



Road Business

A University of New Hampshire Technology Transfer Center publication

Vol. 17 No. 1

Spring 2002



On the Road in New Hampshire

Derry Rebuilds English Range Road

In August 2000, the UNH T2 Center went to the town of Derry with their Reconstruction Project Planning Workshop. Participants focused on rebuilding English Range Road an original Range Road created in the 1770's. It is designated as a scenic road. Last year Derry rebuilt the road using some of the suggestions from the workshop.

In these workshops participants walk a road section soon to be rebuilt. They look at deficiencies and discuss ways to correct them. Dave Blanchard of Derry says, "it's a class that ties in the workshops *Basics of a Good Road* and *Drainage* as a foundation in which to attack a road project." Gus Lerandean, All States Asphalt, and Maurice Nelson, Pike Industries, co-instruct the class along with the New Hampshire Department of Transportation District Engineers. Everyone participates and learns from one another.

The workshop revealed that inadequate drainage was a primary issue. As a result, Derry installed 2100 feet of underdrain. They replaced and installed 17 culverts. Ditches were cleaned and/or created. In some cases it was necessary to

add ditches just to one side of the road based upon the topography.

One goal was to create a uniform road width of 20 feet. Previously, the road width ranged from 17-22 feet. No changes were made to curves or horizontal alignment. They did change the vertical alignment; one hill was lowered by 2 feet. Townspeople were concerned about a fatality that had occurred

8 years before on the hill. To avoid the added costs of repairing any damaged walls on the scenic road all work had to take place within the confines of the stone walls

Before beginning the reconstruction project, the highway department held a public meeting. Since it is a scenic road, the residents were concerned that improvements on the road might change the "look" of it. They also feared drivers would travel faster on the improved wearing surface. Today, traffic travels at the same speeds as before the construction. One apparent benefit is more residents now walk on the road for their exercise.

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Road Business is a quarterly publication of the

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The Technology Transfer Center at the University of New Hampshire (UNH) is supported by the Federal Highway Administration (FHWA), the New Hampshire Department of Transportation (NHDOT), and UNH. Any opinions, findings, conclusions, or recommendations presented in this newsletter are those of the authors and do not necessarily reflect the views of the FHWA, NHDOT, or UNH.

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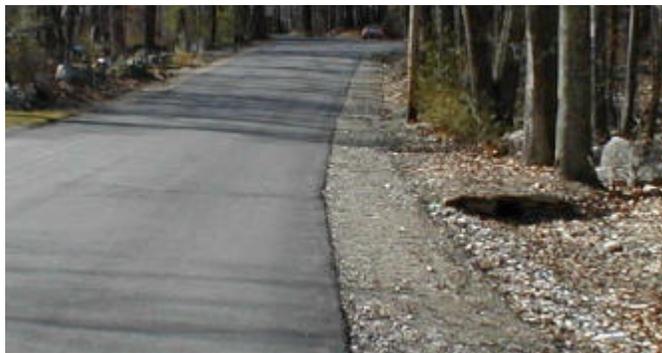
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Before and After

Left: Inadequate drainage is indicated by the cracking. Also, there weren't any ditches so the water stayed on the road surface.

Below: Ditches were created to increase drainage, shoulders were backed up giving the roadway support.



Before and After

Left: A hill created poor sight distance. Again, there was inadequate drainage.

Below: Three feet of ledge was removed. The hill was lowered by 2 feet. Underdrain and catchbasin were installed. The slope of shoulder was cut back, loam added, and then seeded (picture taken before winter sand was swept).

Special thanks to Dave Blanchard from Derry for his assistance with this article



Rumble Strips in Work Zones

by Beth Terney, Project Assistant

Road managers in New Hampshire are using portable rumble strips in work zones in addition to traditional traffic control devices. Rumble strips are often used along highway shoulders to reduce motorist speed. The focus of this article is on use of rumble strips in work zones.

