

MICHIGAN
STATE HIGHWAY DEPARTMENT
Murray D. Van Wagoner
State Highway Commissioner

FIELD STUDY OF JOINT SEALERS

By

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Research Project 36 G-4(2)

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Testing and Research Division
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On September 30, 1940, the experimental joint sealers on M-153 as described in the report of September 12, 1939, were examined by J. W. Kushing and G.A. Mansfield. The sealers were studied with emphasis on their relative sealing ability and apparent resistance to weathering and traffic.

Barrett Capping Compound - stations 15+00 and 16+00. At both stations it was found that the joints were open practically the complete length. The material was much harder than when placed and was crumbled quite easily. This observation bears out the conclusions made after two weeks from the date of placement.

Barrett Tarvia Plastic - station 17+00. Material was open at both sides of joint resulting in an ineffective seal. This material was softer than the Barrett Capping compound and possessed only a small degree of suitable characteristics superior to the capping compound.

Owen Laboratories Sealer - stations 18+00 and 19+00. A large amount of the sealer at these joints had disappeared. The material in place was easily crumbled and there was no adherence to the concrete.

Genasco G-360 - stations 20+00 to 25+00 inclusive. The material had hardened considerably and presented a cracked surface in weathering. The joints appeared to be about 80% sealed at this time.

Genasco G-8 - stations 26+00 to 31+00 inclusive. This material seemed to provide a better seal than the G-360 giving about 95% effective seal

along the joint. The material was harder than when placed and had settled down from the surface of the pavement. There were indications that the material was shoved out of the joint to some extent during warm weather.

Rubber Associates Thermoplastic No. 52144 - stations 32+00 to 38+00 inclusive. Two of these joints showed rather satisfactory sealing, but the material did show insufficient adhesion, with surface cracks in the material which would allow infiltration of water. The failure is caused by the soft grade of material seeping along the premolded filler and also being carried by traffic leaving insufficient material for a proper seal.

Rubber Associates Joint Lok - station 39+00. Only 50% of the material was found in place and the surface of the material still in place was badly weathered and very crumbly. There was no adherence of the material to the concrete.

Rubber Associates Thermoplastic No. 53039 - stations 40+00 to 46+00 inclusive. These joints varied as to efficiency of seal but on a whole could be called fairly satisfactory. In some cases, the material was not thick enough and did not possess sufficient elasticity to completely seal the joint. This material has a tendency to be spread by traffic on the concrete adjacent to the joint but the semi-firm grade material proves a more effective sealer than No. 52144.

50% Thermoplastic No. 52144 and 50% Thermoplastic No. 53039 - stations 47+00 and 48+00. The remarks for Thermoplastic No. 53039 apply to this mixture.

90% MOA and 10% Thermoplastic No. 53039 - stations 39+00 to 56+00 inclusive. These joints were particularly bad from the standpoint of seal and it appears that such a small addition of the thermoplastic compound is not effective in improving the qualities of the MOA.

90% MOA and 10% Thermoplastic No. 52144 - stations 57+00 to 64+00 inclusive. The remarks for the addition of No. 53039 apply equally as well to this mixture.

90% TP-2 and 10% Thermoplastic No. 52144 - station 65+00 to 70+00 inclusive. There was a slight improvement in the use of TP-2 with the thermoplastic over MOA, but not sufficient to warrant it being called even a fair sealer.

90% TP-2 and 10% Thermoplastic No. 53039 - station 71+00 to 76+00 inclusive. No improvement in the use of No. 53039 over No. 52144.

SOA - stations 77+00 to 101+00 inclusive. Practically all of the sealer had disappeared in one year.

CFA - stations 102+00 to 161+00 inclusive. At the temperatures at the time of year which this survey was made, the material was open on both sides of the joint. This material may be satisfactory seal at warmer temperatures when kneaded into the joint opening by traffic, but with lower temperatures it cracks, possessing little elasticity.

