

OFFICE MEMORANDUM



MICHIGAN
STATE HIGHWAY DEPARTMENT

December 9, 1966

To: E. A. Finney, Director
Research Laboratory Division

From: M. G. Brown

Subject: Field Test Applications of "Speed Crete" Patching Mixtures.
Research Project 65 NM-140. Research Report No. R-618.

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The following is a brief initial report on four field test applications of "Speed Crete" patching mixtures being followed under a New Materials research project. These have briefly been mentioned to you in status reports dated May 24 and October 3, 1966.

All four applications were supervised by personnel from Concrete Maintenance Products, Crystal Lake, Illinois, manufacturers of Speed Crete, and Holmes Associates, Oak Park, the manufacturer's representatives in Michigan. Areas to be patched were prepared by local maintenance forces, and in one particular case, by a District highway maintenance crew.

For general information, Speed Crete is a special hydraulic cement-type mixture packaged in 50-lb plastic-lined bags for addition of only small amounts of water immediately prior to use. As mentioned in earlier status reports, the basic laboratory data should be completed about the end of this month and will be summarized in a separate report. The main selling point of Speed Crete has been its fast-setting properties (10-15 minutes) and early opening to traffic in about one hour. The current retail price of about \$5.50 per 50-lb bag, in quantities of 20 bags or less, produces a material cost of about \$11.00 per cu ft of patching mixture. This material cost is as high or higher than some currently used epoxy patching mortar mixtures.

The subject field projects are described in chronological order.

Pavement Patch, US 23 BR, Ann Arbor

This full-depth patch was placed about mid-April, 1966, by City of Ann Arbor personnel under the guidance of Concrete Maintenance Products representatives. The patch is about 4 ft by 6 ft and 8 in. deep in the northbound passing lane on US 23 BR just south of the Huron River. This is opposite 1340 N. Main Street. A total of about 16 bags of Speed Crete was used, with the bottom 7 in. of the

patch containing 25 lb of pea gravel per 50-lb bag of Speed Crete. The top 1 in. was placed with straight Speed Crete mixture. All mixing was done in a horizontal mortar-type mixer, the type generally recommended for this product. To date the patch appears to be holding up well under traffic.

Sidewalk Patch, N. Washington, Lansing

The second test patch being observed was placed the morning of April 29, 1966, in a sidewalk and curb area in front of the Gladmer Theater on N. Washington Ave. in Lansing. The area was chipped out and prepared by Lansing DPW forces and is about 3 ft by 2-4 ft and varies in depth up to about 2-1/2 in. (Figure 1). A total of three bags (150 lb) of Speed Crete was mixed, by hand, in a wheelbarrow and placed by W. Hayes and K. Williams of CMP. The stiff Speed Crete mixture was packed in the pre-wet area, screeded, shaved to grade, and hand rubbed with a wet sponge. The finished patch is also shown in Figure 1.

Northbound US 127 over NYC RR, North of Jackson

The third field application was primarily arranged and planned by the Research Laboratory and Office of Maintenance as a field test. The northbound structure carrying US 127 over the NYC RR about 3.4 miles north of Jackson contained a number of spalled areas over high steel and one deeply scaled area near the east curb. District maintenance forces under Dave Hodges chipped and removed unsound concrete early on May 17, 1966, beginning at the north end of the deck. Figure 2 shows the first prepared area in the northwest corner of Span 3 just before wetting with water and application of the Speed Crete mixture, and the finished patch about five hours after placement and four hours of traffic.

A patched area about 2-ft square and 1-1/2-in. deep was placed along the center construction joint at the south end of Span 1 and smaller patches along the steel expansion dam over Pier 2. A large deeply scaled and spalled area near the east curb toward the north end of Span 3 was patched with about five bags of Speed Crete. The prepared area is shown in Figure 3. The bottom 1-1/2 in. was filled with three bags of a mixture containing 25 lb of pea gravel to a 50-lb bag of Speed Crete. The top inch was filled with straight Speed Crete mix. A total of about nine bags of Speed Crete was hand mixed in a wheelbarrow and placed in the various patches. All patches were cured with a spray application of clear membrane curing compound.

To date all patches appear to be sound but a close inspection will be made next spring to record the first winter performance.

