

MATERIALS & RESEARCH DIVISION

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Date: 09/12/95
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RESEARCH UPDATE

Number Update U95-10

SILICOFLEX STRIP SEAL JOINT SYSTEM

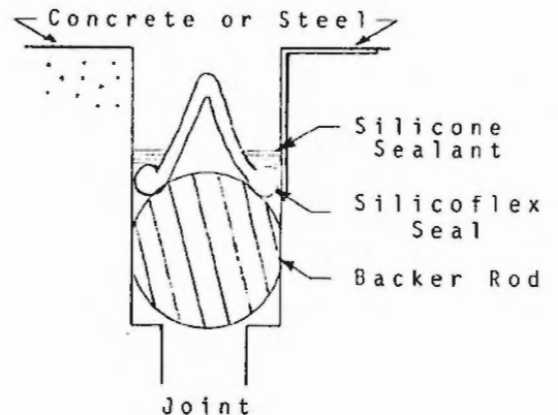
HISTORY AND JOINT DESIGN:

The bridge selected for the trial installation of the SILICOFLEX system is Bridge number 1 on the Berlin State Highway located between I 89 Exit 7 and US Rte 302. The 152' simple span curved girder bridge was constructed in 1974 on a 6% grade with a super elevation of 6.2%. The original joint at the upper abutment included at grade structural steel angle plates and a 5" by 5 5/16" neoprene seal designed for a 3" gap at 45°F. The 33' long joint is on a skew of approximately 20° and would be expected to have a maximum total temperature movement of 1 13/16". Within 10 years of construction, damage was recorded in the form of severe delamination of the A588 weathering steel girder ends beneath the joint due primarily to the leakage of deicing salt solutions. The neoprene seal which would typically compress to a 2 1/2" width during warm weather gradually developed a compression set and failed to return to its original dimension as the joint opened in the winter. Because a replacement neoprene seal would be expected to fail in the same manner, correction of the problem was limited to painting and greasing the rusted beam ends.

EXPERIMENTAL JOINT DESCRIPTION:

The SILICOFLEX system is a patented product which was developed by General Electric and R. J. Watson, Inc. The materials are available from Bridgesaver, Inc. 1801-A Willis Road, Richmond, VA 23237, Phone: (800) 448-3636, Fax: (804) 271-3074.

The SILICOFLEX strip sealing system consists of a preformed elastic strip seal which is extruded in a modified flat "V" configuration. The proper sized seal is squeezed together and inserted to the desired depth in the open joint. The light compressive force which holds the seal in place can be easily overcome to make any corrections for the proper depth. The seal is locked in place and made waterproof by extruding a liquid silicone sealant along both sides of the seal element. The sealant will bond to steel or concrete surfaces which have been cleaned properly. In most cases sandblasting is required to insure proper cleanliness.



INSTALLATION:

The original neoprene seal was removed on August 1, 1995. The new 3 1/2" seal was installed the next day by Vermont Agency of Transportation, District 6 maintenance forces with technical assistance by the manufacturer and Bridgesaver personnel. The contact area which had been blast cleaned was also wiped with a SILICOFLEX cleaner/primer. The installation included placement of the seal in the top and vertical face of the upper curb. Two splices were made by butting the strips and coating the ends with the locking sealant. The edges of the seals were recessed 2" while the center averaged 1" below the riding surface. Traffic was maintained on the adjacent lane during the short period required for the installation.

COST:

Current material costs are \$40.00 per lineal foot for the 3 1/2" seal and \$10.00 per caulking tube of sealant. A tube will cover 5' of joint for an overall material cost of approximately \$42.00 per lineal foot.

PRELIMINARY CONCLUSION:

The SILICOFLEX strip seal joint system appears well suited to replace a variety of compression seals and should be effective if the sealant bond is sufficient to resist displacement under the buildup of winter sand and other debris.

FOLLOWUP:

The SILICOFLEX system will be inspected at least annually during the winter months to determine its effectiveness and service life.