MOA - stations 162+00 to 188+00 inclusive. This material has been used for some time by the Michigan State Highway Department. Its character-

istics have not been satisfactory and the results in this instance where most of the material had disappeared does not recommend it for a joint sealer.

TP-2 - stations 189+00 to 247+00 inclusive. Although this material possesses slightly better adhesion qualities than MOA, it is hard and semi-brittle with no effective seal.

Oil-Latex Sealer - stations 248+00 to 276+00 inclusive. Although in the majority of cases this material provided a fair to satisfactory seal, the results were not as good as have been obtained on other experimental projects. It is apparent that a sufficient amount of the material must be used in order to obtain a completely satisfactory seal.

CONCLUSIONS

All of the materials were subjected to the climatic changes of an annual period. It was possible to determine the ineffectiveness of some of the materials at very early ages. On the basis of failure of adhesion at low temperatures and seepage along filler at high temperatures it is necessary to eliminate a number of the materials. As was indicated by the results of earlier surveys, the following materials showed favorable characteristics as a joint sealer:

1. Genasco G-360
2. Genasco G-8
3. Rubber Associates Thermoplastic No. 53039
4. Oil Latex Sealer

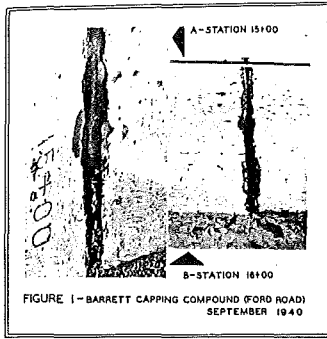


FIGURE 1 - BARRETT CAPPING COMPOUND (FORD ROAD) SEPTEMBER 1940

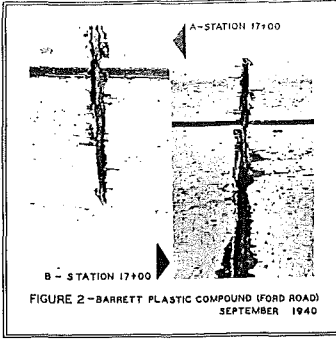


FIGURE 2 - BARRETT PLASTIC COMPOUND (FORD ROAD) SEPTEMBER 1940

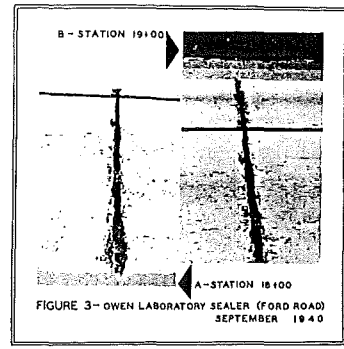


FIGURE 3 - OWEN LABORATORY SEALER (FORD ROAD) SEPTEMBER 1940

