



On Thursday, October 11, 2012 MaineDOT Bridge Maintenance Forces and representatives of EMSEAL installed a demonstration bridge joint seal on the Old Bath Road Bridge (#6033) over US Route 1 in Brunswick.



The EMSEAL (BEJS) is a 'pre-compressed' 100% acrylic cellular foam compression-type seal with a silicone external facing. In the background you can see the pre-compressed seal confined between the hardboard slats and shrink wrap (stock photo).



The existing bridge joint was prepared by the Maintenance crew by cleaning the existing steel angles. EMSEAL recommends sandblasting to rough, white metal and cleaning with solvent immediately prior to applying the EMSEAL epoxy adhesive.



EMSEAL epoxy adhesive was applied to the inside surfaces of the steel. The manufacturer states that the adhesive may be used within a 40°F to 95°F temperature range. Part B (hardener) is always mixed into Part A (base) and blended until it is a uniform gray color.



Mixed epoxy adhesive is applied to the inside of the joint walls. The pot life of the epoxy is approximately ten to thirty minutes, depending on ambient temperature. The epoxy must be uncured while installing the BEJS seal into the joint-gap.



The pre-compressed joint seal is removed from its constraining boards & shrink wrap and set into place 1/2" below the top of the metal angles and allowed to decompress to its full width, bonding it to the adhesive on the joint walls (stock photo).

EMSEAL BEJS Watertight Joint System for Bridges

Old Bath Road Bridge over US Route One in Brunswick, Maine

October 11, 2012



Silicone adhesive is applied to the exposed face of one end of the silicone bellows before inserting the next length of seal. Spreading the silicone adhesive on the underlying foam material should be avoided.



Before the epoxy cures, a 3/4" deep band of silicone adhesive is injected between the foam and the joint-face. The material should be tooled to ensure a proper bond and seamless appearance. Excess silicone that squeezes out from butt joints should also be tooled.



Pre-formed 90 degree angles and termination pieces are available from the manufacturer. Unlike straight-run lengths, both sides of Universal-90s are silicone coated so there is no top or bottom and any unit can be turned over for use in an inside or outside angle as shown in the left photo.

On the drain side of the deck, 90 degree sections were used to bring the seal up and over the curb, then up and over the barrier as well (as shown in the photo, left).

On the opposite side of the deck, the seal was brought up and over the curb and then run directly through the barrier and terminated as is the standard joint seal replacement procedure according to the Bridge Maintenance Crew (see photo below).

Factory-fabricated transitions and/or terminations must be installed before the straight-run seal is installed. The straight-run material is then matched into them and sealed with silicone.



Low (drain) side



High side

EMSEAL BEJS Watertight Joint System for Bridges

Old Bath Road Bridge over US Route One in Brunswick, Maine

October 11, 2012



Completed BEJS installation. According to EMSEAL, the BEJS is capable of movements of +50%, -50% (100% total) of nominal material size. The seal is available in sizes ranging from 1/2" (12mm) to 4" (100mm). Other sizes may be available, check with the manufacturer.



Dale Peabody and Doug Gayne from MaineDOT Transportation Research inspected the joint on October 17, 2012. We found debris already accumulating within the bellows of the seal after just one week. According to NCHRP 319, debris accumulation can be detrimental to the performance of these types of compression seals (NCHRP p.12).



The air temperature during the inspection was approximately 50 degrees. The joint gap measured about 2-1/2 inches. This joint will be inspected by the Transportation Research Division again in 2013.

Manufacturer's note: Silicone left between the wrinkles of the bellows could constrain movement. Remove excess sealant before it fully cures.

Pricing information: a 2-1/4" wide seal was selected for this installation costing \$20.94 per linear foot. Seals are supplied in 2 meter pre-compressed "sticks", Universal-90s are priced per each. Sufficient epoxy and silicone is included in the pricing for standard application rates.

References:

Transportation Research Board, 2003, *NCHRP Synthesis 319 Bridge Deck Joint Performance*, 46 p.

EMSEAL Joint Systems Ltd, 25 Bridle Lane, Westborough, MA 01581

Submitted:

*Doug Gayne, Product Evaluation Coordinator
Maine Department of Transportation
Transportation Research Division
October 26, 2012*