A newsletter for municipal employees, public and private road-related organizations, and citizens.

On the Road in NH:

Technology Transfer Center
New Hampshire LTAP at UNH

Highway Memorial Dedicated in Manchester

Submitted by Peter Capano -- City of Manchester Highway Department

A memorial ceremony dedicated to 10 highway department workers, whose lives were lost in service to the city, was held in Manchester on September 3, 2009 at the Highway Department.

With Valley Street closed to traffic on a sun-splashed afternoon, the accolades came in from Mayor Frank Guinta, Governor John Lynch, and Reverend Douglas Rickard, who gave a moving speech (*see Figure 1*). More than 300 people, including many relatives of those honored, were in attendance.

The memorial features the city seal along with the names of the ten deceased individuals. It is located just outside the highway department's north wall (*see Figure 2*).

Dan Garrity, Vice President of AFSME Local 298, organized the Memorial project. A reception was held at the American Legion's Sweeney Post Hall in Manchester following the dedication. Manchester Community Television and the Union Leader newspaper covered the event.

Figure 1: From Left to Right--Kevin Shepphard, Manchester Public Works Director; Rev. Douglas Rickard; Mayor Frank Guinta; Dan Garrity, VP AFSME 298; & NH Governor John Lynch.

Figure 2: The memorial with the names of the 10 deceased individuals.

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UNH Technology Transfer Center Mission: To provide technical and management information about roads and bridges to municipal officials and road-related organizations.

Master Roads Scholars

Master Roads Scholar—Kelly Gibbons

Kelly is an airport maintenance technician for the City of Lebanon Municipal Airport. He has worked for the City for 5 ½ years.

Kelly enjoys the variety of projects he gets at work and says he does "anything and everything." The airport is currently working on runway expansions.

Kelly will continue to take classes with the UNH Technology Transfer Center because education is important to him. He says that "learning should never stop." He advises Roads Scholar to "keep attending training." His favorite part of being in the Program is meeting different people to learn how they solve the same problems.

Master Roads Scholar—Jason Kimball

Jason Kimball has been working for the Town of Merrimack for 9 ½ years. He will continue to take T² classes because he loves where he works and loves living in the town of Merrimack. Jason likes that his job allows him to be outdoors and he loves plowing snow in the winter.

Master Roads Scholar—Ed Tourville

Ed Tourville is a highway equipment operator for the Town of Enfield. He has been working for Enfield for eight years. When Ed was younger he used to ride along in a pick-up truck with his father while he plowed snow.

Ed wants to continue to take classes to keep up with new information in all fields. He likes his job because there is something different each day. His favorite part of the Roads Scholar Program is attending classes on gravel roads and grading.

Master Roads Scholar—Shawn White

Shawn White has been the Director of Public Works for the town of Whitefield since the spring of 2008. He started working for the town of Whitefield as a police officer in 1999 and was promoted to Sergeant. His father, a NHDOT engineer, would bring him to job sites when he was younger. After high school, Shawn worked as an equipment operator for several organizations in the public works field.

Shawn will continue to take classes with the T² Center because "knowledge and continuing learning is an asset to anyone, and it shows in daily activities and projects." Shawn encourages Roads Scholars to "work hard and show your supervisor that training is beneficial to you and the department." Shawn enjoys competitive bass fishing.

Master Roads Scholar—Dave Wholley

Dave has been the Operations Manager for Salem DPW for 14 years. Previously, he was a water meter repair technician for the town. Dave says "I couldn't ask to work with a better group of professionals at the Salem DPW!" His department

Master Roads Scholars Cont.

motto is "Red and blue follow yellow."

Dave will continue to take classes with the T² Center because he says, "you can never educate yourself enough in this profession." He wants to continue learning about new techniques and technologies. Salem DPW is currently working on the milling and overlaying of Rte. 28, the demolition of a condemned building, and the replacement of 25 feet of culvert.

Dave's favorite part of the Roads Scholar Program has been meeting interesting people within his profession. He advises new Roads Scholars "to stay positive, understand your importance in public safety, and always try to make a difference for others." He says class attendees should walk away from each class with at least one thing to implement at work.

Dave has been married to his wife Christine for 10 years. They have a five year old son, Adam, and a three year old daughter, Madison. Dave enjoys camping, watching NY Yankee baseball, and spending time with his wife and kids. Dave says "I owe all that I am to the love, support, and understanding of my family!"

Master Roads Scholar is the fourth and final achievement level in the UNH T² Center Roads Scholar Training 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/rdsclr.html**

UNH T² Training Calendar: **www.t2.unh.edu/training**

UNH T² Roads Scholar Program & NHPWSTC Public Works Academy Update

The UNH Technology Transfer Center and the New Hampshire Public Works Standards and Training Council (NHPWSTC) have continued the partnership of the Public Works Academy.

Here is a summary of the contract partnership:

- All Academy hours will also count as hours in the Roads Scholar Program.
- Administration for all Academy classes is done by the UNH T² Center.
- Graduates from the Academy Level 1 (after passing all required exams) will also graduate from the Roads Scholar Program level 1.
- Graduates from the Academy Level 2 (after passing all required exams) will also graduate from the Roads Scholar Program level 2.