Pros

Rumble strips provide auditory and vibratory stimulus. The sound alerts the road crew and pedestrians that a vehicle is approaching. They are particularly effective when a workzone is around a corner and workers can't see oncoming traffic. They are also effective when visibility is low, such as when trees are leafed out.

Rumble strips have a low effect on the average speed of cars. However, driver awareness is increased.

Cons

A few rumble strips applications can be hazardous as drivers might swerve to avoid the strips placing them into oncoming traffic. Motorcyclists and bikers might lose control of their motorcycle or bicycle.

A pro of strips is also a con, the noise. Workers should avoid using strips in neighborhoods where noise becomes a concern.

Recommendations for Use

There are four recommended uses for rumble strips:

1. Place on the road before the flagger.
2. With shoulder work, use along the shoulders to protect the crew.
3. Place rumble strips well in advance of the workers allowing drivers time to slow down. Use rumble strips in the buffer zones in conjunction with visual stimuli. Greg Hatfield, Public Works Director in Whitefield plans to use the strips he purchased this way.

As with any traffic control device, proper signage should alert drivers to take the desired



Rumble Strip Installation (photo from Texas Transportation Institute)

action. Rumble strips are effective where conventional techniques alone are not.

The NYDOT uses rumble strips in their work zones. They find the strips work well on low-volume streets and in cities. The NYDOT does not use them on high-volume/high-speed roads because of the potential for swerving.

Conclusions

Rumble strips are inexpensive and cost effective. They are most practical when used for long term work zones. Rumble strips should be used in places when other methods alone are unsuccessful. Work zones should be evaluated before using rumble strips. Rumble strips augment the traffic safety devices as outlined in the Manual for Uniform Traffic Control.

Sources:

Kennedy, Chuck. "Rumble Strips." *Rubber Tough*. www.rubbertoughusa.com, June 2001. (800) 724-4910.

"New York State Dot Announces Work-Zone Safety Initiative." *News Release, NYS Department of Transportation*, 3 April 2000. <http://www.dot.state.ny.us/news/press2000/0019news.html>, June 2001.

"Work Zone Enhancements for Shoulder Work." *Department Policy, NYS Department of Transportation*, 28 July 1995. <http://www.dot.state.ny.us/progs/safety/sb-95-8a.html>, June 2001.

Children at Play Signs

Seldom Effective, and Usually Unnecessary and Confusing

Warning signs call attention to unexpected conditions on or adjacent to a road. Conditions might require speed reduction or other actions in the interest of safety. Therefore, sign messages must be clear. *The Manual on Uniform Traffic Control Devices (MUTCD)* the standard for placing traffic signs ensures clear messages. It also emphasizes that drivers must respect traffic signs. This article will focus on Children at Play signs, which are often unclear and drivers tend to disrespect them.



Citizens often demand that Children at Play signs be installed on their street. They argue that the signs will reduce the risk of potentially tragic accidents. There is some merit to their concern. In a NCHRP study of pedestrian accidents, researchers found that over 40 percent of the accidents involved children. Almost two-thirds of those accidents occurred in residential areas other than intersections. The Children at Play sign, however, is rarely an effective solution.

The MUTCD requires that use of warning signs be based on an engineering study or on engineering judgment. Such a study could draw the following conclusions.

1. The Children at Play sign has little effect on driver behavior, which is seldom the cause of accidents. The NCHRP study reported that nearly 80 percent of the collisions involving children resulted from an unsafe or illegal act by the child. From that study, an ITE Traffic Control Devices Handbook author concluded that no traffic control device could be expected to protect a child.
2. Signs give parents and children a false sense of security. By relying on the sign, parents might monitor their children less closely. Children might interpret the sign to mean they can play in the

street. Thus, a Children at Play sign can contribute to the very accidents parents seek to avoid.

3. One Children at Play sign can lead to many such signs throughout a town. Nearly every block has children living on it. As stated in the MUTCD, “The use of warning signs should be kept to a minimum as the unnecessary use of warning signs tends to breed disrespect for all signs.”

