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STUDY OF PREMOLDED RUBBER BASE PLATE FOR JOINTS

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Samples of black vulcanized rubber stock were received by the Research Laboratory on March 24, 1954 from Servicised Products Corporation for evaluation of this material as a possible substitute for metal in joint base plate applications.

The material was a semi-hard rubber with a Shore A hardness of 96. The Shore A scale is a linear scale on which tire treads measure about 60 to 65 and tire inner tubes approximately 35 to 45.

Physically the material appeared suitable for use as base plate but the question arose whether serious deterioration of the rubber might be caused by soil microorganisms. As a result, soil burial tests were run on the material with specimens being buried in rich garden soil for periods up to one year. The results of these soil burial tests indicated that no serious deterioration of the rubber occurred.

Materials and Methods

Six 0.090 by 8 by 8-inch samples of the rubber stock were used in the test. Forty-two tensile specimens were prepared from these slabs and divided into 14 sets of three specimens each. One set was stored in the laboratory for natural aging on March 24, 1954 and one set was tested by the Detroit Testing Laboratory, Inc. for original tensile properties on March 29, 1954. The remaining twelve sets were buried in rich garden soil on April 14, 1954 by Mr. C. San Clemente of the Bacteriology and Public Health Department of Michigan State College.

The soil burial samples were placed in rich garden soil in loosely cov-

ered 1-quart jars with three specimens (one set) in each jar. The jars were stored in an incubator at 37 C (98.6 F). Moisture, which was lost from each jar at the rate of about 1 gram per day, was replaced once a week. One set of samples was removed from soil burial each month and sent to the Detroit Testing Laboratory to be tested for tensile properties.

When the final soil burial specimens were tested after 12 months, the natural aging specimens were tested at the same time in order to determine whether any deterioration in physical properties at that time was attributable to something in the soil or to normal deterioration from age.

Results and Conclusions

The results of the tests are indicated in Table I. The tensile strength increased and the elongation at break decreased with age in both the natural aging specimens and in the soil burial specimens. The decrease in elongation was greater for the specimens in soil for 12 months than for those naturally aged for the same length of time. Also, the naturally aged specimens were not as hard as either the original or the soil burial specimens. These differences are not considered particularly serious.

Since no serious deterioration of the rubber stock was apparent after 12 months of contact with rich garden soil, a very nutrient medium for soil microorganisms, such material is probably capable of remaining in contact with highway subbase soils for relatively great lengths of time without deterioration due to attack by soil microorganisms.

While this study shows no significant adverse effects from burial in soil, specimen joint assemblies employing this material should be made up for experimental installation in a concrete pavement to test practical features of handling and installation before final judgment is passed on its suitability for the purpose.

TABLE I

PHYSICAL PROPERTIES OF PREMOLDED RUBBER BASE PLATE
AFTER SOIL BURIAL

	Tensile Strength, psi	Percent Elongation at Break	Shore A Hardness
Original Properties	1150	126	96
Properties after soil burial - months			
1	1195	80	96
2	1250	103	97
3	984	87	96
4	1090	100	97
5	1446	93	95
6	1340	65	96
7	1553	40	99
8	-	-	-
9	1568	38	99
10	1597	33	96
11	1596	38	96
12	2783	27	97
Properties after 12 months of natural aging	2190	70	88