This contract is valid August 17, 2009 until May 1, 2011. At that time, the contract will be reviewed by both groups.

Welcome Fall 2009 Public Works Academy attendees!

NHPWSTC Academy: www.t2.unh.edu/nhpwstc/academy/index.html

Invasive Plants on Our Roadsides

By Melissa Toni, Environmental Protection Specialist, Federal Highway Administration

Invasive plants are non-native species that out-compete native vegetation, which disrupts ecosystems. They are found along many roadways and are one of the greatest threats to biological diversity and general ecology in the United States.

What do invasive species have to do with roads in particular? Highway and road corridors provide numerous opportunities for the movement of invasive species: seeds can move on vehicles and in the loads they carry; seeds and plants can be moved from site to site during spraying and mowing; seeds can be introduced into the corridor during construction by riding on equipment and in mulch, soil, and sod; and existing plants allow wind to spread the seeds to other locations along the right-of-way.

Purple loosestrife is one example of an invasive species. It was introduced into gardens as an ornamental plant because of its showy purple flower (*see Figure 1*). The seeds then spread to wetlands near the gardens. After many growing seasons of seed spread, purple loosestrife is currently found in many large wetland areas, in numbers greater than those of native plants. It outcompetes native wetland plants that provide food for waterfowl and other animals that rely on the wetland area. As a result, waterfowl have less to eat during migration and nesting seasons, and the wetland cannot support as many birds.

Figure 1: Purple loosestrife - Photo courtesy of The New York State Museum

Invasive species control and management is a significant concern to the Federal Highway Administration (FHWA). Executive Order 13112 prohibits federal agencies from authorizing, funding, or carrying out actions that it believes are likely to cause or promote the introduction or spread of invasive species.

The FHWA encourages construction and landscaping techniques that help to accomplish the intent of the Executive Order and promote environmental stewardship. Methods include minimizing soil disturbance to reduce opportunities for the introduction of invasive species, control of existing areas through mowing or spraying, using more efficient equipment cleaners, and using improved seeding equipment for steep slopes.

For more information:

- Attend the UNH T² Center workshop on Invasive Plants on 10/13 in Concord: *www.t2.unh.edu/training/invasive_plants.pdf*
- NHDOT BMPs for Roadside Invasive Plants: *www.nh.gov/dot/org/projectdevelopment/environment/units/technicalservices/documents/BMPsforRoadsideInvasivePlants.pdf*
- FHWA Roadside Vegetation Management: *www.fhwa.dot.gov/environment/vegmgt/index.htm*
- NH Dept. of Agriculture & NH Invasive Species Committee Guide to Invasive Upland Plant Species: *http://agriculture.nh.gov/divisions/plant_industry/documents/InvasivesBooklet2005.pdf*
- USDA - Invasive Plants: *http://www.invasivespeciesinfo.gov/plants/main.shtml*
- USDA - Executive Order 13112: *http://www.invasivespecies-info.gov/laws/execorder.shtml*

This article was reprinted with permission from NY LTAP (Cornell Local Roads Program) Spring 2009 newsletter. Edits were made to make applicable to NH.

Surface Contacting Tools Used in Removing Ice and Snow Pack

This article reviews five mechanical surface contacting tools used to reduce, and sometimes break, the bond of an ice pack.

The five surface contacting tools discussed are:

1. Standard cutting edge
2. Serrated cutting edge
3. GradeBit/Stinger cutting edges
4. Grader-mounted scarifier
5. IceBuster grader attachment

Standard Cutting Edge

The standard cutting edge, generally composed of standard carbon steel or some type of through-hardened cutting edge on a motor grader moldboard, is still widely used.

Compared to motor graders, underbody plows are not capable of applying as much down pressure and they move slower. Underbodies use cutting edges with carbide inserts backed by a set of conventional edges. An advantage of underbody plows is that they can be used for maintaining gravel roads.

When snow and ice buildup is particularly thick, the motor graders and underbody plows should continue to break up the ice pack, even if it appears to be ineffective. The down pressure of the blade will rough up the surface of the packed snow and ice so that control materials, such as treated sand, can get through.

Serrated Cutting Edge

Serrated cutting edges can be a productive method of removing ice and snow buildup, but if used carelessly they can cause road surface damage. The greatest damage can be caused to seal coats or asphalt surfaces. With hard use, and an inexperienced operator, these edges can last as little as 24 hours.

The primary use of serrated edges is when buildup occurs on residential streets where a mix of only 12 percent salt is added to the sand, and only hills, curves and approaches to stop signs are treated.

A great benefit of the dozer with a serrated edge is that it does the cutting up in front of the grader and the operator can clean up the loose snow with the grader's moldboard. Usually this is done in one pass. During other seasons the dozer is used for back filling and removing washboard on gravel roads.

GraderBit/Stinger Cutting Edges

Although these cutting edges are primarily designed to penetrate the road surface, the manufacturers do recommend them for ice and snow pack removal. Their function is to reduce the snow and ice pack, or to improve traction, and not necessarily to reach the bond where damage to the road surface may occur.

