On the Road in New Hampshire

New Hampshire Road Managers and Crews Attend Workshops in Record Numbers

Guided by Pete Coughlan, Maine Local Roads Program Director, participants set up mock work zones in a workshop in Concord.

Calendar Year 1995 was a record-setting year for attendance at UNH T² Center training activities. A total of 839 individuals responsible for road maintenance and repair participated in 43 workshop sessions covering 18 different topics. This is a 38% increase in enrollments over 1994 and a 114% increase over 1993. (Enrollment and other statistics are presented in Table 1 on page 2.)

These increases in participation are a testament to the commitment to self-improvement of those who attended. Participants were primarily municipal Road Agents, Public Works Directors, Highway Superintendents and Foremen, and their crews. Municipal selectpersons, planners, and town administrators also participated as did a number of NH Department of Transportation employees, regional planning commission staff members, and private engineers and technicians. Whatever their positions, participants asked many questions and contributed information from their own experiences.

The increase in training activity participation coincided with a 30% increase in the total number of Road Scholars (from 74 in 1994 to 96 in 1995). Even more impressive was the continuing efforts of 1994 Road Scholars to improve themselves by attending UNH T² Center workshops, and thereby increase their accomplishment levels in the Road Scholar Program. The number of individuals at the Road Scholar II level more than doubled (from 7 to 16) and the number of Master Road Scholars more than tripled (from 3 to 13).

continued on page 2

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The Master Road Scholars constitute a body of professionals in road maintenance and repair. To take advantage of their expertise, the UNH T² Center staff asked them to serve as an Advisory Panel for Training. In a September 1995 meeting, they accepted this responsibility as a group, and individual Master Road Scholars will assist in workshop development and instruction.

A new workshop, Introduction to Computers, illustrated how public works directors and road agents have adapted to modern methods of managing their roadways and equipment. The six sessions were attended by 81 individuals, many of whom also attended workshops for the Road Surface Management System and the Municipal Equipment Management System.

In addition to technical and computer topics, New Hampshire road managers and their crews showed a desire to improve their supervisory skills. There were 23 participants at the Successful Supervision workshop and 85 at four sessions of Moving to Higher Performance, the latter based on Stephen Covey's best seller, Seven Habits of Highly Successful People.

<table>
<thead>
<tr>
<th>Table 1</th>
<th>Training Comparisons: 1993 - 1995</th>
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<tbody>
<tr>
<td></td>
<td>1993</td>
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<tr>
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<tr>
<td>Enrollments</td>
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<tr>
<td>Non-Road Scholar Programs</td>
<td></td>
</tr>
<tr>
<td>Number of Workshops</td>
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<td>Enrollments</td>
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<tr>
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<tr>
<td>Mountain of Demonstrations</td>
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</tr>
<tr>
<td>Registered Participants</td>
<td>--</td>
</tr>
</tbody>
</table>

To meet the desires for training, the UNH T² Center has arranged a number of workshops for 1996. The Spring workshops and a telecourse, described the next page 3, cover a wide range of topics and nearly all qualify participants for advancement in the Road Scholar Program.

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Master Road Scholar Initiates Article Reprinted Nationwide

David Wadleigh’s Road Kill Concerns Shared by Other T² Centers

In March of last year, Master Road Scholar David Wadleigh, Road Agent in the Town of Tilton, became concerned about the safety of his crew while picking up and disposing of dead and possibly rabid animals. He called Marsha Barden of the NH Animal Control Center who informed him of the proper methods for handling dead animals killed and left on Tilton’s roadways.

David called the Director of the UNH T² Center with the information and suggested it be included in Road Business. The Director wrote the article, and forwarded it to Marsha Barden who furnished some additional details. The finished article was published in the Spring 1995 issue of Road Business.

Over the past year, fourteen other T² Centers have reprinted the article. As spring approaches, the information is likely to appear in newsletters of other Centers.

With one telephone call, a New Hampshire Road Agent and Master Road Scholar brought attention to a problem facing road managers and crews across the nation.

Given the extreme consequences of careless handling of rabid animals, David has likely prevented at least serious illness if not death to some individual.

On behalf of our readers, and the readers of the other newsletters that carried the article,

Thank you, David.

