



**ARIZONA
TRANSPORTATION
RESEARCH
CENTER**

CRAFCO POTHOLE REPAIR

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PRODUCT EVALUATION
84-06
CRAFCO POTHOLE REPAIR SYSTEM

JULY 18, 1986

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16. ABSTRACT This report contains a product evaluation of Crafcoc Inc., pothole repair systems. The pothole repair is a hot-applied elastomeric asphalt product. The hot asphalt is designed to be mixed with locally available aggregate to produce a permanent pothole repair. Before placing the product, the pothole must be properly cleaned and prepared. A test section of Crafcoc's product was placed on I-17 in Phoenix. The product was evaluated for eighteen months. The pothole repairs performed well under heavy traffic conditions. Based on the field performance, the Arizona Transportation Research Center recommends that Crafcoc's pothole repair be considered for use on future maintenance projects.			
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I. INTRODUCTION

Joint breakouts/potholes are becoming an ever increasing problem along the Black Canyon Freeway (I-17). Considerable manpower is necessary to control the pothole problem. Previous attempts at permanent repairs have included Set 45 and Cono-crete 149, both utilized primarily on grinding contracts. The Set 45 repairs failed within 6 months but the Cono-crete 149 seems to perform satisfactorily. The only successful asphaltic concrete pothole repair product has been Unique Patching Material (UPM), which has been utilized on pothole repair contracts and is presently utilized by District I maintenance forces.

Conversations with District personnel indicates that a "typical" joint fracture for the concrete pavement looks like the failures shown in figure 1.

Besides the joint spalling shown in figure 1, corner breakage is the next most common pothole producer within this area. To repair these forms of potholes generally requires a 6-7 man crew limited to work hours between 9:00 a.m. and 2:30 p.m. to avoid rush hour.

A Crafcoc product has been produced to facilitate permanent repairs of potholes. The system utilizes a hot applied elastomeric asphalt product and locally available crushed rock (i.e., 3/4" concrete rock) to construct a durable pothole repair. The crushed rock provides the stability for the mix and sustains the traffic loadings. The elastomeric asphalt product behaves as a binder and provides indefinite resiliency to the mix.