The GraderBit system works well for cutting ice and snow pack. This is a very aggressive machine, and care must be taken to not damage the road surface when operating.

The cutting bits are square with different widths of bits available. The larger-size square bits can be set up to make a solid cutting edge. GraderBits are recommended to be used with only a 10-degree angle on the moldboard, which can be a problem.

The Stingers can be used at more of an angle, but the bits have to be lubricated so they can turn in the mounting plate holes.

In the summer a gravel maintenance grader can be equipped with a set of Stingers on the moldboard and used on gravel streets.

Grader-Mounted Scarifier

The Grader-mounted scarifier is perhaps the best known tool and one that has been around for a long time (*see Figure 1*). However, it can be one of

the most damaging to road ways when removing snow and ice buildup.

During construction season they become very valuable in penetrating up to 10 inches into material such as thin asphalt-surfaced roads and hard-packed base.

In certain cases, it can be a valuable tool for breaking thick snow and ice pack in valley gutters and drainage ditches. Generally, its use is very limited in winter operations.

Figure 1: A grader-mounted scarifier is generally a poor tool for breaking snowpack due to great potential for road surface damage.

IceBuster Grader Attachment

The IceBuster grader attachment is a fairly new approach to removing ice and snow pack (*see Figure 2*). It can be attached to the front of a motorgrader on a quick hitch, on a front-end loader and on a scarifier mount behind the front wheels of a motor grader. In addition, smaller models are available for skid loaders. The IceBuster is designed solely for ice and snow pack removal and causes very little pavement damage (*see Figure 3*).

Figure 2: An IceBuster mounted on a grader.

However, the machine requires operator skill and responsibility in its maintenance and operation. Greasing of the machine is very important. The hydraulic lift on the attachment has enough down pressure to pick up the front of a grader. However, there is a variable down pressure adjustment, and 500 psi seems to work best.

Operating speed should not exceed 10 mph. When working on residential streets with a front-mounted IceBuster, the grader's moldboard can be used to clean up in one pass. Although the purpose of the IceBuster is to break ice and snow pack, it can also be used to loosen recycled concrete and to pulverize asphalt chunks from thin pavement that has been broken up by scarifying.

Summary

This article is intended to give you an overview of the use of surface contacting tools for winter road operations. Winter buildup of ice and snow is treated in many ways. The driving force in the decision of what tool to use usually comes from policies, type of equipment available, permitted hours of operation, funding, traffic volume and reasonable safety for the driving public.

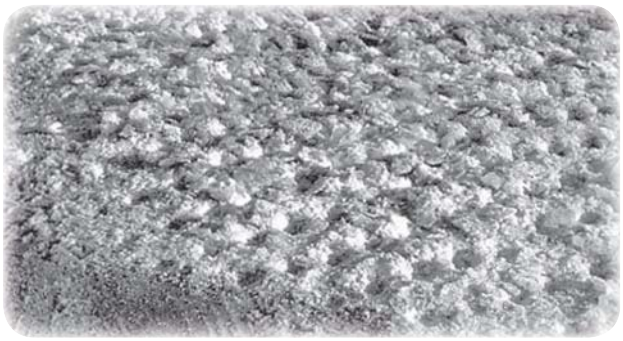

Figure 3: Broken snowpack after using an IceBuster. The IceBuster works very aggressively but does little damage to the road surface.

This article was reprinted with permission from NV LTAP Winter 2007 StreetWise newsletter. Original article was published by SD LTAP, Special Bulletin #40.

UNH T² Center Technical Note

Proper Culvert Installation

By Justin Pelletier, UNH Civil Engineering Student & UNH T² Project Assistant

A culvert is a closed conduit used to allow the passage of water, usually from one side of a road to the other (*see Figure 1*). Use culverts as an effective way of improving drainage and decreasing erosion. While design is imperitive, this article will discuss proper culvert installation techniques.

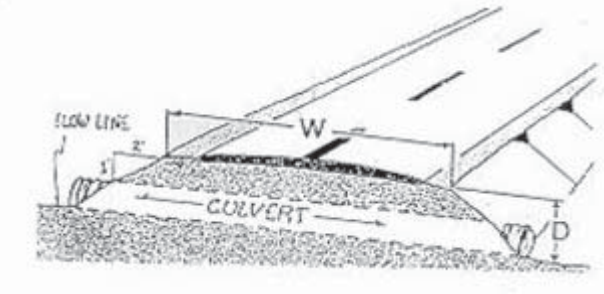

Figure 1 – Road cross-section showing culvert slope (Skorseth, Place Culverts Correctly the First Time)

There are two categories of culverts: stream-crossing and run-off management. A stream crossing culvert allows water to pass under a roadway that crosses a stream. A runoff management culvert (or cross-drain) is strategically placed to route roadway runoff under and away from the roadway. Roadway runoff is water that runs off the road and into the environment after a rainfall. Runoff can cause erosion, pooling of water, and pollution from toxins that are moved to other areas by the runoff.