---

Mark your Calendars: The 10th Annual Mountain of Demonstrations Will Be on June 21 at Waterville Estates in Campton
TRAINING ACTIVITIES: SPRING 1996

Call the UNH T² Center to register for any of these courses: 862-2826 or 800-423-0060

Bridge Inspection & Maintenance
Dover: Tuesday, April 2
Hillsborough: Tuesday, April 9
Shelburne: Thursday, April 11
Fee for Public Employees: $25
Road Scholar Credit: 5 hours, Other Technical
Will cover the fundamental components of bridges and bridge inspection and maintenance procedures. Participants will prepare bridge inspection and maintenance plans for the bridges in their respective municipalities.

Can You Dig It? Safety, Dig Safe & Wetlands
Manchester: Friday, May 9
Campton: Friday, May 16
Fee for Public Employees: $25
Road Scholar Credit: 5 hours, Other Technical
Will cover the tasks required before one digs a trench or excavates: safety and planning, Dig Safe regulations and procedures, and Wetlands Board regulations and procedures.

Cold-Mix Asphalt Applications
Concord: Tuesday, March 19
Fee for Public Employees: $15
Road Scholar Credit: 5 hours, Other Technical
An panel of experts from the NHDOT and the private sector will explain the wide range of possible applications of cold-mix asphalt.

Emergency Management Telecourse
Concord: Wednesday, April 17
Fee for Public Employees: $15
A Non-Road Scholar Training Activity
This seminar-by-satellite will provide vital information to public works and emergency response personnel on how to prepare for emergency events.

Introduction to Computers
Lebanon: Wednesday, April 3
Dover: Tuesday, April 30
Fee for Public Employees: $50
Road Scholar Credit: 5 hours, Other Technical
This hands-on workshop for new computer users covers the elementary concepts of computers, the MS-DOS operating system, and windows.

Municipal Equipment Management System
Lebanon: Thursday, April 4
Dover: Thursday, May 2
Fee for Public Employees: $60
Road Scholar Credit: 5 hours, Other Technical
To facilitate the use of “MEMS,” will cover the management system and its components; schedules, work orders, and other management tools; the software package; and reports. Participants will also receive the software and documentation.

Road Surface Management System
Lebanon: Thursday and Friday, May 9 and 10
Dover: Monday and Tuesday, May 20 and 21
Fee for Public Employees: $75
Road Scholar Credit: 5 hours, Other Technical
This two-day workshop introduces new users to the management system and its components; inventory and surface condition assessment; repair strategy determinations; and software package structure and operation.

Work Zone Traffic Control for Low Volume Roads
Manchester: Thursday, April 4
Fee for Public Employees: $25
Road Scholar Credit: 5 hours, Tort Liability/Safety
Will cover all aspects of work zone traffic control on municipal roads A repeat of last spring’s highly successful workshop conducted by the staff of the Maine Local Roads Program.

Workshops Being Developed

Supervision & Delegation
Manchester, Wednesday, April 10
Dover: Tuesday, April 16
Fee: To be determined
Road Scholar Credit: 5 hours, Supervision
Will cover delegation principles and individual applications.

Maintenance and Grading of Unpaved Roads
Hillsborough: Thursday, April 25
Fee: To be determined
Road Scholar Credit: 5 hours, Basics
For road managers and motor grader operators, will cover basics of unpaved roads and proper grading techniques to maintain them.
Ernest Allain works for the City of Berlin as an Engineering Assistant. An Engineering Assistant does a number of things from inspections, to working with planners and even oversees center line painting. The City Engineer works with many departments in Berlin so Ernest does as well. Ernest started work with the Department of Public Works in 1971 after serving in the Navy. He began as a laborer and worked his way up to becoming an Inspector and finally to his present position as Engineering Assistant.

When asked why he takes so many classes he said “to get better knowledge and bring the knowledge back for use to the city.” Ernest brought RSMS back to the city after taking a UNH T2 Center class. Now, Berlin uses RSMS to create a strategy for paving. His supervisors support the training in fact, they suggested it. He also points out there are others from Berlin also attend classes despite the fact the have to drive over the notch.

Ernest is married. He and Susan have two children: Brian who works with a construction firm in Southern NH and Holly, who manages an outlet store in Tilton. In his spare time he likes to play golf, deer and partridge hunt, and fly fish.

Congratulations Master Road Scholar Allain!