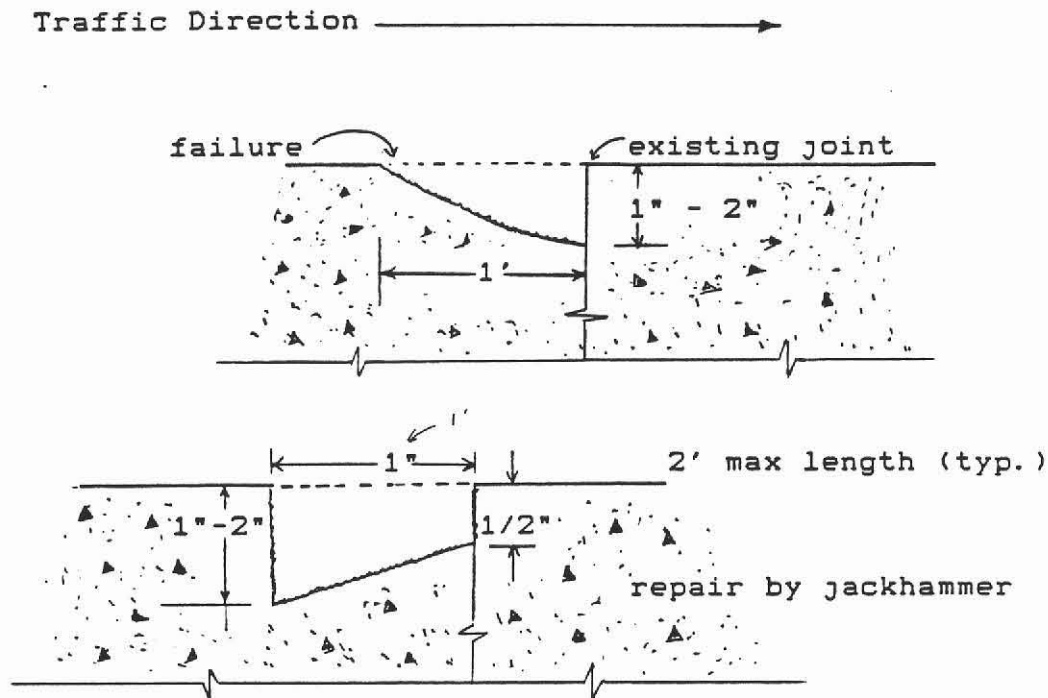


FIGURE 1 - TYPICAL JOINT FRACTURE

II. CONSTRUCTION REPORT

To provide an evaluation of this product, District I maintenance forces incorporated Crafcoc pothole repair on the repair of three concrete potholes located on I-17 SB, Lane 3, between MP 199-200 and one asphaltic concrete pothole repair located in the center of the Adams Street on-ramp. This strategy enables the evaluation of the product for both concrete and asphalt concrete pothole repairs.

The Crafcoc Company requested the test evaluation and District I selected the test locations and conditions. Research was contacted to aid in the evaluation and to document the test sites. The demonstration took place on December 6, 1984.

The test sections, selected by maintenance, were located as shown in Figures 2 thru 7. The sites were selected to enable a comparison of (a) pothole patch performance for both AC and concrete, (b) pothole patch performance adjacent to a transverse control joint (with U.P.M. material across from it), and (c) a pothole patch performance across a transverse control joint.

District I maintenance provided traffic control and performed all pothole preparatory work. This consisted of removing all deteriorated concrete, brooming the debris, airblasting the cavity, and applying torch heat just prior to tacking the surface. The Crafcoc personnel performed the surface tacking and pothole patching. District personnel provided the aggregate heat source.

Pothole preparatory work began about 9:30 a.m. and patching at about 10:15 a.m. The ambient air temperature was 80 - 90 degrees under sunny skies. The asphalt product was maintained at 375 degrees Fahrenheit throughout the day. Concrete potholes ranged from 1 square foot to 14 square feet in size and between 1.5 inches and 3 inches in average depth. Repair times ranged from 12 minutes for pothole number 1 to 29 minutes for number two. Repair rates ranged from 48 minutes per cubic foot for #1 to 11 minutes per cubic foot for #2.

The materials incorporated into the patches consisted of an elastomeric asphalt product shipped in approximately 1 cubic foot blocks and heated on site in an oil heater/distributor trailer. The asphalt product was applied manually with a hand wand. The crushed rock appeared to be 3/8 inch - 3/4 inch clean concrete aggregate. All the aggregates were stored in 5 gallon containers and applied to the potholes by handbroadcasting. It was noted

that the aggregate utilized for pothole number 3 had some fines present and the Crafcop personnel attempted to segregate out the fines by hand.

Once the potholes were repaired it required approximately 2 hours before traffic was allowed on it. However, sand dusting was not performed prior to opening to traffic. It was difficult with no previous experience to assess when the patch would sustain traffic. The manufacturer's representatives indicated that traffic could be resumed after 20 minutes.

The cost of the material was approximately \$.25/pound for elastomeric material and \$15/ton for aggregate.

III. ANALYSIS

The repairs were performed in a satisfactory manner and the system seems to have potential. The product does have some apparent disadvantages in that it requires more time to construct the patch and there is an inherent danger of working with materials at elevated temperatures. The material cost is comparable to U.P.M., however, placement requires the use of a circulating hot oil crack sealing pot, which could be rented for approximately \$2,000 per month.

Another drawback is the inability of the material to sustain traffic immediately in the event of an emergency. Other products such as U.P.M. can be driven over virtually immediately and thus are less vulnerable to emergency conditions.

Finally, the Crafcop pothole repair procedure is more stringent in regard to cleaning and drying the repair surface than are other products on the market.

