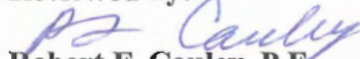
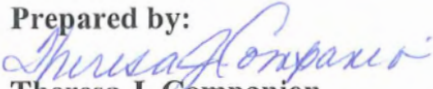


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RESEARCH UPDATE

U 1999-7

X.J.S. EXPANSION JOINT SYSTEM

REFERENCES:

Report WP 93-R-21, U1998-8

INTRODUCTION:

In 1997, the X.J.S. Expansion Joint System was installed on two expansion joints on Interstate 89, BR #72N in the City of Winooski, as part of the Winooski-Colchester IM-DECK (31) project. The joints at pier #1 and #2 were installed in two phases, with the easterly lane being placed on July 8, 1997 and the westerly lane on August 8, 1997.

PRODUCT DESCRIPTION:

The X.J.S. Expansion Joint is a system composed of a two-component silicone sealant placed between a polymer concrete nosing. The system, which is cold applied, is designed to provide a watertight, chemical-resistant seal to accommodate high traffic loads and remain pliable in cold and warm temperatures. At the time of installation, joints measuring 25.4 mm to 76.2 mm are designed to have an allowable expansion movement of 100 percent and an allowable contraction movement of 50 percent. Those between 76.2 mm to 101.6 mm have an allowable movement of 50 percent in both expansion and contraction.

The product was installed by a representative from Garvin Construction Products of Charlestown, MA, the regional supplier of the system. Assisting in the operation was a crew from A.D. Rossi, Inc. of St Johnsbury, VT, subcontractor for the project, who did the joint preparation (cutting and sandblasting). Cost of the complete system was \$104.23 per linear foot.

PERFORMANCE:

During an inspection on September 30, 1998, after the product had been in service for 13 months, minor damage to the polymer nosing appeared on the southern joint. Three D-shaped cracks formed on the outer edge of the nosing, each approximately 50 mm in length. The resulting chips could not be pulled out by hand and seemed to be held in place by the silicone sealant. The exact cause of the cracks was unknown, but was most likely due to snow plow abrasion or impact.

On September 7, 1999, Jim Davis, technical representative from Silicone Specialties Inc. and Materials and Research personnel inspected both joints. The southern joint had no further evidence of damage. In spite of the cracked nosing, the silicone sealant appeared to be intact through the entire length of the joint. The northern joint revealed a small puncture hole in the inner wheel path of the passing lane. The hole was the full depth of the joint sealant and approximately 10-20 mm long. A possible cause for the damage may be associated with a sharp stone or object puncturing the seal and continually pushing down through the material by traffic.

On October 28, 1999, Jim Davis, with the assistance of District Maintenance, repaired the damage to the northern bridge joint. Repair of the joint involved closing the lane to traffic. The area around the hole was cleaned of debris and then a small area of the existing joint sealant was cut away around the hole forming a V-shape at each end. The idea was to cut away any loose material and create more surface area for the new sealant material to bond to. The joint was then cleaned again with a brush and, in this case, the backer rod was not visible so a new section of backer rod was inserted (slightly longer than the opening) to hold the new sealant material. The repair sealant was applied with a caulking gun. Application began by filling the area between the backer rod and the existing sealant, ensuring a watertight seal. Then the remaining area was filled and tooled for a finished look. The material was left to set for 15 - 20 minutes before traffic was allowed over the joint.

Overall, the repair of the joint was simple and did not require any special tools or equipment. The time to repair the joint was approximately 15 minutes plus set up and breakdown time of the safety package.

SUMMARY:

Interstate 89 is one of Vermont's busiest corridors, with actual 1996 annual average daily traffic of 46600 at Exit 15 in Winooski. Consequently, expansion joints are exposed to high traffic volumes with heavy truck loads. After two years, the X.J.S. Expansion Joint System is performing well. Minor damage has occurred to both the northern and southern joints, yet ride quality has not been compromised. The repair of the northern joint has restored the watertight seal.

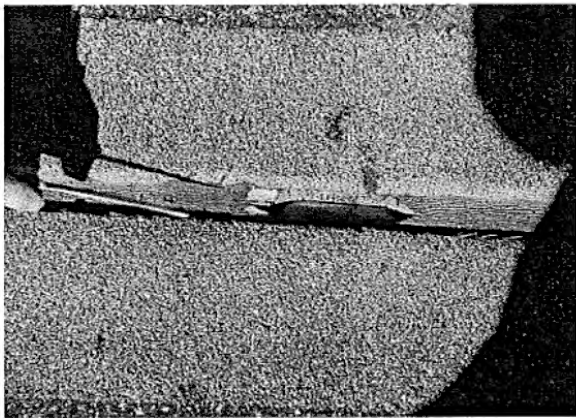
FOLLOW-UP:

The system will be inspected again next year after an additional expansion cycle and winter maintenance. A follow up examination of the repair will be a focal point of the inspection. An update report will follow.



Repair of X.J.S. Joint

Puncture hole in northern bridge joint (inner wheel path of passing lane)



Joint cleaned, V-shape cut out at each end of hole, backer rod installed.



Filled with joint sealant and tooled.