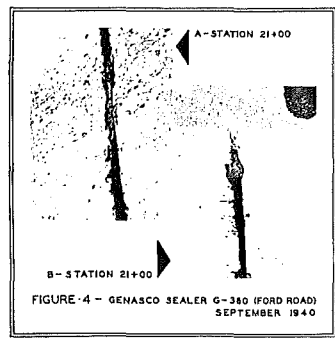


FIGURE 4 - GENASCO SEALER G-380 (FORD ROAD) SEPTEMBER 1940

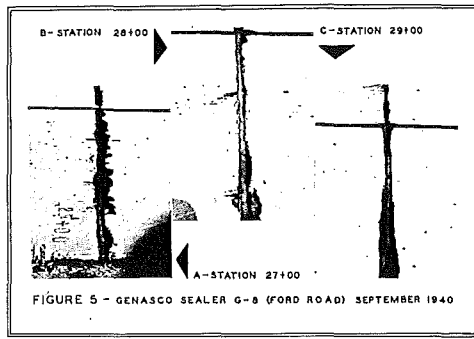


FIGURE 5 - GENASCO SEALER G-8 (FORD ROAD) SEPTEMBER 1940

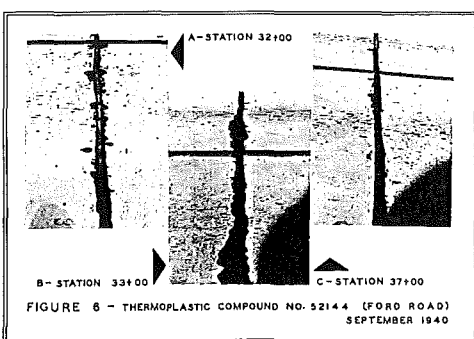


FIGURE 6 - THERMOPLASTIC COMPOUND NO. 52144 (FORD ROAD) SEPTEMBER 1940

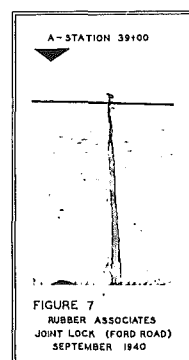


FIGURE 7 - RUBBER ASSOCIATES JOINT LOCK (FORD ROAD) SEPTEMBER 1940

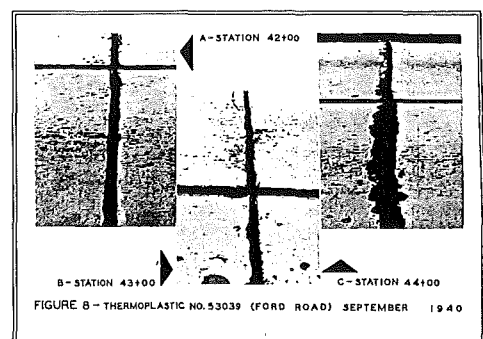


FIGURE 8 - THERMOPLASTIC NO. 53039 (FORD ROAD) SEPTEMBER 1940

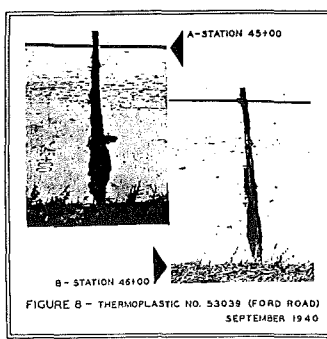


FIGURE 8 - THERMOPLASTIC NO. 53039 (FORD ROAD) SEPTEMBER 1940

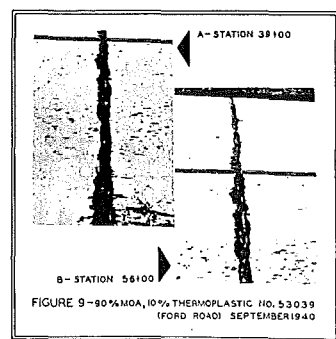


FIGURE 9 - 90% MOA, 10% THERMOPLASTIC NO. 53039 (FORD ROAD) SEPTEMBER 1940

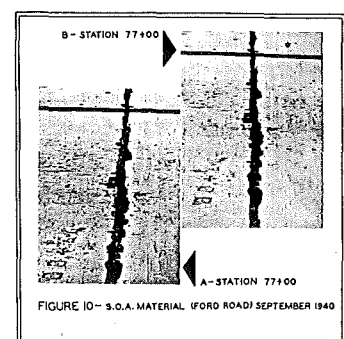
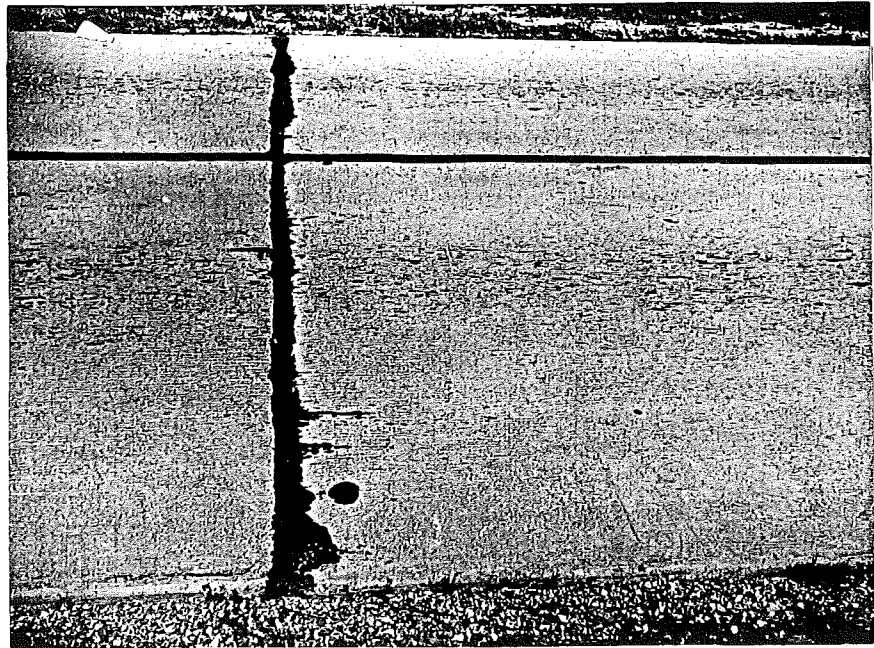
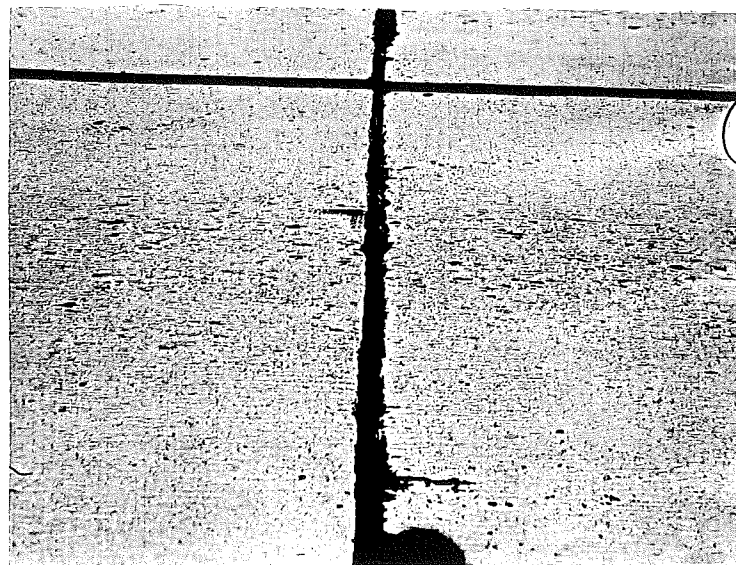