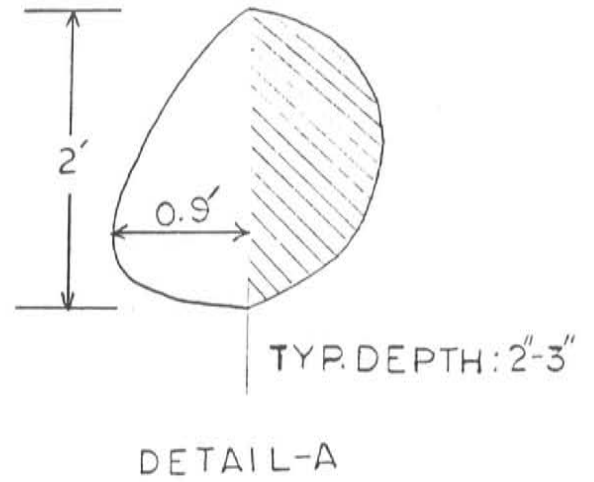
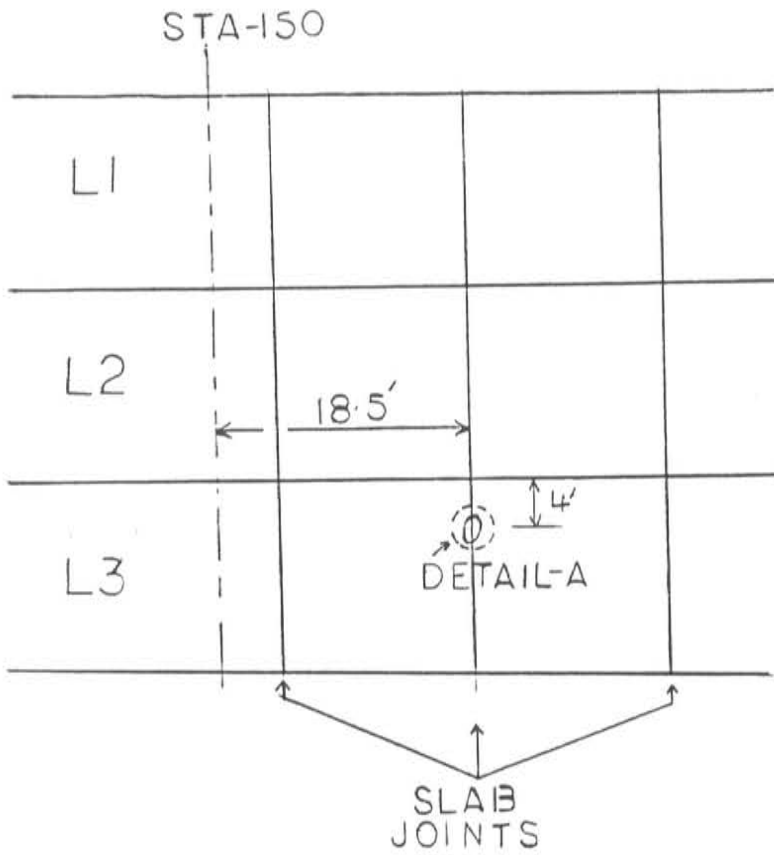


