: New Durham
- John Hubbard: North Hampton
- Ralph Marshall: Seabrook
- David Moore: Lebanon
- Peter Neary: Derry
- Kent Perry: Lyndeborough
- Scott Pilote: Hooksett
- Paul Ristaino: Meredith
- Robert Smith: Freedom
- Steve Smith: Somersworth
- Nathan St.Cyr: Whitefield
- Michael Stack: Merrimack
- John Thayer: Sanbornton
- William Thompson: Whitefield
- Ryan Towle: Concord
- Robert Truesdell: Hinsdale
- Doug Urquhart: Hooksett
- Alan Williams: Stratham
- Mark Zedon: Hooksett
Pervious (a.k.a. porous) pavement is a surface material that allows the passage of water through the surface (see Figure 1). Pervious pavement includes porous asphalt and pervious concrete. A pervious pavement surface is more coarse than conventional pavement due to the pores, but it looks nearly identical to conventional pavement. Pervious pavement can be used for roads, sidewalks, or parking lots.

Properties

The design of pervious pavement allows water to pass through the top of the pavement by traveling through air voids. Typical porous designs have an air void content of 15 to 35 percent. This allows reduction in stormwater runoff and the filtering out of pollutants that would otherwise have been released into the surrounding environment.

Water is stored in the pavement and subbase. A square foot of pervious pavement can drain water at a rate of three to five gallons per minute. This is equivalent of 275 to 450 inches of rainfall per hour. In addition, a six inch pavement layer with 20% voids can hold approximately one inch of water.

A material’s ability to accept runoff is often measured using a Coefficient of Runoff, or C-factor. Conventional concrete and pavement have a C-factor of 1.0. This C-factor indicates they have total runoff and do not accept any water. Pervious pavements have a C-factor between 0.35 (the same as grassy areas) and 0.65 (the same as uncompacted gravel).

Pervious concrete usually weights between 100 to 120 pounds (lbs) per cubic foot (ft³). This is lighter than conventional concrete which usually weighs around 140 lbs/ft³.

Pervious concrete also has a lower compressive strength than conventional concrete. Pervious concrete typically has a compressive strength around 2000 pounds per square inch (psi) while conventional concrete has a compressive strength around 4000 psi.

Porous asphalt has proven to have strength characteristics comparable to standard asphalt pavement when properly designed and installed. Improving the strength of pervious pavement can be done by increasing the thickness of the pavement layer or introducing some fines into the mix. However, adding fines will reduce the permeability of the pavement.
Design and Specification

Porous asphalt consists of coarse aggregate that is “open-graded”, or has little to no fines, and bonded with asphalt cement (see Figure 2). Using an open-graded aggregate leaves interconnected voids through which water can flow.

Pervious concrete consists of open-graded aggregates bonded with portland cement and water. Typical aggregates used for porous asphalt and pervious concrete conform to ASTM C33 #67 and #89.

Specify the stone reservoir materials to conform to AASHTO #3, AASHTO #5, or equivalent. Install a filter course of one half inch gravel both above and below the reservoir. This prevents material such as sand, salt, or pine needles from clogging the reservoir (see figure 4).

Specify filter course materials to conform to AASHTO #57 or equivalent. Also install a non-woven geotextile between the bottom filter course and the existing soil to further prevent fines from entering the subbase. The existing soil beneath the subbase should have a drainage rate of no less than 0.27 inch per hour or enough to drain the design storm event within 24 hours (whichever is greater).


<table>
<thead>
<tr>
<th>Standard</th>
<th>Stone Size</th>
<th>#67</th>
<th>#89</th>
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<tbody>
<tr>
<td>Min</td>
<td>No. 4</td>
<td></td>
<td>No. 16</td>
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<tr>
<td>Max</td>
<td>to 3/4 in</td>
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<td>to 3/8 in</td>
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<tr>
<th>Sieve Size</th>
<th>Percentage by Weight Passing</th>
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<tr>
<td>2-1/2 in</td>
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<tr>
<td>1-1/2 in</td>
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<td>1 in</td>
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<td>3/4 in</td>
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<tr>
<td>3/8 in</td>
<td>20-55 90-100</td>
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<td>No. 4</td>
<td>0-10 20-55</td>
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<td>No. 8</td>
<td>0-5 5-30</td>
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<td>No. 16</td>
<td>--- 0-10</td>
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<tr>
<td>No. 50</td>
<td>--- 0-5</td>
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</tbody>
</table>

Figure 2: Open Graded. v. Well Graded aggregate

A thickness of four inches is typical for low-traffic parking lots. However, you should design the pavement thickness to meet the structural requirements of the site.