FIGURE 10 - S.O.A. MATERIAL (FORD ROAD) SEPTEMBER 1940

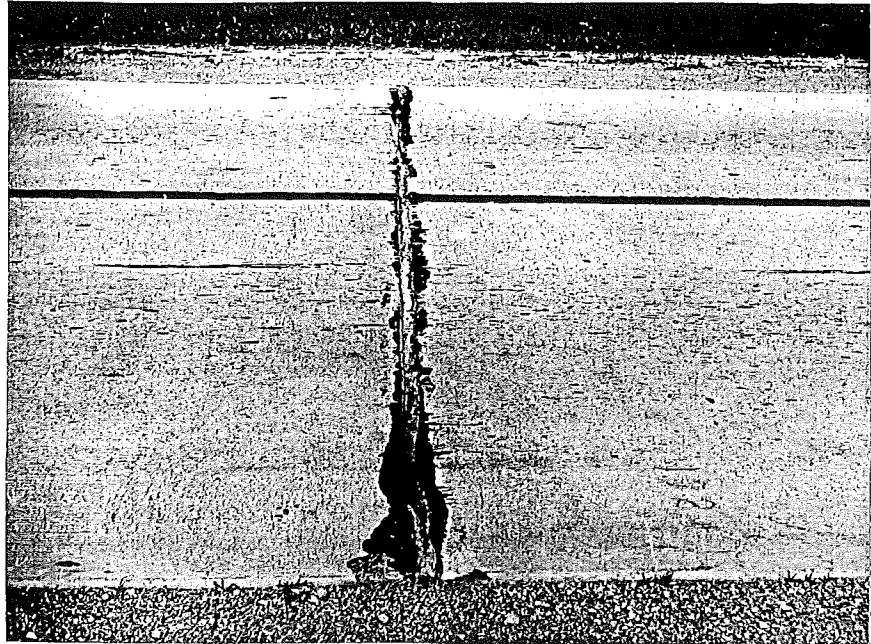


A - Station 115+00



B - Station 115+00

Figure 11 - C.F.A. Material (Ford Road) September 1940

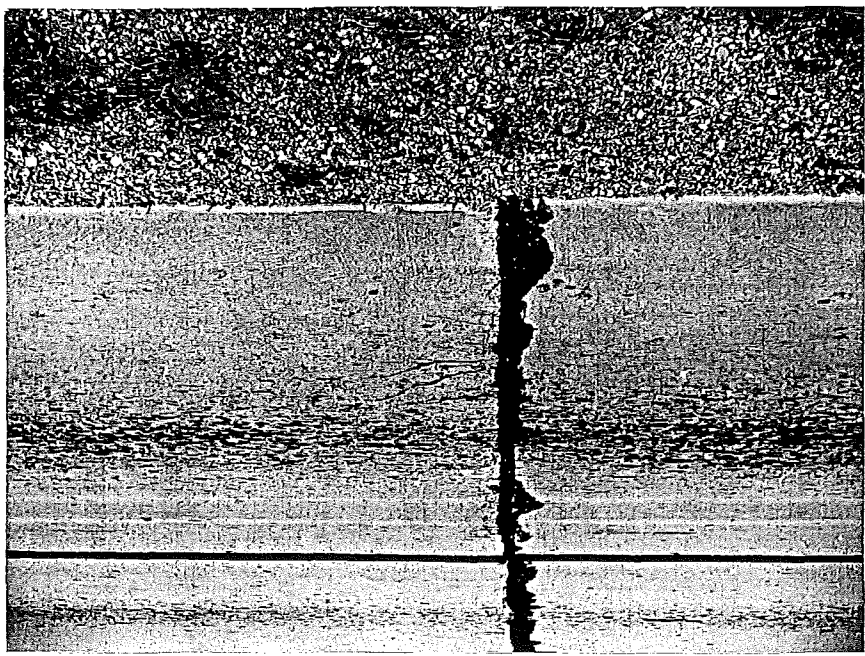


A - Station 172+00



B - Station 172+00

Figure 12 - MOA Material (Ford Road) September 1940



A - Station 196+00



B - Station 196+00

Figure 13 - T.P.-2 Material (Ford Road) September 1940



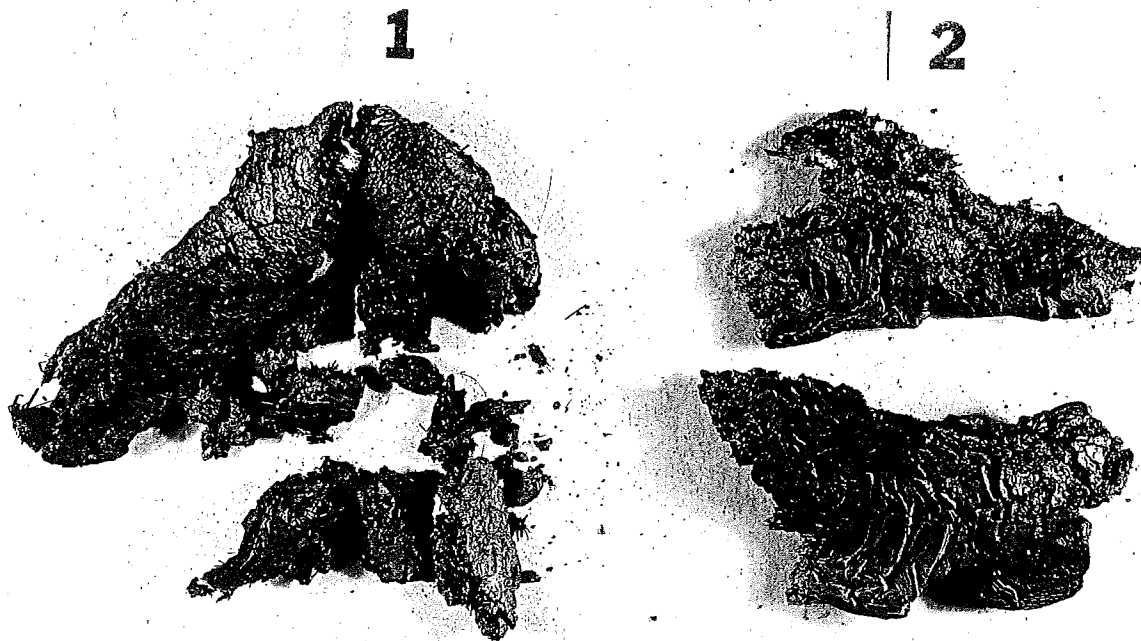
A - Station 272+00



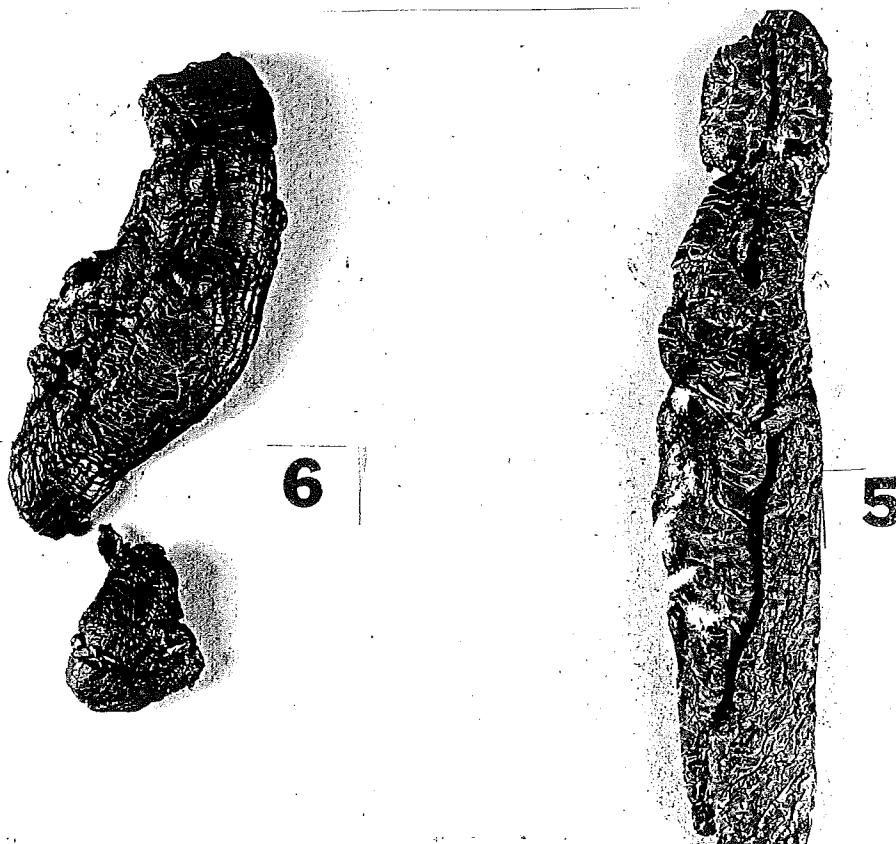
