

Maintenance to Reduce Potholes

By Stefanie Fishman, Project Assistant

Potholes form when water becomes trapped beneath the pavement surface. As vehicles run over the saturated base material, the unsupported surface layer collapses resulting in a hole. The pothole expands as traffic hits the hole.

Water enters the road base through surface cracks or from the sides of the road. In New Hampshire potholes occur most often in the spring. During the winter the water freezes, drawing more water into the base material. The February and March freeze-thaw cycles often cause frost heaves, which let in more water. The ice melts from the top down, leaving a trapped pool of water.

Highway departments can minimize the number of potholes formed by keeping water out of the base material. Preventive maintenance preserves or extends the life of a pavement. It does not improve the structural capacity of the pavement. A preventative maintenance program is intended to fix light deterioration, and to reduce failures, routine maintenance, and other service activities.

Proper Budgeting

At the end of a winter, budgets have often been drained to cover snow removal costs. To ensure money for spring repair, agencies should have separate budgets for snow removal and for road maintenance. This money can be used for preventative maintenance such as crack sealing, debris removal, and drainage repair.

Using a Management System

Along with a maintenance budget it is important to have a plan of action. A pothole control program is an essential part of an overall pavement management system. By sticking to regularly scheduled maintenance tasks, agencies can decrease the accumulation of water in the subgrade and road base. The elimination of water reduces pothole formation.

A pavement management system such as RSMS can help detect early signs of roadway failure. It enables maintenance action before potholes



develop. Having a comprehensive inventory of all city or town roads by pavement type, thickness, and condition of roadway allows the department to coordinate and prioritize maintenance efforts, which is more effective and saves money. Agencies can train crews or hire an expert to recognize problem areas before potholes develop. By having well-trained people the problem areas can be preserved, repaired, and strengthened immediately.

Drainage

Poor drainage is a major contributor to pothole formation. Water weakens pavement support and contributes to frost heaves and cracking. Maintenance and improvement to drainage features reduce the amount of water on the road.

Preventive maintenance of drainage includes clearing debris and foliage from ditches, storm drains and culverts. The department may install underdrains along shoulders where it is difficult to prevent water from entering the subgrade. Load limits may also be applied to roads during periods where the subgrade is saturated.

Crack Sealing

An active crack sealing program is cost effective and extends the life of the pavement. The base, subbase and subgrade of a pavement lose

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Milestones:

Master Road Scholar *Bruce Berry*, is the new Director of Public Works in Amherst.

Jason Hatch is the Road Agent in Danbury.

Dale Hemeon is the Highway Department Manager in Hooksett.

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>

Beaver damage
<http://www.dec.state.ny.us/website/dfwmr/wildlife/beaver3.pdf>.

Search the New Hampshire Revised Statutes Online:
<http://sudoc.nhsl.lib.nh.us/rsa/search.htm>

Description and Status of Bills in the New Hampshire Legislature:
<http://www.gencourt.state.nh.us/ns/billstatus/default.asp>

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carrying capacity when wet. Water enters these layers through cracks. As traffic passes over unfilled cracks it weakens the surface allowing more and more water to enter. This problem can cause potholes to develop rapidly, causing severe pavement failures. Sealing is a preventative maintenance technique, it can stop the water from entering the pavements and reduce potholes.

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Coordinating Road Work

Whenever possible the department should coordinate roadwork with utility companies. If a utility improvement is needed on a roadway, agencies should avoid reconstruction prior to this work. By talking to the utility companies and sharing the expenses, both participants will save money.

A permit system may also be established to make utility companies responsible for the maintenance of their patches for some period of time after work is done.

Sources

Dauber, Greg *Pothole Prevention*, Moving Forward Pennsylvania Local Roads Program, Vol 18 No 4 Winter/Spring 2001.

Army Corps of Engineers "Pothole Primer" Is a Good Source Booklet, Road Management and Engineering Journal, TranSafety, Inc. www.usroads.com/journals/rmi/9702/rm970204.htm, February 1, 1997.

Crack Sealing Why Crack Seal?, Asphalt & Concrete Repair, City of Fort Wayne Indiana Division of Public Works, www.ci-ft-wayne.in.us/street_dept/crack_sealing.htm, 2000.

Pavement Maintenance Effective Preventive Maintenance Treatments, Center for Advanced Transportation Systems Research Arizona State University US Department of Transportation, Federal Highway Administration, Washington DC, February 1996.

Spring Has Sprung—and So Have the Potholes, The Link, Kentucky Transportation Center, Vol 17 No 1 Spring 2001.

Congratulations Stefanie

Stefanie Fishman graduated from Civil Engineering program at UNH in May. Stefanie, a UNH T² Center Project Assistant for three years was responsible for workshop publications, many *Road Business* articles and "other duties as assigned." Stefanie enthusiastically took on all challenges and many were thrown her way!

Stefanie leaves UNH to attend Graduate School at Berkley.

Stefanie,

Congratulations and best wishes for continued success and a happy life. We, and the many people you served in New Hampshire municipalities, will miss you very much.

Kathy, Dave, and Charlie