Lately, if you’re driving around Fitzwilliam, you’re liable to see Edwin Mattson doing most anything on the Road Crew. He’s the Road Agent there and has been short-staffed since the summer. Ed has been the Road Agent for 8 years, it’s an appointed position. He also serves as treasurer for the Road Agents Association. Before becoming Road Agent, Ed worked as a dispatcher with public safety and was in the Air Force. He’s always worked at least part-time with the Highway Department.

Ed takes classes to gain knowledge. The Selectman in Fitzwilliam support education. Ed feels he has used a lot of what he has learned. He thinks the people involved in the training do a good job and fondly remembers John Anderson, who was the first manager of the UNH T2 Center. He thinks more people should attend workshops, and has been a “big pusher” of them. He has three people on his crew and has brought each one of them to at least one class.

Ed has been married 29 years to Sandra. The Mattson’s have three children, one son and two daughters. His son, Greg, works for the highway department under Ed’s supervision. He’s the grader operator and came in third in the Property Liability Trust Grader Competition this fall. Ed has three grandchildren. In his spare time, Ed likes to snowmobile, water-ski, fly fish and take long automobile trips.

Congratulations Master Road Scholar Mattson!
Bud Moynahan is the Public Works Director in Rye and Secretary of the Road Agents Association. Before being employed by the Town of Rye 10 years ago, Bud had done a number of construction jobs, from working with a contractor building Interstates 89 and 93 to working as a bulldozer operator in the Army.

So why does Bud attend so many workshops? He says, "I've been a student of construction all of my life and a lot of voids still need to be filled." He's learned something at every workshop and finds that they provide networking opportunities. "Meeting people is a big advantage. You only have to listen, not talk. Someone always has a better idea." He goes to every class that looks interesting and finds everything beneficial to the town and himself. He asks, "Where else can you learn this stuff? There aren't any other courses that are relevant." Bud sends his mechanic to training sessions and is thinking about sending others on his crew to training.

Bud is a native to Maine: he grew up in Eliot and now lives in Kittery. He "fitness" walks every night with his wife Sylvia. The Moynahan's have 2 children and five grandsons. When he's not busy at the Town Garage, he spends his time riding motorcycles, playing golf, and western line dancing (although he says he's not very good at it). He is good at being a Master Road Scholar.

Congratulations, Bud!

---

**Technical Assistance for RSMS and MEMS**

*Clarification of Telephone and Field Visit Help for Public Works Software*

The UNH T² Center’s technical assistance for computer software has contributed to the successful application of Road Surface Management System (RSMS) and the Municipal Equipment Management System (MEMS) for many New Hampshire towns and cities. Confusion about both telephone and field visit procedures, and reduced funding levels for 1996, have caused us to examine how and to whom we’re providing assistance. The following clarifications are for RSMS and MEMS within New Hampshire. (Procedures for out-of-state users are being communicated separately.)

The UNH T² Center will continue to provide technical assistance when the problem is RSMS or MEMS related. The problem might be a malfunction in either program or incompatibility with the user’s operating system or hardware that is otherwise operating effectively. Users who experience software or hardware problems other than RSMS or MEMS will be advised to contact an appropriate technician.

Every effort will be made to resolve the problem over the telephone, which will continue to be a free service. If the problem cannot be resolved without field assistance, the consultant will visit the municipality but on a cost-share basis subject to the following conditions:

1. Within the past year the individual needing assistance has attended a UNH T² Center workshop for the particular program, or has been using the program on a regular basis.
2. Payment for the municipal cost-share has been pre-authorized by an appropriate municipal official. The following cost-share rates do not include travel time.
   - For up to 2 hours, $40.
   - For each of the next two hours, $15 per hour.
   - For each additional hour, $10 per hour.

To help users satisfy the training requirement, the UNH T² Center will continue to conduct workshops each spring and fall in locations throughout the state. Users who do not fulfill the training requirement may arrange assistance directly with the consultant but at their own expense.

