

OFFICE MEMORANDUM



MICHIGAN

STATE HIGHWAY DEPARTMENT

June 22, 1965

To: W. W. McLaughlin
Testing & Research Engineer

From: E. A. Finney

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Subject: Metal-Fiber Joint-Forming Material. Research Project 63 NM-102.
Research Report No. R-528.

At the May 18, 1965 meeting of the Committee for the Investigation of New Materials, Item 12 under "Old Business" concerned the subject material. It was decided that a study should be made to determine whether this material meets current specifications, and if so, that the Committee would recommend to the Office of Design that it be approved as an alternate.

Briefly, previous action on this New Materials project is as follows: on July 30, 1963 the Committee approved an experimental project where metal-fiber joint material was to be used to form all contraction joint grooves. On March 12, 1964 the Research Laboratory submitted a proposal outlining the experimental project and proposed supplemental specifications for transverse joints in concrete pavement. These supplemental specifications were required to modify existing specifications applicable at that time so that this material could be used. Although specifications for joints in concrete pavement have changed in some details since March 1964, the major items needing modification in current specifications to permit the use of this material are as follows:

1. The premolded fiber filler currently specified (Supplemental Specification of 6-8-65) must meet requirements of Article 7.16.03-a-3 of the Standard Specifications. This calls for a bituminous premolded filler. The Pavement Specialists, Incorporated (PSI) filler is non-bituminous.
2. A 1/4 by 2 in. premolded filler is specified. The PSI filler would have to be 1/4 by 2-3/4 in., since the lower 1-in. portion (encased in a 26-gage galvanized steel cap in order to stiffen the filler and make a straight and aligned section across the 24-ft width of pavement) is not removed in forming the joint groove.
3. The PSI insert requires machine placing.

In summary, this metal-fiber joint-forming material does not meet specifications. However, in our opinion, the exceptions to specifications are not of such a nature as to result in an inferior installation. Certain advantages of this type filler, such as machine placing and filler strip alignment for the entire transverse width of 24 ft, should enhance the possibilities for improved joint groove construction.

W. W. McLaughlin

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Attached are "Proposed Supplemental Specifications for Transverse Joints in Concrete Pavement," updated from the March 1964 draft to conform to present requirements, but permitting the use of this material. These specifications may be used if it is decided to permit this type of joint groove construction on an experimental project.

OFFICE OF TESTING AND RESEARCH



E. A. Finney, Director
Research Laboratory Division

EAF:LTO:nl

Attachment

PROPOSED SUPPLEMENTAL SPECIFICATION
FOR TRANSVERSE JOINTS IN CONCRETE PAVEMENT
(Metal-Fiber Joint-Forming Filler)

Description

The construction of transverse joints in concrete pavement shall conform with the requirements of the 1965 Standard Specifications for Road and Bridge Construction except as otherwise specified herein and as shown on the plans.

The plane of weakness at all contraction and construction joints shall be formed by the use of a non-bituminous fiber filler, partially encased in a metal cap.

The joint grooves shall be sawed to the dimensions specified in Fig. 1.

Materials

The filler shall be a non-bituminous premolded filler, manufactured from vegetable fiberboard, and treated with resin and alum for waterproofness. The moisture-free density of the filler shall be at least 15.3 lb per cu ft, and its tensile strength shall be a minimum of 150 psi. Moisture content, as shipped, shall be in the range of 5 to 9 percent by weight.

The metal cap shall be fabricated from 26 gage galvanized roll formed steel stock and shall encase the lower 1 in. of the filler.

Construction Methods

a. Forming Transverse Contraction and Construction Joints. - The plane of weakness at transverse contraction and construction joints shall be formed by use of a 1/4 by 2-3/4 in. non-bituminous premolded filler with the lower 1 in. encased in a metal cap, and the filler shall be installed with a power-driven mechanical joint vibrator.

After the passage of all the finishing equipment except for transverse floating and burlap drag, a horizontal groove coinciding with the transverse centerline of the load transfer assembly shall be formed in the fresh concrete with a mechanically vibrated metal bar. Two lengths of the non-bituminous filler, joined in the center with a metal clip, shall be installed in the groove and vibrated into the concrete to proper depth and position specified. No end plates shall be installed but a vertical joint groove at each end of the joint extending from top to bottom of the slab and of the same width and depth as specified for the horizontal joint groove shall be formed by inserting plastic, premolded joint filler, or other non-swelling material of proper dimensions in the fresh concrete at the time the transverse plane of weakness is formed. The pavement surface shall then be finished by transverse floating and burlap drag. At no point shall the top of the installed filler be above the finished pavement surface. After finishing, the top of the filler shall be flush with, to a maximum of 1/4-in. below, the surface of the pavement, and the vertical centerline of the fillers shall be perpendicular to the pavement surface.