Pervious pavements require a special subbase. A stone reservoir is necessary to collect and store runoff while it drains into the soil (see Figure 3). Design the thickness of this reservoir according to the required drainage necessary for the site.

Figure 3: A stone reservoir.

Figure 4: A chart of particle size and percentage passing through.
Applications

Use pervious pavements in low traffic areas with minimal heavy vehicle traffic. Do not use pervious pavements on truck routes or in high traffic volume locations.

Prevent freeze-thaw damage with proper design and maintenance. The pavement must be fully saturated for water to freeze and create pressures that crack the pavement. If the pervious pavement is designed properly and not clogged, then it should never become fully saturated.

Typical applications of pervious pavement include:

- Driveways, low-traffic roads, fire lanes, and emergency access roads
- Parking areas, especially over-flow parking and those associated with office buildings, shopping centers and recreational facilities
- Sidewalks
- Road shoulders and vehicle cross-overs on divided highways
- Boat launching ramps
- Pool decks and patios

Design Considerations

1. Pretreatment. In porous pavement designs, the pavement itself acts as pretreatment to the stone reservoir below. Sweep the surface regularly to maintain a clean surface and prevent clogging. Design the landscaping and drainage around the site to prevent the flow of materials into the pavement.

2. Flow. Water will filter through the pavement surface, then into the stone reservoir, and then eventually into the ground. The geotextile liner and sand layer below the stone reservoir distributes the water evenly to the subsurface and maintains a flat base.

   Designs may also require a means to handle stormwater overflow to the storm drain system.

   If this is the case, install perforated piping just below the pavement surface to route overflow water from the reservoir to the storm drain system.

3. Maintenance. Create a maintenance plan that includes specific guidance on how to conduct routine maintenance, a maintenance schedule, and how to repave the surface. Identify pervious pavement areas with signs.

   Acceptable routine maintenance practices to prevent clogging include vacuum sweeping, power scrubbing, and power washing. Complete these three to four times per year. Also, inspect pervious pavement surfaces at least annually for damage.

4. Landscaping. For porous pavement, the most important landscaping feature is a fully stabilized upland drainage system. Reducing sediment loads on to the pavement can help prevent clogging. Mow upland vegetation and seed bare areas to stabilize soils and catch sediments.

5. Construction. Quality control during construction is crucial to a long pavement life. Consider air void structure and unit weight characteristics when deciding on pavement. Prevent sealing voids so water can drain through to achieve the correct surface texture. Do not use trowels, seal the surface, or leave roller marks. Compact pavement surfaces with one to two passes of a compaction roller. Do not overcompact the pavement surface. This will compress the air voids in the pavement and prevent water infiltration.

Cost Considerations

Porous pavement is initially more expensive than traditional asphalt. While traditional asphalt and concrete costs between $0.50 to $3.00 per square foot (ft²), porous pavement can range from $2 to $8 per ft², depending on the design. However, porous pavement may eliminate or reduce the need for land intensive BMPs, such as dry extended detention.
or wet retention ponds. The cost of vacuum sweeping may be prohibitive if a community does not own a vacuum sweeper. Consider site specific costs in estimates including proximity and cost of gravel supplies and site permeability.

Benefits

The biggest benefit of pervious pavement is stormwater runoff collection. This meets needs for site runoff restrictions and limitations, prevents flooding, recharges groundwater, and reduces non-point source pollution.

Pervious pavement also has a role in the removal of pollutants. Removal is accomplished through absorption, filtration, and microbiological degradation. Pervious pavements have high removal efficiencies for sediments, phosphorous, nitrogen, zinc, lead and Chemical Oxygen Demand (COD).