Requesters of UNH T² Center technical assistance must call the T² Center office (862-2826 or 800-423-0060). If the requester's inquiry cannot be satisfied by office personnel, a staff member will take the requester's name and telephone number for referral to a consultant. Individuals who call the consultant directly must arrange for payment of services independent of the UNH T² Center.
RSMS Surveys by UNH Civil Engineering Majors

Municipalities Should Apply Now for Summer 1996 Surveys

A Problem: Resources to Conduct Road Surveys

More and more New Hampshire municipalities recognize the need for pavement management. They increasingly look to their local road manager — road agent, public works director, or similar individual — to identify maintenance requirements and to prepare long-range work plans and budgets. Many managers turn to the Road Surface Management System which incorporates the following functions:

1. Inventory the road system,
2. Determine and document the condition of each road,
3. Assign maintenance or repair methods for each condition type,
4. Determine costs of maintenance and repair methods,
5. Assign repair and maintenance methods to each road,
6. Establish maintenance and repair priorities, and
7. Establish long-range work and budget plans.

To use this plan, however, requires:

- Gathering inventory and road condition data by riding all roads at least once,
- Entering that data into a computer, and
- Operating the computer to get reports for management analysis.

To perform these tasks the local road manager and at least one crew member must take time away from road work. This barrier to carrying out the above steps has prevented many municipalities from applying a management system to their road network.

Solution: Surveys by UNH Students

Over the past two summers, the UNH T² Center has hired civil engineering majors to help 27 municipalities manage their paved and unpaved roads. We will repeat the program in 1996. The following division of responsibilities has been effective the past two summers.

- Students hired and trained by the UNH T² Center conduct the road inventory and condition assessment, enter data, and operate computers, and provide a final report.
- Municipalities perform the management functions inherent in pavement management, and reimburse UNH for student labor and mileage.

Regrettably, UNH T² Center funding levels dictate that we provide this service on a reimbursable basis. WE WILL CHARGE ONLY WHAT IT COSTS US. The form on page 5, based on the assumptions below, enables calculation of a cost estimate for this service. Because publication of the estimating procedure must apply to all possible situations, it is conservative. If you wish to discuss specific situations, or have any questions, call Dave at the UNH T² Center — (603) 862-4348 or (800) 423-0060 (in NH).

The UNH T² Center staff has begun the student selection process. To enable our hiring the necessary number of students, we request you notify us of your interest by April 1, 1996. We will forward a formal agreement with provisions based on the assumptions below. Schedules of the surveys will be arranged with local road managers or other designated officials.

Cost Estimate Assumptions

This cost estimating procedure on page 5 is based on the following assumptions:

- Two-student teams, working 4 ten-hour days per week, will perform the inventories, condition assessments, and computer operations.
- Each team can inventory 30 miles of paved and 40 miles of unpaved road per day.
- Each team can assess 20 miles of paved and 30 miles of unpaved road per day.
- Preparation for surveys, evaluation of data, and preparation of the report will total 4 days.
- Travel to and from the Municipality will be from Durham.
- The Municipality will provide maps and other planning information in a timely manner.
- The local road manager will expeditiously assign repair strategies for the road conditions identified during the survey.

This cost estimating procedure is intended for use in programming funds. Assumptions are, therefore, conservative; variances will likely result in decreased rather than increased costs. Travel distance, for example, will be calculated from Durham or from the team member's residence, whichever is less. Also, in many towns the survey teams will be able to inventory and/or assess road faster than the assumed rates.
Cost Estimate Form

Basic Factors
1. Enter miles of paved road ....................................................... .................................
2. Enter miles of unpaved road .........................................................
3. Distance: Municipality to Durham ...................................................

Estimated Days in the Field
4. Divide line 1, miles of paved road, by 25 .................................................................
5. Divide line 2, miles of unpaved road, by 35 ............................................................... .................................
6. Add values from lines 4 and 5 ........................................................................
7. Multiply the value from line 6 by 2 ........................................................................
8. Round value in line 7 to nearest whole number ..................................................
9. Total Days: Add 5 to the value in line 8 ................................................................

Cost Calculations
10. Multiply the distance in line 3 times the estimated total days in line 9 .......................... $
11. Multiply the value in line 10 times $0.82 .................................................................$
12. Multiply line 1, miles of paved road, time $0.82 ..................................................$
13. Multiply line 2, miles of unpaved road, times $0.82 ..............................................$
14. Multiply estimated total days in line 9 by $180 ..................................................$
15. Total Estimated Cost: Add the values in lines 11, 12, 13, and 14 ..........................$

Cost Estimate Example

Basic Factors
1. Enter miles of paved road ....................................................... 57
2. Enter miles of unpaved road ......................................................... 23
3. Distance: Municipality to Durham ................................................... 65

