

The banner features the 'ROADS & BRIDGES' logo in large, bold, red letters on the left. To the right, there is a photograph of a road construction site with traffic cones and vehicles. Below the logo, there are three red buttons with white text: 'HOME', 'SUBSCRIPTIONS', and 'CALENDAR OF EVENTS'. On the far left, there is a 'QUICK SEARCH' box with a 'GO' button. In the center, there is a call-to-action graphic that says 'Nominate your Top 10 ROAD project' in red and blue, with 'CLICK TO NOMINATE!' in blue below it. The background of the graphic is a close-up of a road surface with yellow and white lane markings.

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*High-performance remedy to potholes puts an end to constant repair work*

- By Don Nathan

Far removed from the days when potholes and utility cuts were filled with anything from sand or clay to oyster shells, today's road crews and utility companies have found that the days of patching a pothole or utility cut are being replaced by an effort to make the first visit to the repair area the last visit.

In the past, when potholes or utility cuts needed a temporary repair, "cold-patch" asphalt was used for repair until the roadway could be resurfaced. Most cold-patch products have been considered temporary and sometimes potentially harmful to the environment. Not any more. A number of high-performance products have answered a long-term need for an efficient, permanent and environmentally friendly answer to the problems related to pavement repair in both asphalt and concrete road and bridge surfaces.

Newly engineered products now allow crews to avoid the costly and unsafe practice of repetitive repairs to the same area while waiting for hot-mix asphalt plants to reopen or the ready-mix truck to arrive. In the past, the late winter/early spring season represented the greatest single challenge for pavement-repair professionals: the need for immediate and substantive repairs to road surfaces that begin to show the effects of the continual freeze-thaw cycles of that time of the year.

## Covering concerns

Recently, yet another challenge has been added to this all-important and highly visible work effort. Contractors and their constituencies are now tasked with repairing an area, while at the same time ensuring that such a repair is done in a way, and with materials, that do not pose a threat to either the crews that apply them or the storm-water systems they drain to. Environmental sustainability is no longer just a catchphrase; it is in many cases a specification or requirement of the job that is being done.

Recent studies by the U.S. Geological Survey, a variety of educational institutions and independent reports have raised concerns about surface-water runoff and its effect on our environment. Naturally occurring groundwater reserves and aquifers, as well as public drain and sewer systems, are all affected by this runoff and the materials carried with it.

Faced with these concerns, many in the pavement-repair industry have responded. Product testing for potentially problematic toxins has led to certification for biologically nontoxic products. In some cases,

formulation redesign or application standards have been enacted to bring the industry into voluntary compliance with its own high standard for the environment, while at the same time balancing strict standards for safety, dependability and ease of use.

It is not only contractors or agencies that are seeking better solutions for asphalt-based repairs. Homeowners are demanding more, too. Bob Wulk, a resident of eastern Tennessee, recently became his own driveway repair crew.

"I've patched the same hole in the same spot in my driveway every year for more than five years," he said. "Hiring a crew was out of the question money-wise, so I came here looking for a solution."

Shopping at his local Lowe's store, Wulk found a 50-lb bag of high-performance repair material and took it home to do the job. Afterwards, he was pleased. "Much better, and easy to use, too. The stuff looks like the asphalt in my driveway—so it keeps the wife happy because it does not look like a patch."

During his repair job, Wulk had a question about the wet conditions the day was forcing him to work in. "Believe it or not, I called the phone number on the back of the bag, and they walked me right through it. I couldn't be more pleased with the advice I received at the store or the help I got from the manufacturer."

Whether it is a homeowner with the occasional pothole or a large utility company or contractor using hundreds of tons a week, performance standards for what used to be known as "cold patch" have changed dramatically as well. No longer does the "throw-and-go" mentality using whatever materials are available pass muster. Contractors and government agencies alike demand and now use products that are not only considered a permanent repair material, but also conform to the rigid environmentally conscious standards of many municipalities.

## Taming the toxic

A number of industry leaders have products that do indeed prevent unnecessary and expensive repetitive repairs. This in itself is an innovation since the SHRP study over a decade ago. The most recent and exciting news is that we can now make permanent repairs (not patches) with environmentally friendly designs. In the past, toxicity of standard cold-mix designs often led to less-than-desirable consequences. Surface-water runoff from standard designs was often found to have contaminants related to the cutback agent used in the material, whether it be diesel fuel, gas oil, kerosene or any other extender. Over the past several years, however, improvements in mix designs have helped alleviate this problem.

Typical cutback asphalts are made by "cutting" hot asphalt with petroleum solvents, which are volatilizing organic compounds (VOCs), to prevent the asphalt from solidifying before it is applied. This process allows the product to be stored, transported or bagged for longer periods of time. Once applied to the roadway, the solvents could lead to contamination, as they evaporated into the atmosphere or were carried away in storm-water runoff.

As a result, several manufacturers have begun producing new cold-patch products that contain organic compounds, which prevent the drain down of both the cutback agent and asphalt cement. Many of these agents do not contain any added VOCs. These new and innovative products use a combination of continued compaction and evaporation to harden, greatly minimizing or eliminating the release of toxins into the atmosphere and our waterways.

As to hardening (or curing), testing has shown that a period of pliability following the repair is preferable to instant setup. This allows the material to seek out and fill small voids and crevices through continued compaction. It is these unfilled areas that are most often associated with failures (as documented in SHRP) because they are susceptible to freeze-thaw and pooling of water causing the hydraulic pumping action that creates repair failures.

In addition to these environmental benefits, installation consists simply of tamping down the patch, which will support traffic as soon as it is installed. As was indicated in the SHRP study of the early 1990s, the

additional labor and equipment costs associated with hot mix can actually make that method of repair more expensive than that of a similar repair executed with a high-performance cold material. Also beneficial, these newly formulated cold patches can now be left in place when a new surface is applied, where before standard cold-mix patch often had to be milled or removed due to incompatibility with new road surfaces.

Contractors, too, are now implementing cold high-performance mix designs in their work.

Jim Russell of JT Russell and Sons in Albemarle, N.C., commented, "These new cold-mix designs are far superior to those we used to work with. They are approved by the state, easily workable in all weather and backed by companies that we trust."

Seymour Adelman of Adelman Sand and Gravel in Connecticut agreed, "The difference today versus years ago cannot really be measured. These are now one-time, permanent patches that get the job done and are safe for our water systems. Of course, the fact that they often make sense economically on small jobs helps, too."

So where does the repair and rehabilitation professional stand as we head into 2007? Quite simply, in a far better position than they may have found themselves 10 years ago. Several of these new cold-patch repair materials have been approved and are already in use by many DOTs and road departments throughout North America. The products are not only rigidly tested to meet the specifications of the manufacturer, but in many cases they are blended and formulated to meet the specific needs of the end user.

From the days when a shovel full of oyster shells had to suffice, repair professionals now work with manufacturers to design and engineer a better and permanent answer to the age-old problem of surface repair.

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Source: *Roads & Bridges* March 2007 Volume: 45 Number: 3  
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