Pervious pavements also:
• Eliminate hydroplaning
• Are considered a BMP by the EPA
• Eliminate the need for retention ponds and other stormwater management practices
• Minimize upgrades of existing systems to keep up with development
• Reduce road glare from wet surface
• Dampen tire and rain noise
• Improve traction due to a coarser surface

Disadvantages

Conduct thorough quality control inspections when pervious pavements are installed.

Disadvantages to pervious pavement include:
• Requires careful finishing and curing
• Local engineers and contractors often lack expertise for specification and installation
• High initial cost
• High rate of failure when designed or installed improperly
• Local planning commissions may still require additional stormwater management-consult your local planning commission before design
• Requires routine maintenance
• Cannot be installed on slopes
• Pervious pavements have not been found to effectively treat fuel leaks from automobiles

References


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Workshops are held on porous pavement by the UNH Stormwater Center: www.unh.edu/erg/cstev/porous_asphalt_workshop.html
Linsey's Administrative Tips

How to Use E-Mail Effectively
By Linsey Shaw, UNH T² Program Assistant

E-mail is a very common form of communication. It is not as formal as a face to face conversation, but there is still etiquette that should be followed.

These tips will help you send a clear E-mail message:

- Begin your email by greeting the person by name.
- Always include a very specific subject line. This is especially important if writing to multiple people. This indicates to the reader what the message is about and helps them manage their e-mail more effectively.
- Limit it to short paragraphs. This helps organize your thoughts and makes it easier to comprehend. If an e-mail is too long the recipient may skip or delete the message.
- Avoid humor and sarcasm. They are easily misinterpreted without voice inflection.
- Never write in ALL CAPITAL LETTERS. This indicates you are shouting or angry.
- Include a hyperlink instead of attaching files if possible. Attachments can contain viruses. Some servers don't allow messages with attachments and some people can not open attachments.
- When replying to a message, ensure you are replying to the person you intend to. Only use the “reply to all” feature if you want everyone to get your reply. If only the sender needs to receive your message do not use the “reply to all”.
- Check your spelling! E-mail is a representation of you, both professionally and personally.
- Read your e-mail in its entirety before sending it to be sure it’s exactly what you want to say. It is a permanent record and can be forwarded to other people.
- End your email with a salutation such as “Regards” or “Sincerely” followed by your name and contact information.

Many people now use e-mail daily. It is important to effectively communicate through e-mail. Be mindful of these tips and etiquette to help your e-mail messages be more effective. Do not use e-mail to vent or communicate negative thoughts and feelings. Use the phone or speak to the person face-to-face. Also, do not use e-mail if you have an urgent or important message. The typical response time for email is 24 to 48 hours. However, the typical response time for a phone call is much less.

Happy E-mailing!

References:
Milestones

- Robert Hatch is no longer the Road Agent in Jackson.
- Leon Kennison is the new Public Works Director in Nashua (start date: July 20th).
- Robert Rudder retired from the City of Lebanon public works department.
- Tom Woodley is no longer with Claremont department of public works.
- Town of Sandown joined NH Public Works Mutual Aid.

- Town of Winchester joined NH Public Works Mutual Aid.

Dates

- Master Roads Scholar Luncheon (Invite only), July 17, 11:30am-2:30pm, New England Center Cafe, Durham.
- NH Good Roads Show, July 31, 9am-5pm, NH Motor Speedway, Loudon.
- Public Works Summit (invite only), July 22, Manchester Community College.

Welcome Joana! We look forward to working with you!

Welcome Joana!

Joana Neves is a Biology student at UNH with a minor in nutrition. She started working for the UNH Technology Transfer Center on May 29, 2009. She will work for our center all summer until fall classes resume when she will again be a full-time student and a C.A. (community assistant) for the on-campus apartments.

Joana is responsible for answering phones, completing Master Roads Scholar interviews, updating flyers, creating folders and manuals, sorting the mail, and assisting with the Road Business newsletter.

Joana likes photography, reading, and cooking.

Welcome Joana! We look forward to working with you!

Farewell Chris!