Estimated Days
4. Divide line 1, miles of paved road, by 25 .................................................. 2.28
5. Divide line 2, miles of unpaved road, by 35 .................................................. 0.66
6. Add values from lines 4 and 5 ................................................................. 2.94
7. Multiply the value from line 6 by 2 ............................................................. 5.88
8. Round value in line 7 to nearest whole number ............................................ 6
9. Total Days: Add 5 to the value in line 8 ...................................................... 11

Cost Calculations
10. Multiply the distance in line 3 times the estimated total days in line 9 .......................... 715
11. Multiply the value in line 10 times $0.82 ................................................................. $ 586.30
12. Multiply line 1, miles of paved road, time $0.82 .................................................. $ 46.74
13. Multiply line 2, miles of unpaved road, times $0.82 .............................................. $ 18.86
14. Multiply estimated total days in line 9 by $180 .................................................. $ 1980.00
15. Total Estimated Cost: Add the values in lines 11, 12, 13, and 14 .......................... $ 2631.90
Road Weight Limits and Commercial Transport

Workshops Clarify New Law and Provide Load Restriction Guidelines

Many municipalities have set road weight limits and have had local commercial transporters recognize the need for them. Some municipalities have not done so successfully. In many instances, road agents and public works directors have set weight limits based on sound technical knowledge and experience, but a few local commercial truckers and equipment operators have ignored them. In other instances, town officials have set road weight limits in ways which seem unreasonable and even arbitrary.

Last spring the Legislature addressed the latter situation. It found that "important sectors of commerce of this state depend, in part, on the efficient vehicle transport of unprocessed natural resources, manufactured goods and other commercial products across class IV, V, and VI municipal roads." In New Hampshire timberland owners and loggers are among the more important "sectors of commerce."

In an amendment to RSA 231 the Legislature authorized municipalities to "establish maximum weight limits, seasonal and otherwise, ... when the highway agent determines that such highway requires postings to prevent unreasonable damage or extraordinary municipal maintenance expense." This amendment potentially impacts road agents who have not had problems posting their roads, as well those who have. It also impacts many commercial transporters.

The UNH T² Center recently arranged two workshops to clarify the new law and to draw upon the experiences of road agents and loggers who have successfully dealt with setting and accommodating road weight limits. The workshops were conducted in partnership with the NH Timberland Owners Association and with assistance from Bernie Waugh of the NH Municipal Association and David Rand, a recently retired engineer from the ME DOT.

The laws governing weight restrictions were openly discussed, first through formal presentations and then during lengthy question and answer sessions. The remainder of the program centered on why is was necessary

- To set road weight limits based on sound judgment,
- To comply with road postings, and
- To communicate with others.

Panels of road managers and timber industry professionals told how they successfully communicated in their respective communities. In these municipalities the road manager’s weight restrictions were accepted as reasonable. To help road managers whose restrictions might be questioned, speakers provided guidelines for when to establish weight limits and when to remove them.

These guidelines, based on practices in Maine and other northern states, use daily high and low temperatures to determine the extent of freezing and the onset of significant thawing. The process involves the calculation of degree days, the number of degrees between some reference temperature, and the average temperature for a particular day. The reference temperature for Freezing Degree Days is 32°F and for Melting Degree Days is 29°F. (A reference temperature of 29°F is used to account for bituminous pavement surface heating effects since the pavement surface is about 32°F when the air temperature is 29°F.) Cumulative Freezing Degree Days (CFDD) and Cumulative Melting Degree Days (CMDD) are the summations over time of the respective degree days.

A Degree Days Log, with column headings as shown below, makes calculation of CFDD and CMDD a matter of simple arithmetic. Local high and low temperature for each day can be obtained from newspapers, government weather stations, private meteorologists, or businesses such as heating oil companies. These are entered into Columns C and D of the Log. Their sum divided by "2" is entered in Column E. The remaining calculations are as indicated by the headings.

The calculations and their application are described in a booklet prepared by the UNH T² Center. It contains tables and describes the background of the guidelines. It also contains a sample form for preparing a Degree Days Log.

For a copy of Guidelines for Spring Road Use Restrictions, call or write the UNH T² Center. Telephone numbers are 862-2826 or 800-423-0060.