FIGURE 2 - LOCATION OF POTHOLE NUMBER 1

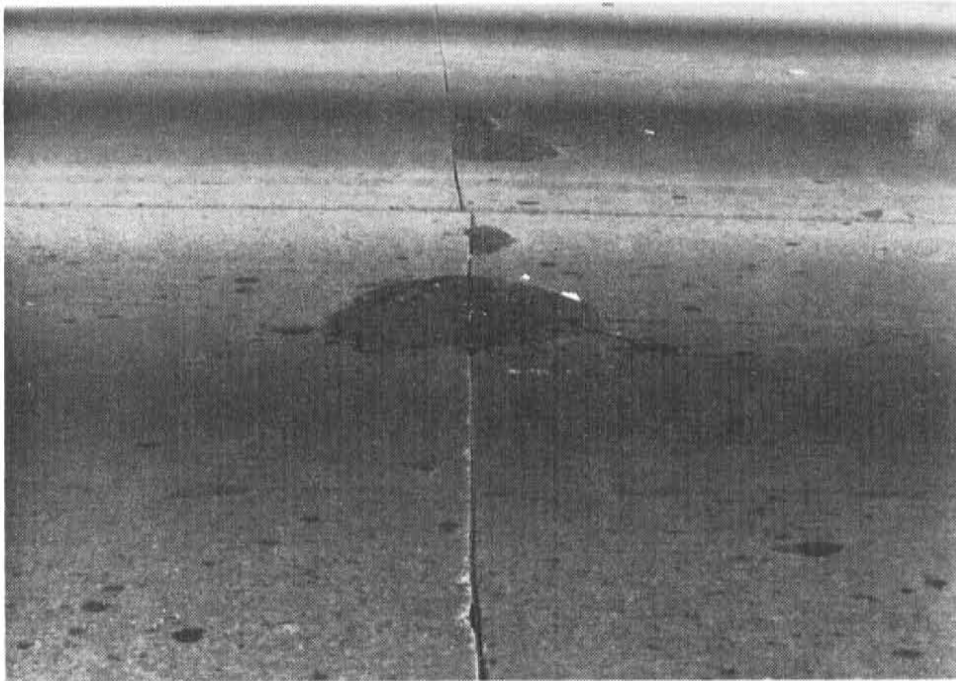


FIGURE 3 - POTHOLE NUMBER 1

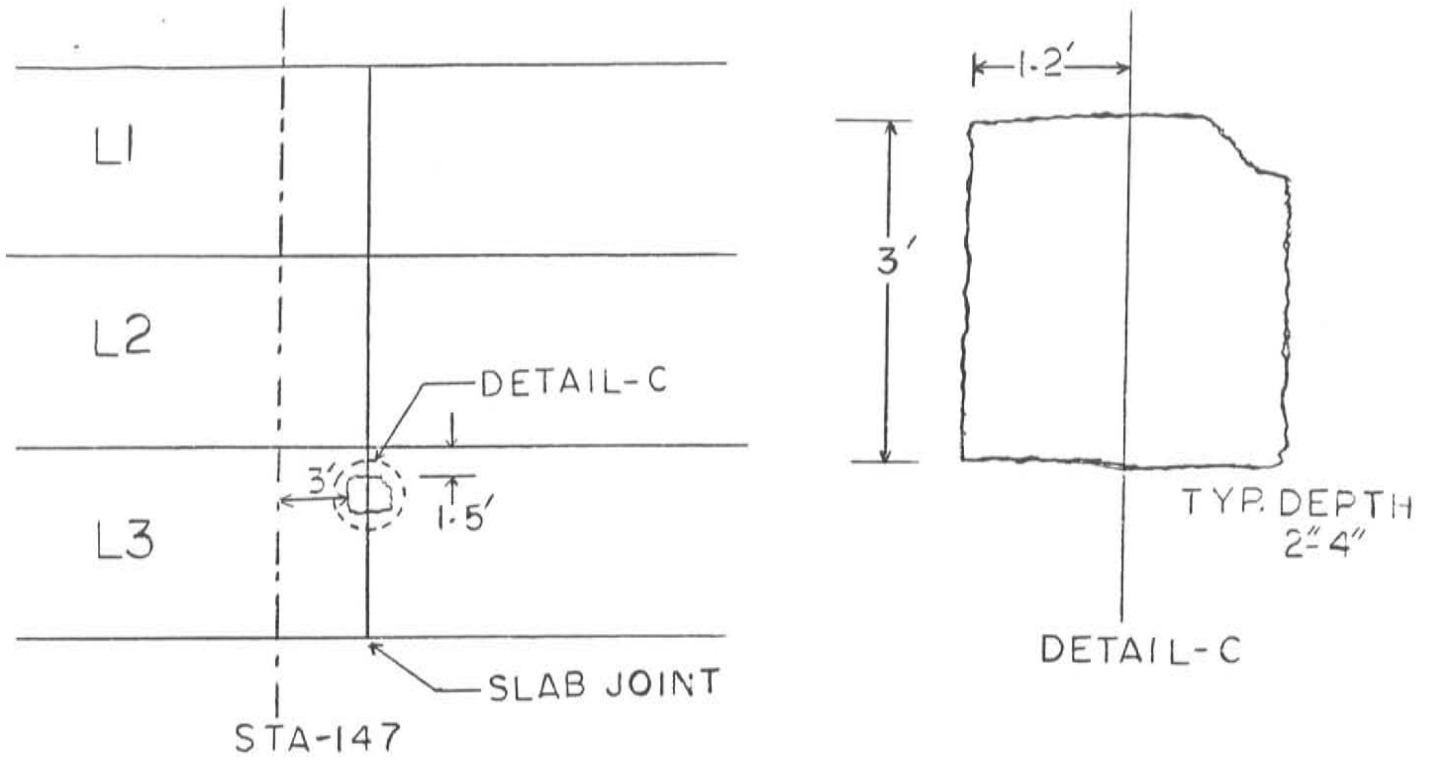