Chris Bourque graduated on May 23, 2009 with a B.S. in Civil Engineering from UNH. Chris is now a Civil Engineer for NHDOT Bureau of Highway Design in Concord.

Chris worked for the T² Center part-time for two years while attending undergraduate school full-time at UNH! He has written numerous technical articles for Road Business and helped us with many other projects over the years.

Chris, your hard work and sense of humor will be missed!

The FHWA Office of Operations has issued the Signal Timing Manual, which is the first manual of current practices related to traffic signal timing. This manual is useful for traffic engineers, signal technicians, design engineers, teachers and students. It covers the following topics: policies, funding, timing plan development, assessment, and maintenance. Download for FREE at www.signaltiming.com

Crossword Puzzle

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

Across

1. The process of mixing portland cement with subgrade materials to obtain a stronger and more stable subgrade is abbreviated as ________.
2. Harold Fife the heavy equipment operator for ________ NH.
3. T² Traffic Safety Systems is offering ________ for local officials.
4. Robert ________ retired from the City of Lebanon Public Works Department.
5. For safety sake, ________ should never be left running or in the “on” position when not needed.
6. The Master Roads Scholar Luncheon will be held in _______, NH.
7. The town of Deerfield mixed ________ with their subgrade material.
8. An email should never contain all ________ letters, this indicates you are shouting or angry.
9. Carl Dehler previously worked in the tree department and as a truck driver and snow plower for the state of ________.
10. The Traffic Signal Timing Manual covers the topics of policies, timing plan development and ________.
11. Your presentation of a budget to the Board and Public should begin with an ________ of the presentation.
12. Chris Bourque graduated from UNH with a B.S. in ________.
13. Email is an effective way to ________, but should not be used to vent or ________ negative feelings.
14. You should always check your email for proper ________ before sending.
15. ________ inches thick.
16. Congress established the ________ program in order to provide services to US municipalities.
17. Proper design and maintenance will prevent ________ damage to pavement.
18. ________ is an example of a salutation often used at the end of an email.
19. Before starting work, you should ________ your workspace by searching for ________.
20. To be considered a Master Roads Scholar you must complete ________ training contact hours.
21. Your agency should always have an up-to-date copy of this document in order to defend against liability.
22. A ________ is a free way to use email to exchange information.
23. The biggest benefit of pervious pavement is ________ runoff collection.
24. The NH Good Roads Show will be held in ________, NH.
25. A typical low-traffic parking lot is ________ inches thick.
26. ________ pavement allows the passage of water through the surface.
27. ________ A material’s ability to accept runoff can be measured using ________.

Down

1. A concise budget summary and ________ has no set ________.
2. Your budget summary should always articulate the priorities and ________ for the new budget ________.
3. ________ the passage of water through the surface.
4. 4 ________ runoff collection.
5. ________ inches thick.
Publications

Accessible Sidewalks and Street Crossings. Designing appropriate, legal, and safe structures for pedestrians with disabilities. USDOT & FHWA.


Concrete in Practice Fact Sheets. These are 29 fact sheets covering various practices for use with concrete. National Ready Mixed Concrete Association.

Local Low Volume Roads and Streets. Rural streets and other less-traveled roads, including inventory, classification, financial planning, program assembly, and helpful resources. ASCE.

Non-Point Source Pollution. Revised from the May 1994 edition, this guide describes the causes of non-point source pollution, and suggests ways that NPS pollution can be prevented. EPA.


Work Zone Safety--CD-ROM. This interactive CD contains training materials for workzone safety; simulations on work performed on the roadside, shoulders, and urban streets; lane closings on multiple roadways and divided roadways; and intersections and walkways. Rutgers University & Advanced Technology Concepts, Inc.

Videos

Flagging in the Workzone, ST-233, 10 min.—DVD. Discusses proper flagging practices and techniques that help make work zones safer for flaggers, workers, and roadway users. OR DOT and T2 Center.

The Muddy Roads Project, M-235, 20 min.—DVD. A study in VT on BMP’s for maintaining gravel roads during mud season. Vermont Agency of Transportation and ERDC-CRREL.