4. Installing a Children at Play sign in response a citizen’s request is based on political reasons rather than on sound engineering judgment.

5. Signs need to be maintained. They are expensive to purchase, install, and inspect.

Because they are confusing and fail to meet any recognized criteria for good signing, placing Children at Play signs can open a municipality to tort liability claims.

There are situations where road managers should consider signs to protect children. The MUTCD describes signs for school zones, pedestrian crossings, and playgrounds. It also contains signs for children with disabilities. The MUTCD signing for such areas conveys a clear message to drivers.

Children at Play signs, on the other hand, are usually ineffective, unnecessary, and confusing. For the reasons given above, they should not be used.

Sources

- “Children at Play” Signs Can Cause Confusion.” *Mass Interchange*, Fall 2001.
- Manual of Uniform Traffic Control Devices*. 2001 Millennium Edition. FHWA. http://mutcd.fhwa.dot.gov/kno-millennium_06.14.01.htm
- Nassi, Richard B. 2001 “Pedestrians,” pp 429-486 in *Traffic Control Devices Handbook*. Washington DC: Institute of Traffic Engineers.
- NCHRP. National Cooperative Highway Research Program Synthesis 139. *Pedestrian and Traffic Control Measures*.

When Should I Pave a Gravel Road?

By Marisa DiBiaso, Project Assistant

Municipal officials often ask the title question. Citizens occasionally ask as well. There are several considerations:

- Traffic weights and volumes
- Safety
- Design
- Relative costs

This article will discuss each below.

Pros & Cons

Paved and unpaved roads each have advantages. The following summary applies to properly constructed and maintained roads.

Paved Roads

- Carry all water off the surface and into ditches
- Eliminate dust
- Accommodate heavy trucks and many vehicles
- Provide a smoother and safer ride

Unpaved Roads

- Have low construction and maintenance costs for very low volume roads
- Keep vehicles at lower speeds
- Can usually be maintained and repaired within a municipal highway department's capabilities

Traffic Weights and Volumes

Traffic volume and weight directly affect road longevity. The New Hampshire Department of Transportation (NHDOT) recommends that roads with less than 50 average daily traffic (ADT) be unpaved. For ADT over 200, the NHDOT recommends an asphalt paved surface. (Regional Planning Commissions have ADT information for some roads, or describe how to estimate it.)

For roads between 50 and 200 ADT, road managers should consider vehicle weights and past performance. If the unpaved road is performing well, with reasonable maintenance costs, paving is rarely justified. They should, however, consider applying a dust suppressant, which will also stabilize the road surface.

Safety and Design

Safety is a primary consideration in road design. Whether paved or unpaved, a safe road must have sight distances, alignments, and lane widths adequate for the expected speeds. The adequacy of present geometric features should be considered in the paved vs. unpaved decision. If inadequate, the cost and other impacts of reconstruction are factors. Although adequate for an unpaved road, geometric features might be inadequate for a paved road, which is often subject to higher speeds.

It is likely the base and drainage of an unpaved road will need improvement before paving. Gravel road bases are usually thinner than paved. Gravel surfaces and bases usually have too many fines to meet paved road design standards. Also, more water will run off a paved road, so drainage must be examined and perhaps modified.

Relative Costs

Gravel roads require grading, shaping, and regular addition of gravel. Dust control is often necessary. These costs increase significantly as traffic volume and weights increase. These increasing costs are factors in the above noted NHDOT recommendations based on ADT.

Municipalities should still calculate relative costs for each specific situation. Estimates should be based on future traffic demands. The geometric features described above will affect cost comparisons. Drainage needs for both unpaved and paved alternatives should be included. Maintenance as well as construction costs must be considered. Cost studies should also consider whether the current maintenance efforts, and their costs, are adequate.

Although politics will invariably influence decisions, focusing on traffic weights and volumes, safety, design, and relative costs will provide an informed decision.

Sources

- "Minimum Geometric and Structural Guides for Local Roads and Streets." 1990. New Hampshire Department of Transportation.
- "When to Pave a Gravel Road." The Link Kentucky LTAP, Vol. 8, No. 2, Summer 1992.