Installation

Install culverts when stream flow and rain expectancy are low. Divert existing stream flows during installation. Ensure the project is complete before the next major rainfall. Major rainfalls affect the flow path and velocity of water. If a major rainfall occurs during the construction phase of the project, hazards and delays can arise.

The goal of installing a culvert is to maintain the natural flow rate of a stream. A civil engineer (or other qualified person) should determine the size and slope of the culvert to ensure natural flow. Engineering, as well as soil analysis, is necessary on large pipe or deep fill installations and may be needed on smaller projects as well.

Soil analyses are used to find necessary information about the soil, such as strength and permeability. These can be conducted in a lab on a field sample or directly in the field. Either way, soil information is needed to design a sufficient foundation for the culvert to be placed on.

Foundation

A strong and stable soil is needed as a foundation for a successful culvert installation. Weak soils provide inadequate support for culverts. They can cause major damage to the culvert and the roadway, especially during winter due to freeze-thaw cycles.

Use a dense, compacted foundation that will not allow water to penetrate through it. Replace existing material with proper foundation material if needed. Also, do not place culverts directly on bedrock. If it is not possible to excavate through rock or to place

desirable foundation material, then a concrete cradle must be cast to anchor the culvert to the bedrock and ensure a stable slope.

Excavation

Dig a trench that is about twice as wide as the diameter of the culvert. Slope the trench sides to not exceed 1½: 1 (1.5" horizontal to 1" vertical) (*see Figure 2*). This decreases the chance of a cave-in during installation. Shape and compact the bottom of the trench in an arc for the pipe to be lain.

Slope

The slope of a culvert should be between ½" and 1" per foot. This ensures that the flow rate through the pipe is not too fast, nor too slow. If water runs through the pipe at a higher velocity than what is normal, erosion will occur at the outlet. If water runs through the pipe at a lower velocity than what is normal, pooling will occur behind the inlet of the culvert. This increases the chance of a blockage, which disturbs the surrounding natural environment.

The slope of a culvert is determined by the engineer who designed the culvert. Check the elevations of the culvert inlet and outlet to ensure the slope is correct before backfilling.

Compaction

Ensure backfill material is free of topsoil, sod, vegetative debris, and rock bigger than 2.5". Topsoil, sod, and vegetative matter decompose and become more compact over time, which creates air voids and large rocks create inconsistent compaction throughout the fill (*See Figure 3*).

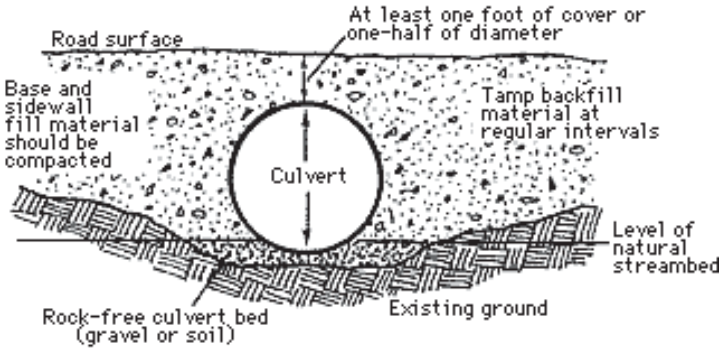

Figure 3: Cross-section of proper culvert foundation backfill and compaction.

Ensure consistent density throughout the fill by compacting in layers of 6" or less. Ensure every layer is the same thickness. Voids are created in the backfill by under-compacting, which causes the material to settle. Settling can cause the flow through the culvert to change, which creates drainage problems and interferes with the surrounding natural processes.

Dips, potholes, and cracks may form in the roadway above if the soil is poorly compacted. Voids also contribute to erosion around the outside circumference of the culvert. Additionally, the fill material may be washed away if large air voids exist or if there are too many of them.

Over-compaction must be avoided as well. If there is too much compaction, the soil may act as a

Figure 2: Culvert trench side slope (OSHA)

wedge and lift the culvert out of place. It may also cause the culvert to bend or dent. Hand tamping is the best method for compaction for the first half of the culvert on smaller scale projects. Other compaction equipment that will get the job done faster may be more desirable once the fill reaches half way up the culvert. Using proper compaction techniques makes it possible to achieve the tight seal around the pipe that is needed to avoid erosion. Once the trench is filled and compacted, road work may begin.

End protection

The potential for pipe end damage during severe floods is due to the velocity of water flowing through the pipe. If water can't flow fast enough through a culvert to keep up with rainfall, the water level builds up above the inlet height. This is called a "head." When there is a head above the inlet of a pipe with high water flow velocity, a vortex is formed above the inlet and very high pressure is exerted on the pipe. This pressure can be great enough to collapse the pipe, or even lift it out of place completely.