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<th>Month</th>
<th>Day</th>
<th>High Temp</th>
<th>Low Temp</th>
<th>Avg. Temp (C+D)/2</th>
<th>FDD</th>
<th>Cumulative FDD</th>
<th>MDD</th>
<th>Cumulative MDD</th>
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<tbody>
<tr>
<td>A</td>
<td>B</td>
<td>C</td>
<td>D</td>
<td>E</td>
<td>F</td>
<td>G</td>
<td>H</td>
<td>I</td>
<td>J</td>
</tr>
</tbody>
</table>
New! CDL Information Sheets
   __General Info Sheet. Describes basic drug
testing procedures in plain language.

   ___Policies. Information about setting policies
for drug testing program before positive
results occur.

   ___Service Providers. A list of service
providers for CDL testing.

___Controlling Nonpoint Source Runoff Pollution from
Roads, Highways, and Bridges. Published by the EPA
in August 1995. A fact sheet (the first in a series)
Produced by the EPA and APWA to improve
knowledge about and efforts to control runoff pollution
from roadways and construction activities.

General principals and guidelines covering location,
mail stop and mailbox location, mail stop design, and
mailbox support and attachment design.

___Handbook of Successful Supervision. Intended for use
by persons who carry out the responsibilities of local
government supervisors.

___Maintenance of Small Traffic Signs. A guide for street
and highway maintenance personnel.

___National Association of County Engineers Action
definition of liability, how to avoid liabilities, notice
of defect, and the elements of a lawsuit.

___Part VI of Manual of Uniform Traffic Control Devices
(MUTCD). Standards and guides for Traffic Controls
for Street and Highway Construction, Maintenance,
Utility, and Incident Management Operations.
Limited Supply--FOR MUNICIPALITIES ONLY.

"Errata Sheets"--Editorial changes to MUTCD Part
VI. Please specify which version.
   ___ATSSA version (5 1/2" x 8 1/2")
   ___FHWA version (8 1/2" x 11")

___New! NHDOT Classification of Highways. A synopsis
of Highway Aid available to Municipalities

___The Salt Storage Handbook. A practical guide for
storing and 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.

To Request Material by Mail

Check the items you would like to have. Fill in your name, address, and other information. Cut out this page, fold so the UNH
T² Center Address is on the outside, staple closed, and mail.

Name

Address

Address

NH Zip

__Town

Position

Organization:

Private:______ Federal:______

State:______ Local:______

Academic:______ Other:______
VIDEOS

from the

University of New Hampshire Technology Transfer Center

The following videos are available from the UNH T2 Center Video Library. You may take the videos out for a two week period, there is no charge. To request by mail, check the videos you would like to have, fill out the mail request form on page 9, staple closed, and mail. To request by telephone, call (603) 862-2826 or (800) 423-0060 (in NH).

Catalog. UNH T2 Center Video Loan Program.


DC-208, Aggregate Blends. Demonstrates graphical procedure for blending aggregate sources to meet proper specification.

DC-211, Stabilization for Low Volume Roads. Describes adding soil stabilizing agents to low volume roads to increase drainage capabilities, base stabilization and reduce maintenance costs.

M-204, Bridge Inspection. Covers federal requirements, reference material, condition inspection and rating, structural inventory and safety considerations.

M-224, Base and Subbase repair. Shows good procedures used in repairing base and subbase failures due to excessive moisture. Covers extensive repairs and rebuilding for a long life.

M-242, Snow Plow and Spreader Operation. Reviews equipment, the daily checks and explains good plow operator tips. Good refresher.

M-236, Common Maintenance Problems and Causes. Broad overview of the causes of problems on the street and roadway system. Discusses source of failures in many products. Also, deals with gravel roads, shoulders, and drainage problems. Good basic training for new maintenance personnel.

M-247, Planning and Organizing Winter Operations. Preparations for winter operations including: Ordering parts and materials, stock piles, checking drainage areas, rental agreements, snow plowing map, crew and staff meetings.

M-264, Removing Minor Slides. Presentation of maintenance techniques used to properly clear roadways of debris left by a minor slide.

PA-Idea Store. Illustrates new ideas for trapping rainwater; equipment for keeping snow and ice off the bottom of plows, and for placing materials in ditches; minimizing aggregate loss; recycling old tires; portable sign displays.

ST-235, Chainsaw Safety. Demonstrates the do's and don'ts of chainsaw operation.