Master Road Scholars



Master Road Scholar Mike Faller

Mike Faller has been the Road Agent in Meredith for four years. He graduated from the University of New Hampshire in 1990 with a degree in Civil Technology. Upon graduation he worked at Atlantic Testing Laboratories in White River Junction Vermont and later at the NHDOT as a Technician and Utility Coordinator.

Mike likes the “hands-on” approach to the Road Scholar program. He believes it is always beneficial to continue education. For him, obtaining his Master Road Scholar was another way to add to his educational background.

Mike lives in Meredith Sonya, with his wife, of ten years and their four year old son, Devon. He enjoys boating on Lake Winnepesaukee as well as hunting and fishing.

Congratulations to Master Road Scholar Mike Faller!



Master Road Scholar Kurt Grasset

Kurt is the Road Agent for the Town of Hancock He began working in the Public Works field in 1985 for the Town of Amherst as a light equipment operator.

Kurt wanted to become a Master Road Scholar for many reasons, mainly professional development. He also believes that the Road Scholar Program helps him keep informed of the new and changing trends in the Public Works field. He finds the Road Scholar Program to be beneficial for the Highway Department, as it provides consistent training that everyone can benefit from. Kurt’s supervisors have always been supportive of his achievement as well as other employees’ achievement within the Road Scholar Program.

Kurt’s family consists of his wife of 14 years, Jennifer, and his son Kody, age 9, and daughter Kalbie, 19 months. His hobbies include hunting, fishing, gardening and the Town’s Volunteer Fire Department.

Congratulations to Master Road Scholar Kurt Grasset!

More Master Road Scholars



Master Road Scholar Alan Côté

Alan Côté is the Highway Coordinator for the Town of Derry. He began work for Derry in 1989 as an Engineering Technician. Previously, he worked as a surveyor. Alan is a licensed septic system designer.

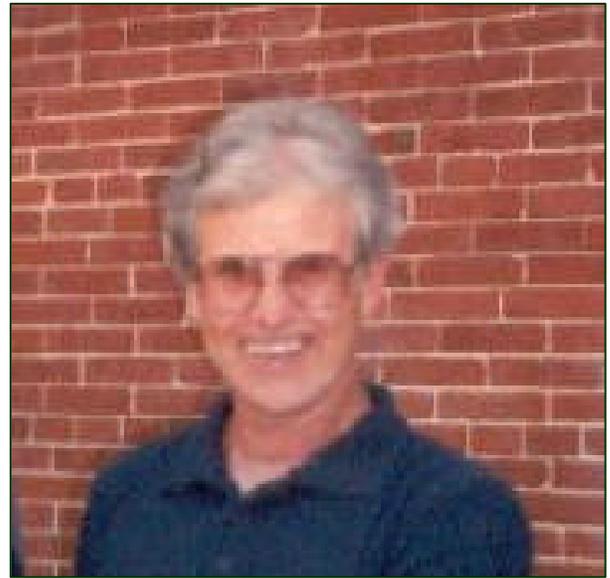
Alan likes to take classes because technology is always changing and classes can provide the latest information. He believes that the UNH T² Center offers a lot of good programs.

Alan sends his crew to classes because he wants them to develop professionally and to gain experience.

Alan and Carrie have been married for 17 years. They have two children, Jacqueline, 14, and Nathan, 12. He enjoys downhill skiing, whitewater rafting, gardening, mountain biking and assistant coaching his son's baseball team. He

belongs to a family group that performs French Canadian Music.

Congratulations to Master Road Scholar Alan Côté!



Master Road Scholar Peter Paris

Peter Paris was appointed Road Agent in the Town of Sharon 6 years ago. Previously, he worked in construction and mechanical contracting where he had 27 years of experience and holds several master licenses.

Pete started taking classes when he began working with the town and he realized the state of the roads. He continues to attend workshops "to broaden my skills, and there is always more to learn."