The inlet of culverts must be protected and anchored with extensions at the entrance of the pipe called head walls (or headers) to prevent this from happening. Head walls are flush with the end of the culvert and extend out perpendicularly from the pipe (*see Figure 4*). Head walls can also be used to help direct water to the inlet of the culvert by using "wing walls." Wing walls extend off the head wall at a given

Figure 4: Typical Headwall

Figure 5: Header with Wing Walls

angle (*see Figure 5*). Headers may be made of poured concrete, bagged concrete, concrete blocks, bricks, logs, cut wood, or even shaped loose rock riprap.

The outlet of the pipe may need modification to protect it from erosion in some cases as well. Outlet structures should be installed at the outlet where scour and erosion are likely to occur from high exit velocity due to steep culvert installation, near proximity to ditch banks, drops at the end of the culvert, or other situations of high velocity at the outlet. These structures are used to reduce and control energy from ditch or culvert discharge, and release the discharge downstream under controlled, stable conditions.

One common type of outlet structure is called a plunge basin. Plunge basins are designed to be filled with water during run-off events. This pooled water dissipates the energy of the flowing water discharged by the culvert. There are two types of plunge basins: depressed type (*see figure 6*) and weir-formed (*see figure 7*).

Depressed type plunge basins are constructed by making a depression below the outlet channel elevation which allows for the water to pool. Weir-formed plunge basins are made by keeping the basin bottom at the original channel elevation and constructing a weir across the outlet channel. The plunge basin is wider than the outlet channel by design and tapers to fit the existing channel at the basin exit point. End protection structures require the design services of a professional engineer.

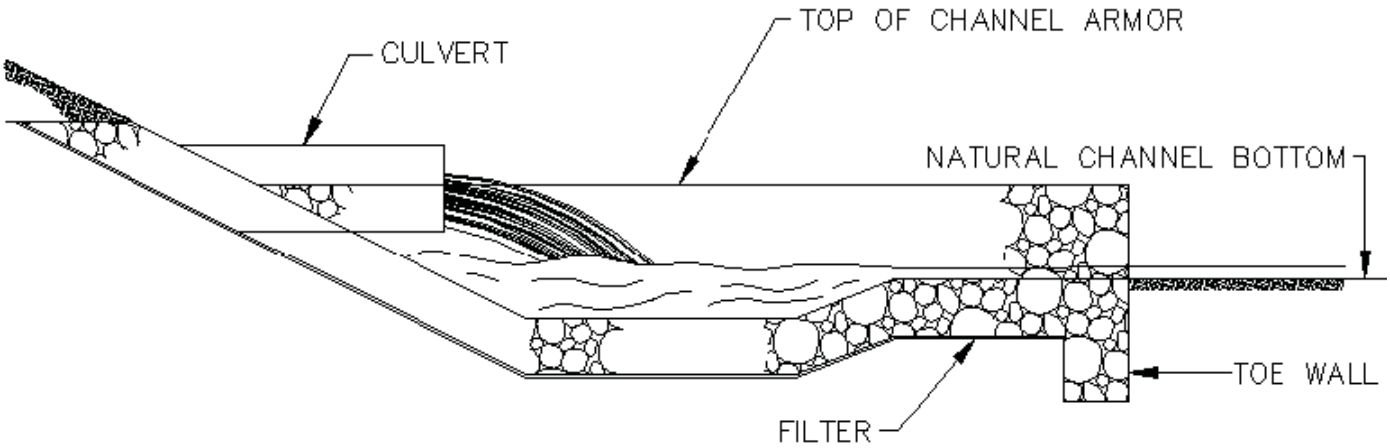

Figure 6: Depressed Type Plunge Basin

Ensure your culvert is installed correctly every time! Rushed installation, inadequate fill material, under-designed pipes, poor compaction, and weak foundations are all short cuts that can save time and money during installation, but will have far greater repair costs in the future. Although it may cost more up front to use proper installation techniques, it will always cost less than fixing a problem that arises in the future due to poor installation.

The problems that do arise are usually quite extensive. Usually the culvert, surrounding area and the roadway above are all negatively impacted. Both a collapsed culvert and under-compacted fill will cause the roadway to dip dramatically and rapidly deteriorate causing safety issues and large repair costs. The cost of repairing these problems is much higher in comparison to the cost of proper culvert design and installation.

For information on concrete culvert design, refer to the American Concrete Pipe Association (ACPA) (http://www.concrete-pipe.org/) and the American Concrete Institute code (ACI 346-09 & ACI 301-05). For more information on culvert installation, refer to the ACPA Concrete Pipe and Box Culvert Installation Manual and ACI 346-09.