FIGURE 4 - LOCATION OF POTHOLE NUMBER 2

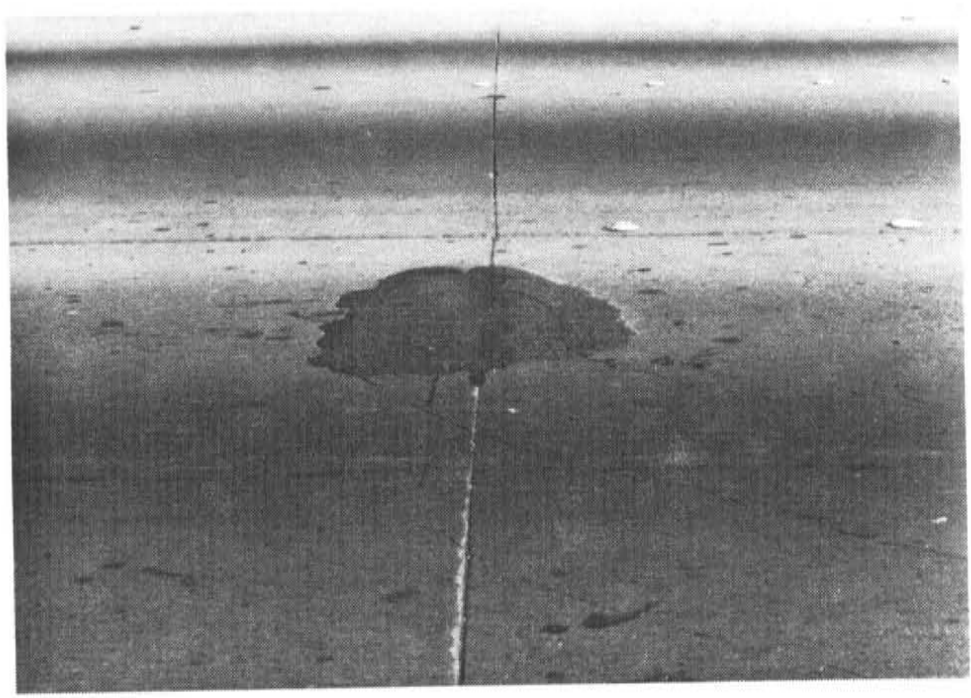


FIGURE 5 - POTHOLE NUMBER 2

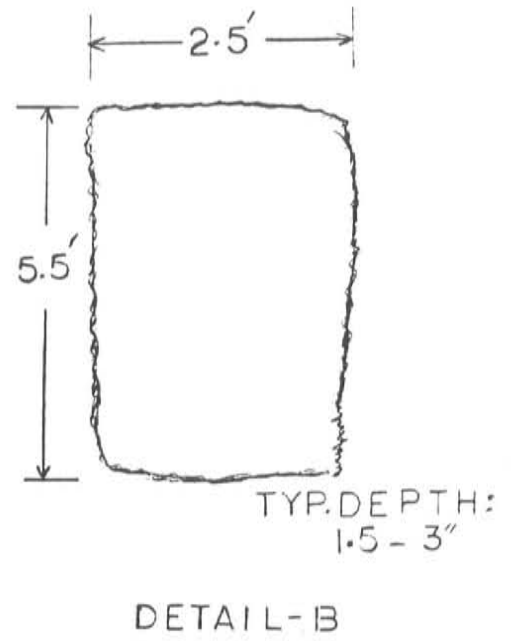
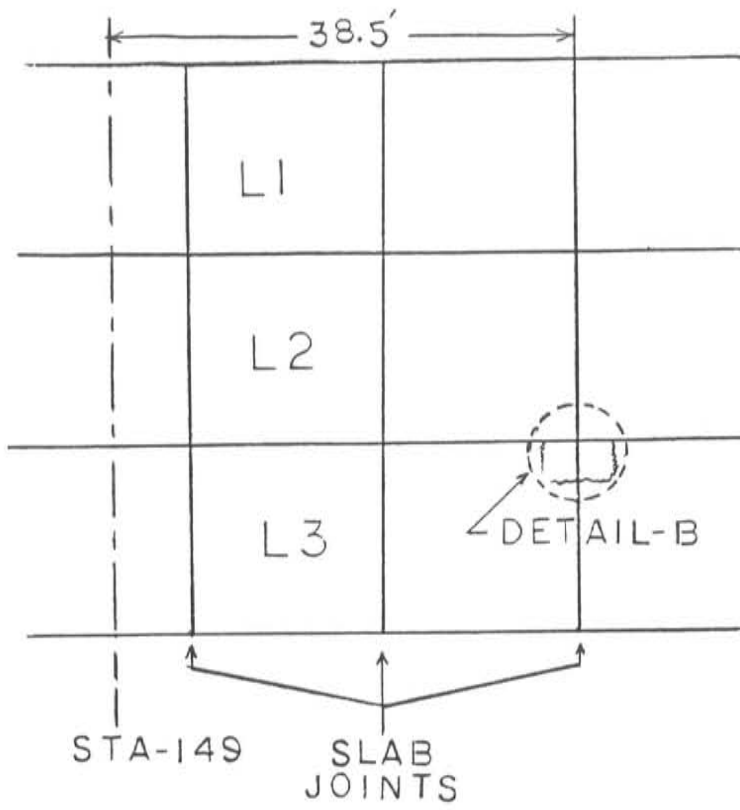