The Selectmen are pleased with his achievement. Since he began taking workshops, he has made many positive changes in the town. For example, he has learned of additional funding sources, handles emergencies more effectively, and has suggested the town create a fund for bridges that will need to be repaired or replaced. Pete has learned to improve his communication skills with contractors and selectmen, benefiting and the town.

Pete and Linda have been married for 34 years. They've been training and showing Morgan horses for over 21 years with their daughter and other family members. He also enjoys mountain biking, hiking, hunting, fishing and travel.

Congratulations to Master Road Scholar Peter Paris!

Road Business Four Year Index

Call the UNH T²Center for Articles or Check the Web

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Publications

University of New Hampshire Technology Transfer Center

Copies of the following books and pamphlets, and our complete list of publications, are available through the UNH T² Center. When requesting an item with a charge, please include the check with your form. If ordering by mail, follow the instructions below. To request by telephone, call 603-862-2826, or in NH, 800-423-0060. You can also request by fax to 603-862-2364, or by e-mail to t2.center@unh.edu

The following materials are available free of charge.

____ *UNH T² Center Publications and Video Catalog.*

____ *Asphalt Pavement Repair Manuals of Practice.*
This manual discusses materials and procedures for sealing and filling cracks in asphalt-surfaced pavements. Information is also given about the materials and procedures for the repair of potholes in asphalt-surfaced pavements.

____ *Call Dig Safe Before You Dig.* An information pamphlet with regulations and helpful laws regarding digging.

____ *Chain Saw Safety.* Flyer on preventing accidents and proper maintenance of a chain saw.

____ *Contractor Beware: Your Real-Life Guide to Power Line Safety.* A Public Service of NH guide to working safely around power lines and electricity.

____ *Controlling Nonpoint Source Runoff Pollution from Roads, Highways, and Bridges.* Published by the EPA in August, 1995. A fact sheet to improve knowledge about efforts to control runoff pollution from roadways and construction activities.

____ *Improving Highway Safety at Bridges on Local Roads and Streets.* This guide discusses effective low cost methods of improving and enhancing bridge and bridge approach safety.

____ Series of Quick Guides for New Hampshire Towns. A set of pamphlets dealing with the topics below. Developed by the UNH T² Center and distributed as a set. 1) Culvert Installation and Maintenance, 2) Ditch/Channel Construction and Maintenance, 3) Vegetative Erosion & Sediment Control, 4) Non-Vegetative Erosion & Sediment Control, 5) Cut and Fill Slopes, 6) Beaver Pipe: Construction and Maintenance, 7) Stormwater Inlets and Catch Basins, 8) Mowing and Brush Control, 9) Snow and Ice Control, and 10) Obtaining Permits.

____ *Statewide Travel Forecasting.* This FHWA book describes methods and techniques of statewide travel forecasting.

____ *Work Zone Traffic Control Guide for New Hampshire Municipalities.* A flip book designed for quick reference for municipalities all over, in addition to NH. Helpful charts, illustrations, and diagrams are included in the information about traffic control devices, parts of a work zone, flagger tips, and much more. One per customer.

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 T² Center.

Name: _____

Position: _____

Organization: _____

Address: _____

Town: _____ State: _____ Zip: _____

Videos

*University of New Hampshire Technology Transfer Center
Road Business, Spring 2001, Vol. 17, No.1*

The following videos are available from the UNH T² Center Video Library. You can have five videos for a two-week period with no 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). Visit our complete publication and video catalog on our website at <http://www.t2.unh.edu>. Or email t2.center@unh.edu