South Pennsylvania over NYC RR, Lansing

The last of the four test areas to be mentioned was placed on July 27, 1966, by Lansing DPW forces supervised by CMP and Holmes Associates personnel. One large and one small patch were placed near the east curb toward the north end of the structure. The prepared areas were etched with muriatic acid and flushed with water prior to patching. About six or seven bags of Speed-Crete were hand mixed and placed in the two patches. The larger patch contained some pea gravel in the mixture in the bottom portion of the 1-1/2 in. depth. To date the patches appear quite sound except for a small hollow region at the eastern end of the larger patch. The completed patches are shown in Figure 4 after about 1-1/2 months of traffic.

These four test areas will be closely followed through this winter and a detailed inspection report made next spring.

OFFICE OF TESTING AND RESEARCH



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MGB:jk

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Figure 1. Chipped and pre-wet area before Speed Crete placement (top), and after shaving off excess material and rubbing with wet sponge (bottom). Sidewalk patch on N. Washington Ave., Lansing (4-29-66).



Figure 2. Spalled area over high steel after chipping (top), and after about four hours of traffic (bottom). The patched lane was closed for one hour after placement. Northwest corner of passing lane, US 127 bridge over NYC RR, north of Jackson (5-17-66).

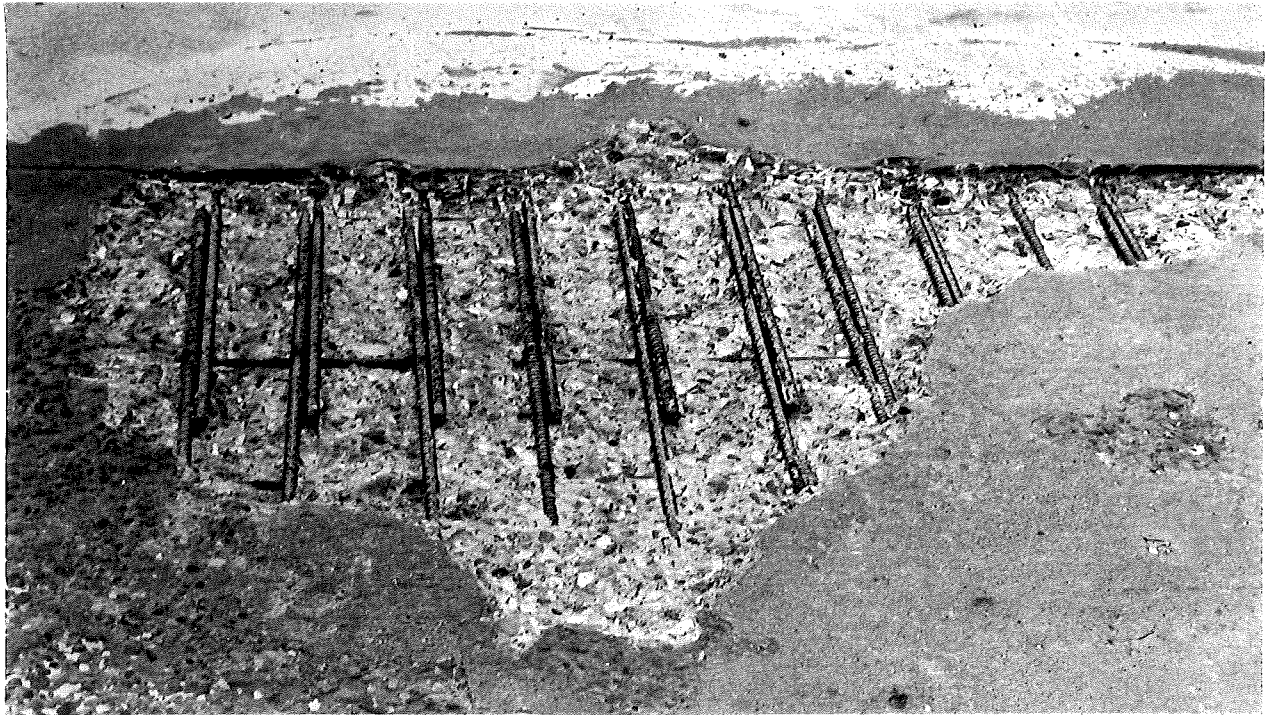


Figure 3. Deeply scaled and spalled area prior to patching near east curb of Span 3 on US 127 bridge over NYC RR, north of Jackson (5-17-66).



Figure 4. Two patches near east curb, toward north end of S. Pennsylvania structure over NYC RR, Lansing (9-8-66).