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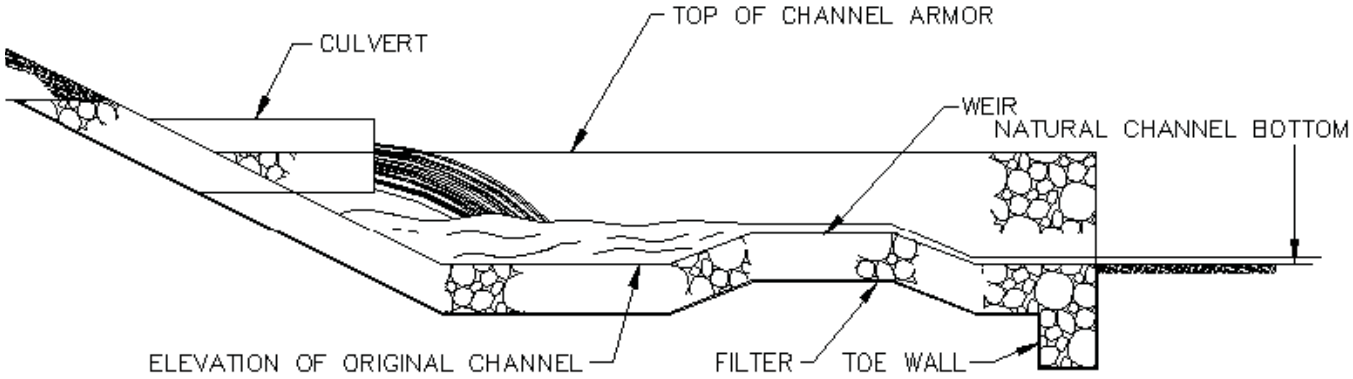

Figure 7: Weir-formed Plunge Basin

Linsey's Administrative Tips

Working in Teams

By Linsey Shaw, UNH T² Program Assistant

A team is loosely defined as a group of individuals who work together to accomplish a common goal. Teamwork has become common in the workplace and is a very powerful tool. Teams are essential to generate new ideas and nurture open communication. Teams also provide motivation, improve problem solving and aid in decision making.

There are two types of teams that exist in the workplace. The first is a problem solving team. This is a team of individuals working to solve one particular problem. The second type of team is a working team. A working team is ongoing. They are there to manage and coordinate daily work together.

The information below can be applied to a problem solving team and a working team.

A team leader can use these tips to help develop a team:

- Create a vision statement.
- Encourage participation from all team members.
- Develop expectations and communicate these clearly.
- Explain why team members are part of the team and what each person is expected to contribute.
- Emphasize the overall goal to get "buy in" from the team members.
- Support the team and help them accomplish their goal.
- Allow team members to have freedom to accomplish their goals in a creative and innovative way.
- Clearly communicate any limitations and boundaries.

In order for a team to be effective, it needs to have certain characteristics. Team members need:

- Time to get to know one another.
- To have respect and trust toward one another.
- To be able to rely on one another to complete the project or goal.

Once the team is developed, the Supervisor should:

- Establish roles within a team to help members be more organized and productive and have a clear understanding of each other's expectations.
- Hold members accountable for their actions and contributions to the team.
- Give recognition and feedback to team members for their contributions.
- Ask team members to reflect on how the team is working together to achieve the common goal(s).

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Welcome Ashley Benson!

T² Project Assistant

Ashley Benson started working as a Project Assistant at the UNH Technology Transfer Center on September 9, 2009. She is a graduate student in the Education Department at UNH working toward her Masters Degree in Literature. Ashley has a B.A. in English Literature and a B.A. in French from Western Washington University in Bellingham WA.

Ashley is proficient in Microsoft Office Word, Excel, and Powerpoint. Some of her duties will be to answer customer inquiries via phone or email, assist in packing for workshops, perform website maintenance, and write articles for Road Business. Ashley will be working part-time for our center, about 10 hours per week, during the school semesters.

Outside of her graduate program, she enjoys reading, cooking, and watching movies.

Welcome Ashley!

My Primary Responsibility Is…

By Gus Lerandeau, Sales Rep. - All States Asphalt, NH House of Representative, & T² Center Instructor

When asking a public works director if he was going to an upcoming seminar his reply was, "My primary responsibility is to my town, after that I will see if time allows." What a response! His response was not about advancing his career, or about networking, or about visiting a new area. Instead, his first thought was to put the people in his town first!

Unconsciously, many times throughout the day, we do look out for the best interests of the town. This includes negotiating the best deal on products and services, ensuring the roads are safe for public travel, and ensuring the welfare of our employees. These are things we do daily that are taken for granted but they make up a Road Manager's job.

I know that many of our decisions are influenced by budgets, but we hope that we have the right tools to support our good intentions. We also look to our governing bodies for their support with our decisions.

Perhaps if we follow the principle of placing our town or employer first the rest will follow as we will get both Selectboards and taxpayers to support with what we want to accomplish.

Think about it. How would you answer "My primary responsibility is _____"?

