Prefabricated Neoprene Joint Sealer

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January 16, 1950

Memorandum to: Mr. L. E. Gregg
Associate Director of Research

Subject: Prefabricated Neoprene Joint Sealer

On November 18, 1948, the assembly of joints with prefabricated neoprene sealers was demonstrated by representatives of the Lastite Joint Company, 105 W. Madison Street, Chicago 2, Illinois, on the construction project on U.S. 27, about 5 miles south of Alexandria. Installation was not possible at that time due to the fact that the contractor was temporarily without cement.

Installation was made on November 30, 1948, under the supervision of a representative of the company. This installation was not completely satisfactory due to the inexperience of the paving crew with this type of joint. The joint at Station 622422 was knocked askew by the finishing machine and makes an angle of about 20° with the vertical at one end (See Fig. 1). Another of the joints has an offset at the center of the joint, the cause of which is not known (See Fig. 2). The third joint resulted in a placement where the depth of the rubber with respect to the pavement surface varies, probably due to finishing difficulties and setting of the joint.

At the time of the installation of these joints, holes were left in the concrete providing for placement of measuring plugs and a thermometer well. These were set with mortar several days after the concrete was poured. Brass measuring plugs were used with tips in a recessed head and a short length of copper pipe closed with a rubber stopper formed the thermometer well. The measuring plugs were placed in pairs on either side of all three joints and the comparison joint. The thermometer well was placed about two feet from the edge in the center of one of the slabs.

During the time since the joints were installed, periodic inspections and measurements have been made. The measurements have been made under temperature conditions varying from the heat of summer to mild winter weather. (So far none has been made in freezing weather). Results of measurements tabulated in Table I show that variations in joint width are slight due to temperature alone. Readings covering the period from February 1949 through September 1949 show a progressive closing of the neoprene joints of .001 to .003-inches per month while the test joint containing hot poured rubber-asphalt sealer for comparison (at Sta. 622482) opened about .005-inches the first three months and has continued to open at an increasing rate.

Between September 1949 and December 1949 a sudden opening has been noted averaging about .030-inches for the three months period; and the comparison joint has opened .083-inches over the same period.

The inspection of September 27, 1949, revealed that spalling had developed at all three experimental joints having the neoprene sealers. There had been no evidence of this on the previous inspection May 25, 1949.

Spalling on the Number 1 joint at Station 622422 was to the depth of the neoprene seal exposing the entire south face of seal for approximately 75 per cent of the width of the west lane and extending past the center line over slightly...
into the east lane (See Fig. 3).

Spalling on the Number 2 joint at Station 622442 was very slight consisting of an area of about six inch radius in the corner on the west side.

At joint Number 3, Station 622462, spalling occurred about 3- to 4- inches south of the joint over an area roughly three feet long and 6- to 8- inches wide parallel to the joint.

No evidence of spalling can be found at the comparison joint in this project. Hence, it must be concluded that the spalling is in some measure the result of the installation of the prefabricated joints.

The last inspection was made on December 30, 1949, and it revealed with regard to the spalling that the Number 1 joint had been patched with a bituminous mix by maintenance forces. This was probably necessary due to the deep nature of the spalled area on a section of the road where vehicular speeds are high. However, spalling is continuing and now extends on all sides around the patch (See Fig. 4).

Joint Number 2 showed only a slight increase in the small spalling area at the west edge of the slab.

At joint Number 3 the spalling in the west lane had enlarged as compared to its size at the time of the September inspection, and in addition some similar spots had begun to develop in the east lane as shown in Figure 5.

Indications are that this is a progressive condition, and that there will be more of it noticeable at the time of future inspections.

In criticism of these joints it must be said that there is the above-mentioned evidence of early failure of this experimental section, while there is no indication of similar failure at any other joint in the several miles checked on either side of the experimental joints.

In defense of the joints it can be pointed out that these are load transfer joints while all the other joints with which comparison is made are weakened plane type without load transfer. Furthermore, as was pointed out earlier, installation of the joints was not accomplished satisfactorily.

Allie C. Peed, Jr.
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Assistant Research Engineer
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Figure 1. West end of joint at Station 622+22 showing placement of joint which was knocked over by the finishing machine.
Figure 2. Close-up of center of joint at station 622+42. Note that the neoprene sealer does not form a continuous seal.
Figure 3. View of severe spalling condition found at Station 622+22 on September 27, 1949.
Figure 4. Condition of joint at station 622+22 on December 30, 1949. Spalling is continuing beyond the boundaries of the bituminous patch with which it was repaired earlier.
Figure 5. Joint at Station 622+62 showing spalling areas developing in both lanes. This is condition on December 30, 1949. Inspection in September showed only a small spalling area in the far lane.