After the concrete has cured for seven days, a 1/2 by 1-3/4 in. deep joint groove shall be sawed symmetrically over the horizontal filler. The remainder of the horizontal filler shall be left in place. The vertical joint filler shall be completely removed.

Immediately following the sawing of the transverse joint groove, the slurry resulting from the sawing operation shall be completely removed from the joint and immediate area by flushing with a jet of water under pressure. The joint shall then be allowed to dry for at least 24 hours prior to cleaning and sealing.

b. Sealing Transverse Contraction and Construction Joints. - The transverse contraction and construction joints shall be prepared for sealing and sealed before traffic of any kind is permitted on the pavement according to "Supplemental Specifications for Joints in Concrete Pavement," (Sawed contraction joints), dated June 8, 1965.

Special Equipment and Joint Material

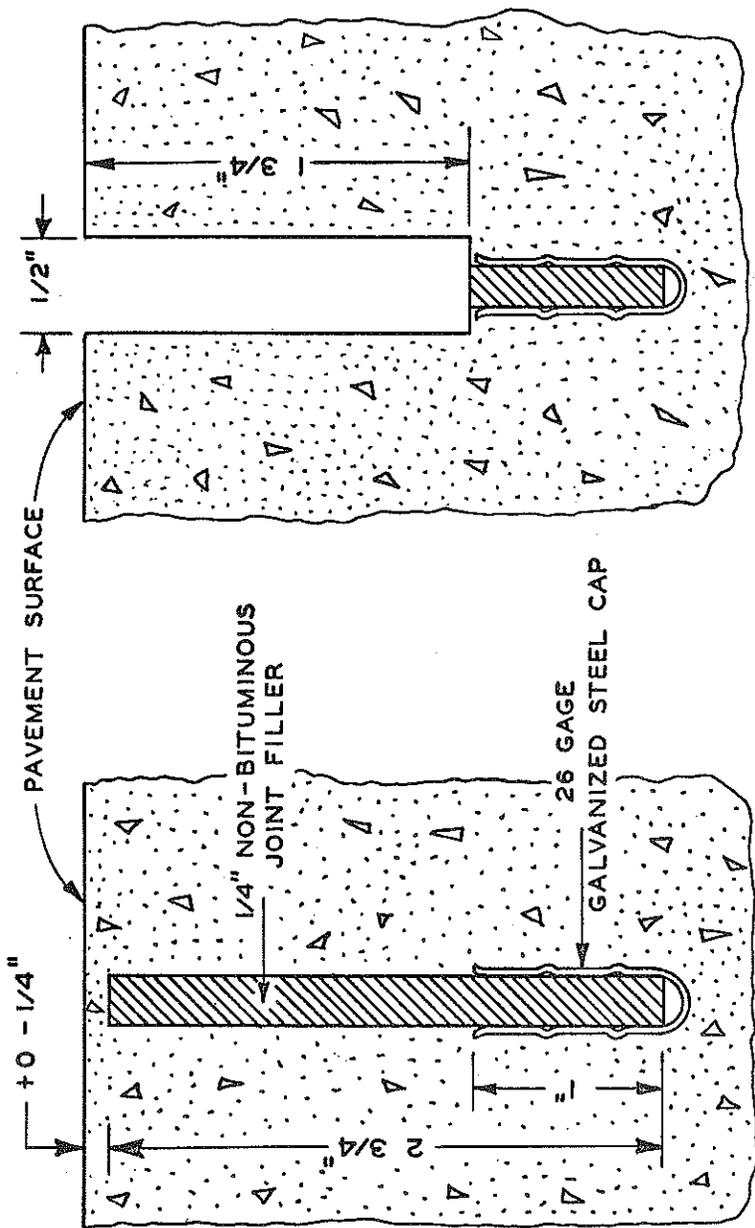
The joint vibrator for installing the non-bituminous premolded fiber filler shall be power-driven and suitable for installing the filler as recommended by the manufacturer. Any approved vibrator may be used. A joint vibrator for installing the filler may be rented from Pavement Specialists, Incorporated for approximately \$500 per month.

The manufacturer of the non-bituminous joint filler is the Pavement Specialists, Incorporated, P.O. Box 9613, Kansas City 34, Missouri.

The 1/4 by 2-3/4 in. non-bituminous filler, trade name PSI Metal Fiber Insert, is currently available from Pavement Specialists, Incorporated at a cost of \$0.0775 per lin ft. Metal clips for joining two lengths of filler are currently available at a cost of \$0.0275 per unit.

Method of Measurement and Basis of Payment

Transverse Contraction and Construction Joints will be measured and paid for in accordance with "Supplemental Specifications for Joints in Concrete Pavement" (sawed contraction joints) dated June 8, 1965.



CROSS SECTION
AFTER INSTALLATION

CROSS SECTION
AFTER SAWING

Figure 1. Cross section of installed filler and sawed joint groove.