

Tech Brief

Evaluation of Pothole Patching Materials

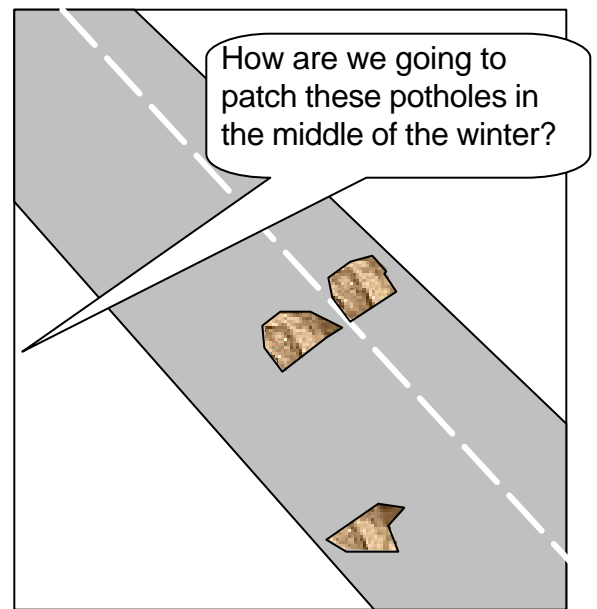
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BACKGROUND

Historically, pothole repair strategies and procedures have not received a great deal of literary attention. However, as highway maintenance agencies become more aggressive about evaluation of effectiveness of materials and techniques in pursuit of more economical and longer-lasting solutions, an increased emphasis has been given to pothole repair research.

In general, the pothole problem can be characterized as one of the most aggravating forms of asphalt pavement deterioration for the traveling public. Potholes also pose danger to the traveling public and cause damage to vehicles.



HERE'S THE PROBLEM

Potholes have always been a problem for highway maintenance organizations, and their treatment has also been very costly and time consuming. Since pothole formation can have very serious detriments, there is a need for their immediate repair, for both safety and rideability. Therefore, the evaluation of pothole patching material in terms of longevity and serviceability of the repair can significantly aid in reducing costs and increasing effectiveness of such repairs.

AND, HERE'S THE SOLUTION

Develop a procedure to evaluate bituminous pothole patching materials and repair procedures for bituminous concrete pavements, and to establish laboratory techniques for quality assurance of those materials.

BUT HOW CAN IT BE DONE?

The plan consisted of (1) a literature survey (2) field performance and demonstration projects (3) laboratory quality assurance tests of the materials selected as pothole patching materials and (4) documentation of the procedures of the pothole patching technique.

THESE ARE OBJECTIVES...

- To identify improved bituminous pothole patching materials and repair procedures for bituminous concrete pavements.
- To establish laboratory techniques for quality assurance of those materials.

HERE IS WHAT WE DID...

Initially, a literature search was conducted to provide an overall review of existing information regarding patching materials, repair procedures, and laboratory testing for quality assurance. Mechanisms of deterioration were studied for both flexible and rigid pavements. Bituminous patching mixtures, based on the type of mixing, as well as the temperature of the mixture at the time of placement, were in tandem with the most important properties that a bituminous patching mixture should possess.

This was followed by the identification of the different types of distress, and their related failure mechanisms, since its essential for an in-depth analysis of the pothole problem. By identifying the mechanisms of failure it is then possible to establish a set of performance criteria that can be used to develop improved pothole patching materials.

In order to evaluate, design, and approve bituminous patching mixtures, several tests were conducted which produce results that demonstrate the characterization of the properties of the mixture and the properties of the aggregate and the binder. These tests were divided into the following groups:

1. Stability
2. Adhesion/Cohesion
3. Durability
4. Workability
5. Storageability

Next, different types of repair procedures were studied which incorporated the patching cost parameters. This is significant because the strategy followed for the repairs should give an optimal combination of equipment materials and manpower at a minimum cost, while providing a long-lasting repair. Also, An evaluation of the cost effectiveness of the patching procedure based on the Strategic Highway Research Program (SHRP) research methodology occurred.

Furthermore, for the evaluation of patching materials following the SHRP-H-106 plan, experimental patches were installed in different testing locations, and their behavior over time was observed and recorded. The New Jersey Department of Transportation (NJDOT) Bureau of Maintenance performed this experimental patching. Laboratory testing to determine the material properties of the experimental patches followed this experimental patching. Considering the results from the field-testing, all of the materials performed similarly, and no recommendations can be made on the best material at this time. Accordingly, cost should be the key issue in determining which patch material should be used.

Here is what we found...	Here is what we recommend...
<ul style="list-style-type: none"> • The throw and roll method produced a patch that lasted the shortest amount of time, and was the most expensive. • The semi-permanent method produced a better, more economical patch. • Perfomix , UPM, Wespro, and Suitkote performed at below average performance. • The laboratory tests did not correlate well with field performance 	<ul style="list-style-type: none"> • Perform field tests on the various cold mix patch materials over multiple seasons to assess actual field performance.

WHAT IS THE NEXT STEP?

Since different experimental patching materials produced varying results under the several tests performed, no correlation could be made with the field performance and the laboratory test. An attempt should be made to involve other testing parameters that could give consistent results between the field performance and the laboratory testing. If performances of patching materials are found to be comparable, cost should be considered as one of the important factors in the pothole patching materials.

FOR MORE INFORMATION CONTACT:

NJDOT PROJECT MANAGER:	Mr. Robert Baker
PHONE NO.	
e-mail	
UNIVERSITY PRINCIPAL INVESTIGATORS	Dr. Ali Maher, Dr. Nenad Gucunski
UNIVERSITY:	Rutgers University -CAIT
PHONE NO.	(732) 445-2569
e-mail	<u>mmaher@rci.rutgers.edu</u>, <u>gucunski@rci.rutgers.edu</u>

A final report is available online at <http://www.state.nj.us/transportation/research/research.html>

If you would like a copy of the full report, please FAX the NJDOT, Bureau of Research, Technology Transfer Group at (609) 530-3722 or send an e-mail to Research.Bureau@dot.state.nj.us and ask for:

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