



ICE MEMORANDUM

MICHIGAN

DEPARTMENT OF STATE HIGHWAYS

February 1, 1971

To: L. T. Oehler
Engineer of Research

From: F. J. Bashore

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Subject: Low Density Polyethylene Foam for Pressure Relief Joints.
Research Report No. R-764. Research Project 69 NM-230.

We have made condition surveys of four installations of polyethylene foam pressure relief joints in Wayne County. These installations were made by Wayne County Maintenance personnel with technical assistance from the Dow Chemical Company. Three of the installations were made to prevent damage to bridge structures and the fourth to prevent potential pavement blow-ups. All joints were sawed to approximately four inches in width and foam planks of two inch nominal thickness were used as filler, except for the Middlebelt Road installation where the now available 4 inch thickness was used. The following observations were made July 7, 1970:

Conner Avenue at SB Structure over I-94, S04 of 82025.

Joints were constructed on both sides of this structure in 1969. The north joint averaged 3.2 inches in width and the south averaged 2.9 inches in width compared to the original widths of about 4.3 inches. Some deterioration of the bituminous cap was observed at the joint grooves. Significant gaps were evident where foam planks were butted together.

North Bound Schaefer at Structure near Ford Gate #10, S01 of 82091.

Joints were installed north and south of this structure in 1969. They have closed from the original 4 inches to widths ranging from 2.3 to 1.4 inches. The greatest variations in widths between adjacent slabs were found in the joint north of the bridge. Faulting of about 1/2 inch was observed at both joints.

Installation was made with 2 inch thick strips custom cut on the job to improve ease of installation. These were laminated horizontally with Dow #11 Latex Mastic. The top layer was trimmed to conform to the pavement surface. This thin layer has delaminated in some areas and has come out of the joint.

Gratiot Avenue at Structure over I-94, S01 of 82025.

This 1970 installation is unique in that a concrete strip was placed about 1 foot each side of the joint to support the polyethylene since there was a bituminous cap in this area and previous experience had shown that this did not work satisfactorily since it is too weak to properly support the polyethylene joint material. Since these joint grooves were uniform in width, two 2-inch foam planks were inserted vertically. These joints had closed to 3.5 inches and looked very good.

Middlebelt Road, 1/2 Mile South of Goddard Road.

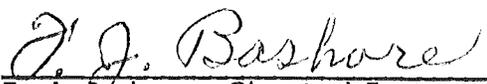
This pressure relief joint was installed in 1970 and averaged 3.8 inches in width when inspected. Seal lengths were not butted tightly leaving significant gaps.

Summary and Recommendations

While Research Laboratory personnel observed the installation of only the first joint installed on the south side of the Conner structure over I-94, the following general comments based on information from Wayne County and Dow personnel can be made:

1. The primary difficulty in making the insertion of the foam filler results from having to compress the foam excessively. If the filler is the same or only slightly wider than the groove, installation using a lubricant is relatively easy. The use of Dow #11 Latex Mastic was reported to function well as a lubricant during insertion and to act as an adhesive to hold the material in place until the joint has closed enough to put the filler under permanent compression.
2. The problem of gaps between lengths of filler appears to be a problem of the mechanics of inserting the second length. By starting the insertion away from the butt joint and working toward it would tend to put the joint under slight compression.
3. In cases where the joint groove is somewhat irregular in width, the horizontal lamination technique is probably preferable. I would suggest that if a relatively thin layer is needed to properly fill the joint groove, that the thin section be placed in the bottom of the joint groove.
4. It is probable that occasional voids will occur between filler and joint groove faces because of variations in joint groove width or filler width. I suggest that these voids be filled with either the above mentioned latex mastic or a one-component calking compound, either polyurethane or polysulfide.

TESTING AND RESEARCH DIVISION


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