Preventive Maintenance: Project Selection, M-284, 30 min.—DVD. The principal is to apply the right treatment to the right road at the right time. It explains the advantages of preventive maintenance and the importance of preserving the life of the road rather than restoring it. FHWA.

Safety Starts with Crash Data, ST-2, 23 min.—DVD. Encourages law enforcement personnel who collect data at crash scenes to thoroughly investigate crashes and submit accurate, complete, and timely reports. USDOT, FHWA, Federal Motor Carrier Admin., & National Highway Traffic Safety Admin.

Stormwater Runoff, There is no Away, DC-262—DVD. Using local seacoast scenes, details the importance of local watersheds and storm water impacts on area water bodies. In addition, public awareness and ideas on how to reduce pollution are shared. Seacoast Stormwater Coalition, 2003.

Work Zone Traffic Control Course, DC-235, 58 min.—DVD. Night Time Work-Zone Control-explains the extra safety precautions to be exercised at night; The Parkway East-describes planning used for rebuilding a Pennsylvania freeway; The Virginia I-95 Time Lapse, illustrates the repairing of I-95 in Virginia; and Flagging Procedures and Operations, which discusses duties, precautions, responsibilities, and flagging instructions. PA DOT & FHWA.

Customer Information

Name: ___________________________________________ Title: __________________________
Affiliation: ______________________________________ Mailing address: __________________________
Town/City: ______________________________________ State: ____________________ Zip: ____________
Phone: _______________ Fax: _______________ Email: __________________________

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Listservs

A listserv is a free way to use email to exchange information. To subscribe send an email to linsey.shaw@unh.edu and include: your name (first and last), your email, your affiliation, and the list you want to subscribe to.

- **PW.NET**: (over 400 subscribers) Want to know what is happening in public works in NH? Need a place to ask questions of other public works officials? Want to receive notifications of UNH T² Center trainings and other events? Sign up for pw.net.

- **OFFICE.ADMIN**: Do you work in an office? Do you spend a lot of time working on a computer? Do you supervise others? Do you conduct interviews? Sign up for office.admin.

- **NE.PAVEMENT**: Do you work in the New England region and manage a pavement program? Are you interested in learning about the latest products or solutions for pavement management? Sign up for ne.pavement.

**T² Center Advisory Board**

UNH T² staff meet with the advisory board quarterly to discuss training, center initiatives and special projects.

**NHDOT Representatives**
- Steve Dubois - Civil Engineer, NHDOT Systems Planning
- Nancy Mayville - Municipal Highways Engineer, NHDOT Planning & Community

**FHWA Representative**
- Christopher Tilley - Area Engineer

**Municipal Representatives**
- Alex Cote - Director of Public Works, Town of Deerfield
- Martha Drukker - Associate Engineer, City of Concord
- Richard Lee - Director of Public Works, Town of New London

**NH Public Works Standards & Training Council**
- Dave Danielson - President, Forcee Advocacy LLC

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About UNH T²

Congress established the Local Technical Assistance Program (LTAP) in 1982 to provide services to US municipalities. There is an LTAP Center in every US state and Puerto Rico, and there are Regional Centers serving Tribal Governments.

UNH T² was established in 1986. We continue the LTAP mission by providing services to NH municipalities, the NH Department of Transportation, and private road-related organizations.

**T² Program Supporters**
- Federal Highway Administration
- NH Department of Transportation
- University of New Hampshire
- National LTAP & TTAP Program

**T² Center Staff**
- Julia Faller, Project Asst.--UNH Business Student
- Charles Goodspeed, T² Center Director
- Butch Leel, Technical Support Assistant
- Kathryn Myers, Training Program Mgr. & Road Business Editor
- Joana Neves, Project Asst.--UNH Biology Student
- Linsey Shaw, Program Assistant
- Bob Strobel, Software Project Manager

About Road Business

Road Business is a quarterly publication of the University of New Hampshire Technology Transfer Center. Any opinions, findings, conclusions, or recommendations presented in this newsletter are those of the authors and do not necessarily reflect the views of our sponsors. Any product mentioned is for information only and is not a product endorsement.
# Summer/Fall 2009 Training Calendar

www.t2.unh.edu/training

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<thead>
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<th>Course Title</th>
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