- _____ **DC-227, Highway Runoff Water Quality**, 33 min.
Step by step research design and results of highway runoff water quality.
- _____ **DC-251, The Importance of Road Drainage**, 19 min.
The basis for this film is that if you do not plan the drainage of water the way you want, nature will drain it for you. Describes surface and subsurface drainage, drainage systems, and procedures for their inspection and repair.
- _____ **DC-254, Soil Erosion and Sediment Control**, 28 min.
This video shows how soil erosion and sedimentation are related. It describes in detail various types of erosion and erosion prevention/control procedures. It also stresses the need for adequate control of erosion in order to minimize the amount of soil lost each year.
- _____ **M-202, Upgrading Gravel Roads**, 20 min.
Discusses how gravel and asphalt roads can be recycled using low-cost alternatives.
- _____ **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.
- _____ **M-208, Down is Up**, 20 min.
Preventive maintenance treatments to reduce down time on construction sites.
- _____ **M-215, Guidelines for Spring Highway Use Restrictions**, 26 min.
Shows where, how and when to post limits on roads in the spring. Discusses criteria for placing and removing restrictions, where to apply them, how much to restrict loads, and when to apply and remove restrictions.
- _____ **M-226, Cleaning of Lined Ditches, Culverts, and Catch Basins**, 16 min.
Demonstrates some good practices for maintaining lined ditches, culverts, and catch basins. It demonstrates before and after conditions and points out the benefits of a properly maintained drainage system. Supplement available.
- _____ **M-230, Replenishing Earth and Gravel Shoulders**, 19 min.
In nine steps this tape points out the important features of the properly drained and sloped shoulder. It shows good shoulders, when repairs are needed, and when to replenish shoulders. Supplement available.
- _____ **M-234, Patching Unpaved Roads**, 11 min.
Describes an eight-step procedure that will provide long-lasting repair. The proper maintenance practices for preparing the hole, filling it with granular material, and compacting the material are detailed.
- _____ Video Catalog.
-

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Websites:

There are many helpful websites for public works employees. If you have others that your colleagues could benefit from, send the urls to t2.center@unh.edu. We'll publish the site and your name in *Road Business*. (No commercial sites please).

UNH T² Center:
<http://www.t2.unh.edu>

How Stuff Works
<http://www.howstuffworks.com>

Gravel Roads Maintenance Manual
<http://www.epa.gov/owow/nps/gravelman.pdf>

FHWA Optimizing Signal Timing
http://www.ops.fhwa.dot.gov/Travel/art_mgmt_01bx2.htm

Maintenance of Signs and Sign Supports for Local Roads and streets
http://safety.fhwa.dot.gov/media/pdf/sign_support.pdf

Metropolitan Planners
<http://www.mcb.fhwa.dot.gov>

PW.NET

Want to know what is happening in other towns? 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

Another New Hampshire First

In 1938 a maintenance engineer for the New Hampshire Highway Department of Transportation was the first to spread salt on the roads to prevent ice from forming.

Grant Funding Available for Used Oil Collection Centers

The New Hampshire Department of Environmental Services (DES) has grant funding available for used oil collection. They are offering \$2,500 grants, which are available annually to towns, cities, counties, Solid Waste Districts, and other government entities, as well as to non-profit organizations that focus on waste management and recycling issues. To qualify, the collection center must be open to residents who change their own oil. The collected oil must be recycled either on-site or off-site. Established in 1994. The grants have been well received. Some typical past purchases with the grant include:

- used oil storage with spill containment
- promotion of the recycling center
- double-walled tanks
- filter crushers
- sheds
- spill kits
- used oil heaters
- monitoring equipment
- used oil burner servicing
- contaminated DIY used oil disposal

For a copy of the latest contract, application form, or information regarding the used oil program, please contact the Used Oil Grant Program at 1 (888) TAKE OIL, or at 6 Hazen Drive, Concord, NH 03301.



Road Business

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Calendar

<i>April</i>				
8	9—Drainage, Hillsborough	10	11—Drainage, Alton	12
15	16—Trenching, Hillsborough	17—SIMS, Alton	18	19
22	23	24—Advanced RSMS, New London	25—Trenching, Lincoln	26
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<i>May</i>				
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6	7	8-- MUTCD, New London	9—Leadership Lessons, Portsmouth	10—Leadership Lessons, Laconia
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<i>June</i>				
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