ST-246, Road Weather Service. Discusses the use of a weather service network to access the conditions (weather) of roads.

TECHNOLOGY TRANSFER CENTER
CIVIL ENGINEERING
UNIVERSITY OF NEW HAMPSHIRE
DURHAM NH 03824-3591

Page 10
New Computer-Interactive Training

Educators and training specialists have long known that trainees learn faster—and remember more of what they’ve learned—if they’re actively involved in the learning process. In computer-interactive training sessions, participants use their own judgment, think about problems presented, make decisions, and receive immediate feedback—positive or negative.

The UNH T^2 Center has two courses, developed by the American Association of State Highway and Transportation Officials (AASHTO), based on Compact Disc Interactive (CD-I). They require a CD-I player and a standard television. The UNH T^2 Center has three CD-I players it can lend to municipalities with the CD-I disks.

The CD-I player houses a microprocessor and memory to handle interactive code. Trainees interact with the system through a hand-held remote-control unit, which resembles a miniature Nintendo-style joystick.

Currently both courses are available. They are:

Snow and Ice Removal a course designed for employees who have their commercial driver’s license. It covers pre-trip inspections, plowing procedures, application of salt and abrasives, and post-storm cleanup.

Traffic Control in Construction Work Areas is a simulated inspection of three work sites. A traffic control plan is available on-screen, allowing comparisons of the planned traffic controls with actual conditions “on the ground.”

To borrow the courses and a CD-I player, please contact David or Kathy at (603) 862-2826 or (800) 423-0060 (in NH).

Entrained Air in Concrete Specifications

Specifications Depend Upon Other Details

Recently we had an inquiry regarding concrete specifications. A similar question was asked in the “Problem Clinic” in the October 1995 issue of Concrete Construction.

The proper amount of entrained air to resist the effects of the freeze-thaw that should be specified for sidewalks, patios, curb and gutters, slabs and roads is dependent upon other details. Factors such as aggregate size and freeze-thaw exposure must be considered. Guidelines and recommendations for the amount of air required can be found in ACI 301, “Specifications for Structural Concrete for Buildings,” and ACI 318, “Building Code Requirements for Reinforced Concrete.” These guidelines can be incorporated by reference when writing specifications.

The table summarizes and compares the suggested air contents. ACI 301 requirements apply only to concrete subject to destructive exposure (see definition in box) and are stated in a range without a tolerance. If the psi is greater than 5000, then it might allow for a 1% reduction in air content (because higher-strength concretes have a greater frost resistance).

<table>
<thead>
<tr>
<th>TOTAL AIR CONTENT FOR FROST-RESISTANCE CONCRETE</th>
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<tbody>
<tr>
<td>Nominal/Maximum Air-Content (Percent) Aggregates Size</td>
</tr>
<tr>
<td>(Inches)</td>
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<td>Exposure</td>
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Note: The requirements of ACI 318 match the recommended total air content values of ACI 202.1, ACI 211.1, ACI 345, and ASTM C 94. The required or recommended air contents depend upon aggregate size and freeze-thaw exposure conditions (described below). ACI 318 specifies a tolerance ±1 1/2% on total air content. ACI 301 states a range and doesn’t indicate a future tolerance.

Moderate exposure-Conditions in a climate where freezing is expected, but where concrete will not be continually exposed to precipitation and free standing water for long periods of time before freezing and will not be exposed to deicing agents or other aggressive chemicals. Examples include slabs that are not in contact with wet soil.

Severe exposure-Conditions in which concrete is exposed to deicing chemicals or wet for long periods of time before freezing. Examples include pavements, curbs, gutters, and sidewalks.

Destructive exposure-Conditions in which concrete is exposed to freezing and thawing, severe weather conditions and deicing chemicals (similar to severe exposure conditions).
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UNH T² Center Staff

- David H. Fluharty, LTAP Director
- Charles H. Goodspeed, TORG Director
- Kathy DesRoches, Administrative Assistant

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## Calendar

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<td>2 Bridge Maintenance, Dover</td>
<td>3 Intro to Computers, Lebanon</td>
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Workshops are described on page 3. For additional information or registrations, call the UNH T² Center.

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*Road Business* is published quarterly by the Technology Transfer Center at the University of New Hampshire (UNH). The UNH T² Center 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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