B - Station 273+00



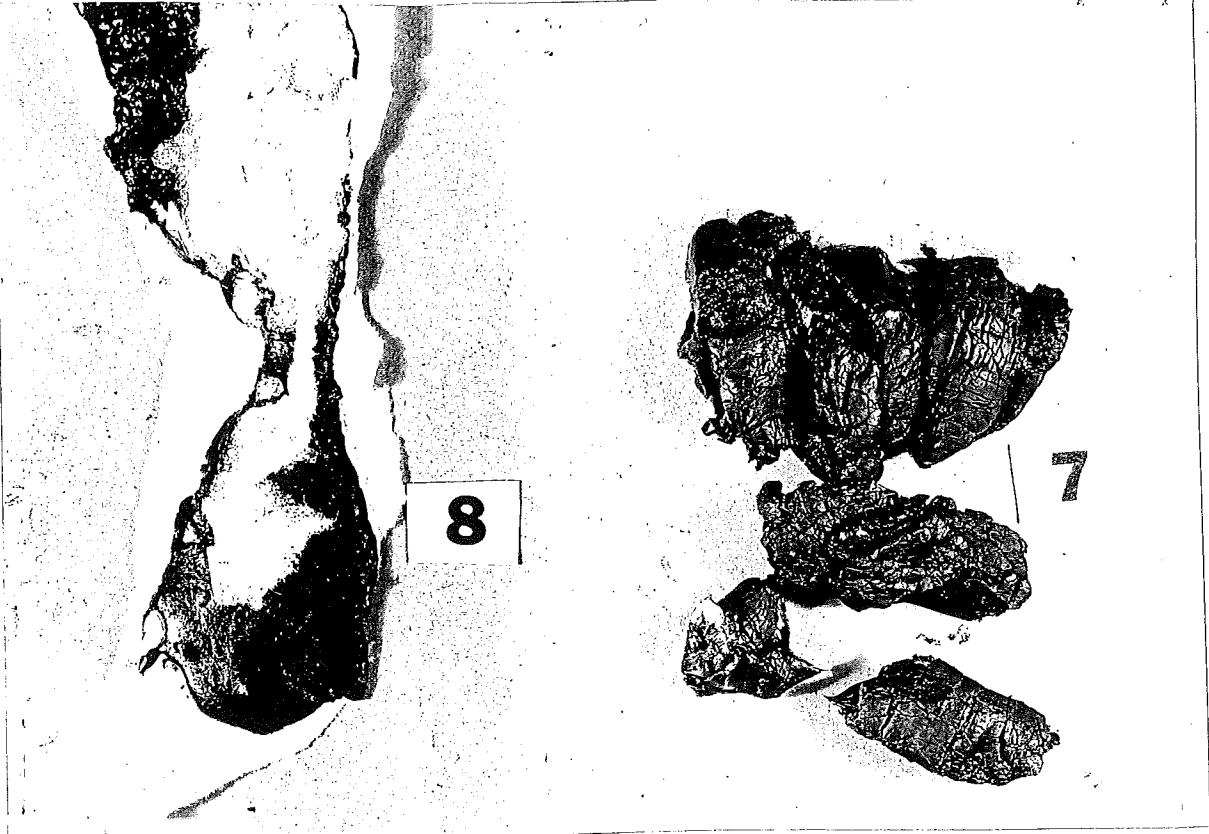
C - Station 274+00



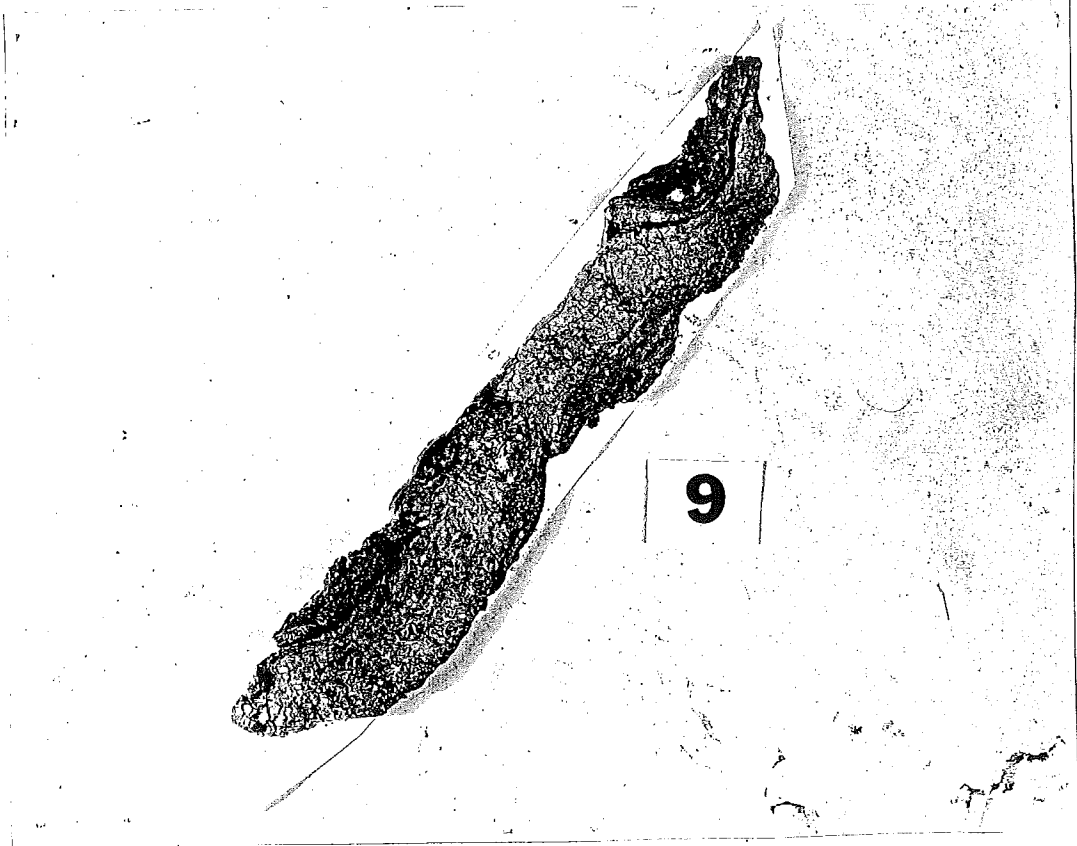
A - No. 1 Barrett Capping Compound, station 15+00
 No. 2 Barrett Plastic Compound, station 17+00



B - No. 5 Genasco G-360, station 21+00
 No. 6 Genasco G-8, station 27+00



A - No. 7 C.F.A. material, station 115+00
No. 8 Thermoplastic No. 52144, station 32+00



B - No. 9 Thermoplastic 53039, station 45+00

Figure 16 - Condition of joint sealers (Ford Road) September 1940

It was definitely indicated in this survey that any joint filler which is easily and permanently extruded from the joint will impose severe requirements on a joint sealer. It is very doubtful if any satisfactory seal can be obtained unless a non-extruding type filler is used. In most cases, it is necessary that the joint filler be at least one inch from the top of the pavement in order that a sufficient amount of sealing material can be placed.

Because of the promising properties above average which the oil-latex mixture showed in this study, the Research Division of the Michigan State Highway Department has made further study of this material to improve its characteristics. Particular attention was given to its mixing and settling characteristics to insure a sufficient amount of time for pouring. A formula has now been determined and the material has been placed as a seal on fibre filler joints. It is believed that in new construction, a very much more effective seal can be obtained because of the cleanliness of the concrete which will insure satisfactory adhesion.

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