FIGURE 6 - LOCATION OF POTHOLE NUMBER 3

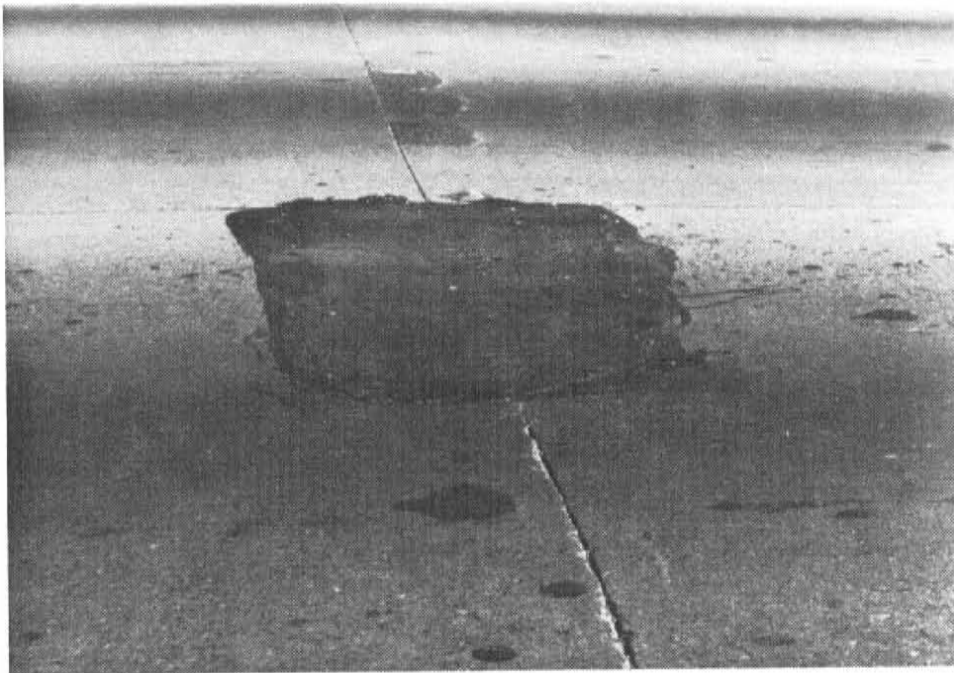


FIGURE 7 - POTHOLE NUMBER 3

EVALUATION

The first inspection of the product was made on February 13, 1985. All three patches on the mainline concrete were performing well. It appeared that slight settlement had occurred at stations 149 and 150.

The patch placed on the asphalt concrete had been replaced because the AC below the patch had excessive degradation. No evaluation of asphalt concrete patching with CrafcO pothole repair could be made at the site.

A second visual inspection of the three concrete patches was performed on June 20, 1985. There was no sign of distress and the material was adhering well.

On March 31, 1986 a final evaluation was made on the CrafcO pothole repair. All three test sites were performing well. Photos taken at the final evaluation showed no change from photos taken at previous evaluations.

V. CONCLUSIONS AND RECOMMENDATIONS

Insufficient data exists at this time to compare long term benefits verses initial costs. The initial cost of applying the crafcO product is greater than that of other products due to the specialized equipment required to heat the product. The product may exhibit satisfactory long term performance, which may result in less costly routine maintenance practice.

Based on field performance to date, the Arizona Transportation Research Center recommends that CrafcO pothole repair be considered for use on ADOT maintenance projects.

APPENDIX

— INTRODUCING THE CRAFCO POTHOLE REPAIR SYSTEM —

The CrafcO Pothole Repair System is the first elastomeric system designed to repair potholes.