Milestones

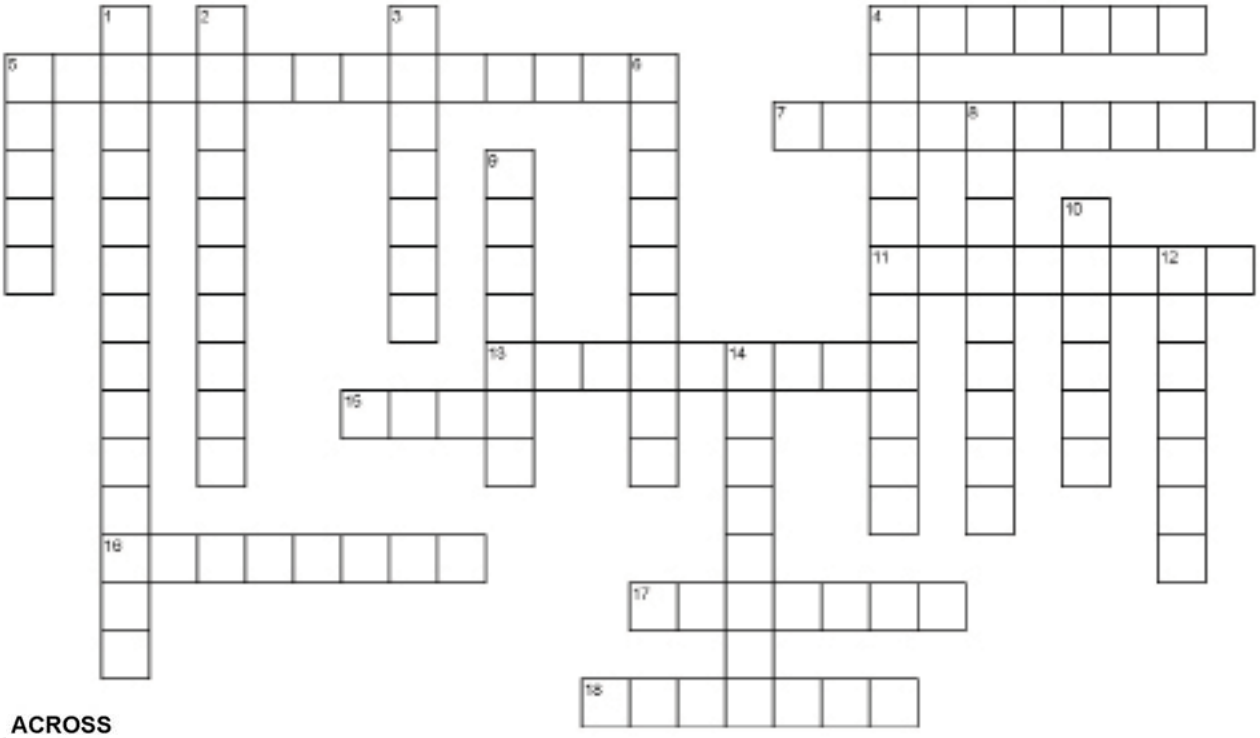
- **Bob Varnum**, prior Road Agent in Antrim, has retired.
- **Craig Clark III** is the new Road Agent in Antrim.
- **Greg Placy** is no longer the NHDOT District 1 Engineer.
- **Dave Rodrigue** is the NHDOT Interim Dist. 1 Engineer.
- **Mike Sousa** is the new Road Agent in Enfield.

Dates

- **October 30, 2009**: Road Managers Mtg, Moultonborough
- **November 18-20**: LGC Conference, Manchester

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

4 Kelly Gibbons started his involvement with public works with the City of _____, NH.

5 A _____ _____ culvert allows a stream to pass under a roadway. (2 words)

7 A _____-_____ is used to route runoff under and away from roadways.

11 Shawn White started working for the town of Whitefield in 1999 as a police officer and was promoted to _____.

13 The _____ grader attachment is designed solely for ice and snow pack removal and causes very little pavement damage.

15 If asked what your primary responsibility is, Gus Lerandereau hopes you respond with "My _____."

16 _____ plants are non-native species that out-compete native vegitation, disrupting ecosystems.

17 A standard _____ edge is a common mechanical surface contacting tool used to reduce the bond of an ice pack.

18 Ed Tourville's favorite T2 Roads Scholar Program workshops are the ones about gravel roads and _____.

DOWN

1 A group of individuals working to solve one particular problem is called a _____ _____ team. (2 words)

2 A highway memorial was dedicated in _____, NH.

3 A group of people that manages and coordinates daily work is known as a _____ team.

4 Purple _____ is an example of an invasive species.

5 According to Dave Wholley. the town of _____ DPW is currently milling and overlaying Rte. 28.

6 The _____ system cutting edge is designed to penetrate road surfaces, but can be used for ice and snow removal.

8 Care must be taken when using a Grader-Mounted _____ to avoid damaging road ways.

9 Jason Kimball loves _____ snow in the winter.

10 The inlet of a culvert is often protected with a _____ to prevent major damage.

12 The UNH T2 Center and the _____ Academy have continued their partnership.

14 _____ cutting edges are more productive than standard edges.

This material is available from UNH T². Publications are FREE unless indicated otherwise. Videos are FREE to rent for three weeks and $15 each to purchase. To request material, fax this completed form to 603-862-0620.

