OFFICE MEMORANDUM

MICHIGAN
STATE HIGHWAY DEPARTMENT
JOHN C. MACKIE, COMMISSIONER

April 16, 1962

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

From: L. T. Oehler

Subject: Woven Asbestos Sheet Packing for Bridge Post Pads.
Research Project 62 NM-67. Report No. 382.

At the February 6, 1962, meeting of the Committee for the Investigation of New Materials, the use of woven asbestos sheet packing as bridge post pads was discussed under new business and assigned to the Research Laboratory for determination of its equivalence to Fabreeka, the rubber-impregnated cotton-fiber pad material now being used. A sample of the woven asbestos sheet packing material submitted to the committee by A. W. Reinhardt of the Detroit Gasket Manufacturing Co. was forwarded to the Laboratory on February 7.

Fabreeka is not mentioned or specified in the Standard Specifications for Road and Bridge Construction, the Road and Bridge Construction Manual, or the Compiled Supplemental Specifications, but it is specified on the Bridge Design Standard Plans for both steel and aluminum railings and posts. It is used as an alternate for sheet lead under steel posts, both materials being intended as fillers to absorb irregularities and to improve contact between the post base plate and the concrete. Fabreeka is also used under aluminum alloy posts, both as a filler and to prevent possible chemical action between the aluminum and alkalies in the concrete by separating or insulating the post from the concrete.

Laboratory tests were designed to determine the relative merits of the woven asbestos and the currently specified materials, as fillers and insulators. The tests were conducted and reported by H. Brunke.

Filler Tests

Compression load tests were conducted on samples of sheet lead, Fabreeka, and woven asbestos to evaluate them as fillers or bearing pads. In each test, a layered sample of six sheets of one pad material was tested, each sheet having a thickness of approximately 0.14 in. and a bearing area of 1.0 sq in. Two six-sheet samples were tested for each of the three materials. A seating load of 100 lb was applied to the sample in each test. Average load deflection curves for the two samples of each material are shown in Fig. 1.

The curves show that the loads needed to compress the materials 25 percent of their thicknesses would be 6700 lb for woven asbestos, 3300 lb for sheet lead, and 1100 lb for Fabreeka. Since maximum load conditions are on the filler material under the anchor bolt nut, this will be considered the critical area. Assuming the load is transferred from the nut through the washer and base plate on a 45° angle, the maximum bearing load on the filler material at the yield stress of the anchor bolt would be approximately 5700 lb for the steel and 6200 lb for the aluminum railing posts. Thus, the load needed to compress woven asbestos 25 percent of its thickness was greater than the load required to develop the yield stress of the anchor bolt. By contrast, this load is much less for the sheet lead and Fabreeka materials. Assuming a criterion of 25-percent reduction of thickness, the woven asbestos would not be equivalent to Fabreeka as a filler pad.

Insulator Tests

Woven asbestos and Fabreeka were also tested for water absorption, since to be effective chemical barriers they must have low water absorption properties. Samples of the two materials were immersed for 72 hr in a water solution containing 2 percent sodium chloride, an approximate representation of existing seasonal conditions on bridge concrete. Average absorption of the water solution in percent by weight after the 72 hr was only 2.5 for the Fabreeka, but was 31.3 for the woven asbestos.

Conclusions

The laboratory tests designed to evaluate the merits of the woven asbestos sheet packing, in light of its two functions as a pad beneath bridge railing posts, indicate that it does not fulfill these functions as well as sheet lead or Fabreeka for steel posts, or as well as Fabreeka for aluminum posts.

OFFICE OF TESTING AND RESEARCH

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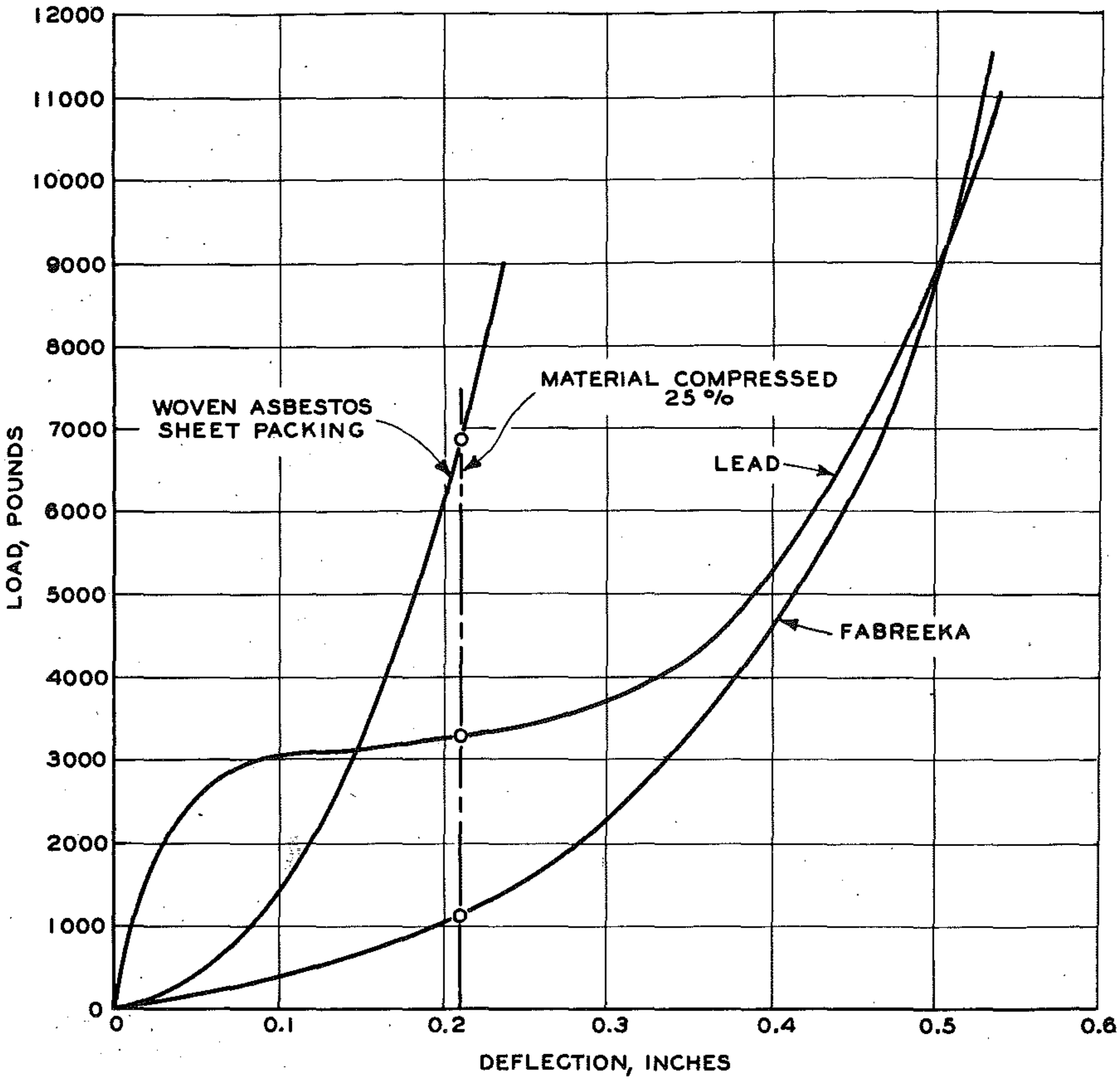

Figure 1. Load-deflection curves.