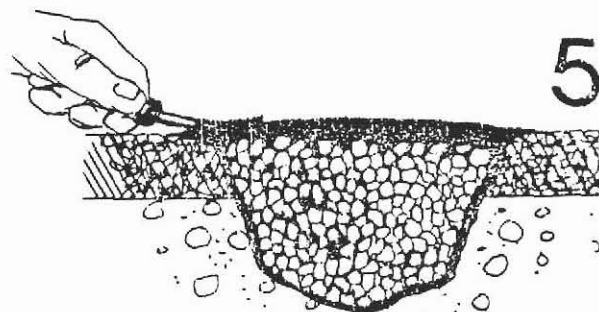
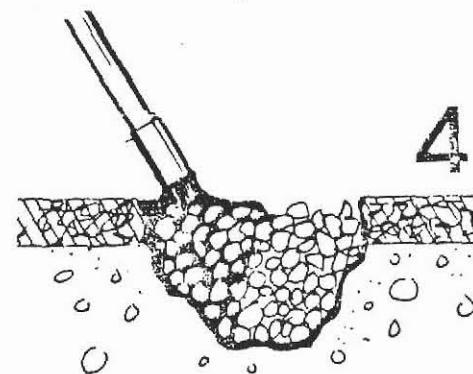
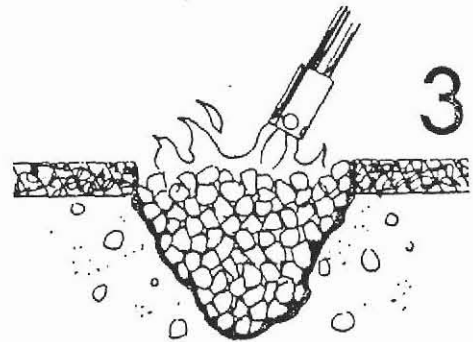
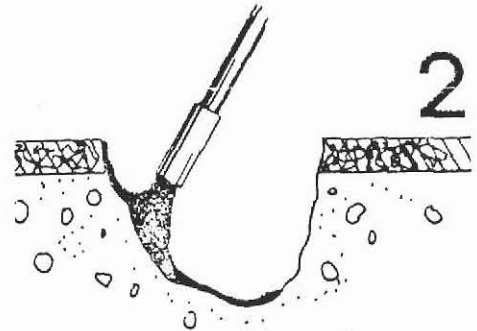
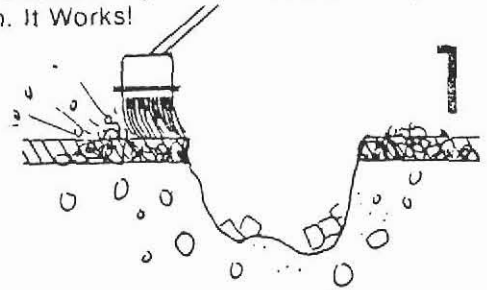
This system, using state of the art polymer technology permits patching of potholes with conventional CrafcO equipment, using locally available crushed rock. If done properly this system will outlast the pavement it is placed in.

The most effective way to alleviate a pothole problem, is to seal cracks before they are allowed to develop into potholes, but if you're too late use the CrafcO Pothole System. It Works!

REPAIR POTHOLES THE CRAFCO WAY

— The most expensive thing about repairing a Pothole is repairing a Pothole again —

1. Clean all loose debris and moisture from the pothole. Clean the edges of all dirt, dust, or foreign matter using brooms, brushes, compressed air, etc. as required to provide an intact and sound bonding surface.
2. Heat the edges and bottom of the hole with a propane torch, to remove any residual moisture from the hole and tack with CrafcO pothole repair binder.
3. Fill the hole with clean crushed $\frac{3}{4}$ " concrete aggregate and level. Heat the rock with a propane torch for 2-3 minutes. Warm the edge of the pavement surrounding the pothole for at least 4".
4. Next fill the voids with CrafcO binder, taking care of the binder is at proper application temp. Overlay the binder approximately 4" and taper the edge with a squeegee or similar tool.
5. If the Pothole is greater than 3" deep, repeat No. 3 and No. 4, making each layer no more than 2" deep each.
6. Protect the repair for approximately 30 minutes and sand or dust the surface if temperature exceeds 90° F.



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