Publications

____ **At the Crossroads - Preserving Our Highway Investment.** The purpose of this document is to stimulate serious discussion about the nation's highways, including their role, extent, how they are financed, constructed, maintained, and to explore more effective and efficient ways of achieving our transportation objectives. This document should be of great interest to policy and decision makers. *NCPP.*

____ **A Snowplow Operator's Guide to Snow and Ice Equipment (CD).** An interactive program with short segments on various winter operations and maintenance topics, such as types of equipment, mounting of equipment, inspection, anti-icing/de-icing, plowing techniques, and a final test. *Author unknown.*

____ **Calcium Chloride Package.** Uses for calcium chloride, chemical advantages, deicing, and options for deicing. *General Chemical.*

____ **Environmental Fact Sheet - Minimum Impact BMPs for Maintenance of Large Woody Material in Streams and Rivers**. About large woody material, and when and why to remove it or not to remove it from rivers and streams. *NHDES*.

____ **Stone Walls & Structures, Scenic Roads & Roadside Trees, Tree Wardens & Special Places**. Information on historic stone culverts, range roads, trees and roadside growth (excerpts from RSA 231), scenic roads (RSA 231:157-158), town initiatives to protect stone walls, and other topics.

____ **United States Pavement Markings-CD ROM also**. Poster illustrates pavement markings. A must for every work environment concerned with road safety and repair. *USDOT & FHWA.*

Videos

____ **Chainsaw Safety, ST-235, 21 min.--DVD**. Demonstrates the do's and don'ts of chainsaw operation. *Oregon Saw: Chain Division.*

____ **Frost Action in Soils, 13 min.--CD.** Describes how frost heaves are formed, the effects they have, and testing of frost action. *USA CRREL.*

____ **Importance of Road Drainage, DC-251, 19 min.--DVD**. Emphasizes the importance of drainage, including surface and subsurface drainage, drainage systems, and procedures for their inspection and repair. *FHWA.*

____ **New Hampshire Public Works Mutual Aid Program, PA-236, 10 min.--DVD.** This is an informational video that explains the benefits of joining the Mutual Aid program. *NHPWMA Program.*

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

____ **Sand and Salt Spreader Calibration, M-1, 13 min.--DVD**. Guided tour of a proper truck calibration. Illustrates proper techniques and calculations for annual maintenance. *Baystate Roads Program, 2007.*

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

Customer Information

Name:_____ Title: _____

Affiliation:_____ Mailing address: _____

Town/City: _____ State: _____ Zip: _____

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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❖
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T² Center Advisory Board

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

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

FHWA Representative

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Alex Cote-Road Agent, Deerfield
Martha Drukker-Associate Engineer, Concord
Richard Lee- Director of Public Works, New London

NH Public Works Standards & Training Council

Dave Danielson-President, Forecee Advocacy LLC

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**

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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.

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Technology Transfer Center
New Hampshire LTAP at UNH

Fall 2009 Training Calendar

www.t2.unh.edu/training

10/1-10/2	Road Surface Mgmt. Software	10 Technical	Concord	$100
10/5	*Academy Lvl 1: Basics of Good Road*	*5 Basics*	*Concord*	*$45/$60*
10/6	Sign Retroreflectivity--for Inspectors	5 Safety	Manchester	$60
10/7	Reconstruction Project Planning	5 Technical	Moultonboro	$60
10/13	Invasive Plants	5 Environmental	Concord	$60
10/15	Winter Maintenance Fundamentals	5 Technical	Grantham	$60
10/16	*Academy Lvl 1: Intro. to Environment*	*5 Environmental*	*Concord*	*$45/$60*
10/19	*Academy Lvl 1: Local Govt Law & PR*	*5 Supervisory*	*Concord*	*$45/$60*
10/20	A Hard Road to Travel	5 Supervisory	Rochester	$60
10/20-10/23	Grader Operation & Safety	10 Technical	Hillsborough	$120
10/23	*Academy Lvl 1: Public Works Safety*	*5 Safety*	*Concord*	*$45/$60*
10/26	*Academy Lvl 1: Flagger Certification*	*5 Safety*	*Concord*	*$45/$60*
10/27	Workzone Traffic Control	5 Safety	Claremont	$60
10/28	Basics of a Good Road	5 Basic	Rochester	$60
10/29	Intro. to Basic Computer Usage	5 Basic	Concord	$60
10/30	*Academy Lvl 2: Chainsaw Maintenance*	*5 Technical*	*Deerfield*	*$45/$60*
10/30	Road Managers Meeting	N/A	Moultonboro	$60
11/2	*Academy Lvl 2: Tort Liability*	*5 Tort Liability*	*Concord*	*$45/$60*
11/4	Communication for Municipalities	5 Supervisory	Lincoln	$60
11/4 & 11/6	Road Surface Mgmt. Software	10 Technical	Concord	$100
11/5	Employee Safety for Public Works	5 Safety	Somersworth	$60
11/10	*Academy Lvl 2: Plan Reading*	*5 Technical*	*Concord*	*$45/$60*
11/12	Bridge Maintenance	5 Technical	Concord	$60
11/13	*Academy Lvl 2: Drainage*	*5 Technical*	*Concord*	*$45/$60*
11/16	*Academy Lvl 2: Winter Maintenance*	*5 Technical*	*Concord*	*$45/$60*
11/17	Sign Inventory Mgmt. Systems	5 Technical	Concord	$50
12/4	Sign Inventory Mgmt. Systems	5 Technical	Concord	$50