

Product Development 98-072
Interim Report

January 10, 2000

The Uretek Method

Description:

In March of 1999, the Missouri Department of Transportation contracted with Uretek USA, Inc., to install MoDOT's first high-density polyurethane lifting and undersealing foam under Route 63 near Ashland. This location was set up as a test section to lift, realign, fill voids and underseal this section of concrete roadway. The test section was expanded prior to beginning to encompass a larger portion of the distressed area than was originally set up.

The Uretek method is a patented process where liquid polyurethane components are injected directly through the concrete roadway using 5/8-inch diameter drilled holes, generally spaced on six to eight feet intervals. As the polyurethane expands, voids are filled and a controlled mold pressure is exerted on an eight to ten feet diameter area under the slab. Multiple pattern injection locations are used to effectively re-support and accurately re-align the desired slab area. The polyurethane quickly cures into a strong, stable and long lasting base replacement material while gaining 90% of its compressive strength within 15 minutes.

Currently, MoDOT uses a cement – agricultural lime – water mixture for mudjacking, or lifting, pavements back to their initial grade elevations. This process doesn't always produce satisfactory results since the mudjack slurry has a high water content, which can be absorbed into the adjacent soils. Several attempts at mudjacking are generally necessary to achieve the desired results. The Uretek's primary purpose will be to provide maintenance operations with another tool in accomplishing pavement settlement and alignment repairs

Advantages/Disadvantages:

One major advantage of Uretek is that the method should provide our maintenance operations a tool to expedite pavement alignment repairs and make it so return visits won't be necessary to continue filling voids under the same slabs. The Uretek method does not depend on pumping pressure to achieve lifting of the slab and there is no need to overlift surfaces to accommodate grout shrinkage. The rapid curing of the Uretek reduces the amount of material escaping through unrelated voids and channels. The material expands up to 30 times its volume after injection. Uretek also provides a positive seal to help prevent water infiltration. Uretek material is guaranteed for a ten-year period against any significant shrinkage or deterioration.

One apparent disadvantage is the cost, and placement of, the Uretek material. For general pavement lifting, it is estimated it will take 1/2 lb./sq. ft., which equates to a material cost of \$3.50 - \$4 per square foot. For any substantial void filling or bridge approach slab lifting, the cost may be prohibitive due to the amount of material required to fill the void. Also, an additional note is that this process isn't something MoDOT maintenance will be able to do. It will have to be done by a contractor since it is a patented process.

Cost:

A cost analysis and comparison to mudjacking has not been calculated. However, the Uretek material cost is \$7.60 per pound. Generally it takes 4lbs/cuft to perform undersealing and base stabilization, 5 lbs./cuft to do lift and undersealing of pavements and 6 lbs./cuft to achieve lifting and undersealing of bridge approach slabs. Where large voids are encountered, 4 lbs./cuft is figured to fill the void in addition to the quantities needed for lifting.

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