

MATERIALS & RESEARCH DIVISION

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Date: June 30, 1994
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RESEARCH UPDATE

NUMBER U94-8

FLEXCON 2000 BRIDGE JOINT SYSTEM I91 BR 18S

HISTORY AND JOINT DESIGN: Interstate 91 BR 18 southbound over TH52 in Westminster was initially constructed in 1962. The 120' structure consisting of three simple spans received tar emulsion and a bituminous pavement on the deck with hot poured joint sealant placed in the sawed joints over the two piers and the approach slab joints. Following 28 years of service, the structure was included in a deck rehabilitation project consisting of concrete repair, membrane waterproofing, and two new courses of bituminous pavement. The 51 foot long joints skewed approximately 25 degrees were dry cut 13/16 inch wide by 1 3/8 inch deep. The placement of a heat resistant backer rod preceded the application of a hot rubberized asphalt sealant (SOF-SEAL by W.R. Meadows).

In February 1991, joint movement was recorded at 11/32 of an inch or 46 percent more than the original width at joint number two over pier number one. When inspected, the sealant was resilient at an ambient temperature of 14 degrees F, but by the Spring of 1991, 95 percent of the joint had experienced failure, with most of it occurring in the bituminous pavement at the bond line. In August 1991, 26 feet of the joint in the travel lane was recut and sealed with a silicone sealant (Dow Corning 890-SL). Gradual deterioration of the joint over the next three years led to the decision to reconstruct it with a FLEXCON 2000 expansion joint system in June of 1994.

EXPERIMENTAL JOINT DESCRIPTION: The FLEXCON 2000 expansion joint system is designed for locations with mid-range joint movements of 0 to 4 inches. The system includes Flexcon A/C elastomeric concrete edge members (nosings) and Koch 2000 SL polysulfide joint sealant. The system is ideal for joint replacement since it is field molded to conform to existing blockouts and joint conditions. The field molding also provides a smooth ride for vehicular traffic, thereby reducing impact forces on the joint and the bridge.

The Flexcon 2000 system is jointly manufactured by: Koch Materials Co., P.O. Box 510, Stroud, Oklahoma 74079-0510, Phone: (918) 968-3541, and R. J. Watson, Inc., 282 Wood Acres Drive, East Amherst, New York, Phone: (716) 741-2166, Fax: (716) 741-2580

The national distributor is: Bridgesaver, Inc., 1801-A Willis Road, Richmond, Virginia 23237, Phone: (800) 448-3636, Fax: (804) 271-3074.

INSTALLATION: The installation was completed on June 8 and 9, 1994. The ambient temperature ranged from 55 to 75 degrees F both days with mainly clear conditions.

The existing pavement and membrane were saw cut and removed for an average width of nine inches by District 2 maintenance forces. The preparation included sand blasting of the concrete which appeared sound with no scaling or other deterioration evident.

The joint construction was carried out by: Davis and Swanson, Inc.,
West Main Street, P.O. Box 293, Tilton, NH 03276, Phone: (603) 286-8955
Fax: (603) 286-7009

The one inch joint opening was filled with an insulation board to serve as the interior form for the elastomeric concrete. The Flexcon A/C liquid components were premixed before combining them with the prebagged aggregate sand mixture in a turntable mixer.

Following initial curing of the elastomeric concrete, the styrofoam was removed with a pick axe and a power grinder was used to clean the vertical faces of the concrete and bevel the edges of the joint opening. A backer rod was recessed approximately 3/4 of an inch and the Flexcon 2000 sealant was poured into the joint opening.

The travel lane was opened to traffic shortly after placement of the sealant and the passing lane portion of the joint was constructed the following day without any significant problems.

COST: The installation and materials were furnished without charge to the Agency for demonstration purposes. The materials required to construct the joint are available for direct purchase or may be purchased installed by an experience applicator such as Davis and Swanson.

Current material costs are \$125.00 per gallon for the Koch 2000 SL sealant, and \$385.00 per cubic foot for the Flexcon A/C elastomeric concrete. Assuming a typical joint design of four inches in width by two inches in depth for each side of the joint, the elastomeric concrete would cost \$42.75 per linear foot. A typical one inch wide by one half inch deep sealant design would cost \$3.30 per linear foot. The cost of the backer rod would bring the total cost for materials to approximately \$47.00 per lineal foot of joint.

The estimated cost of a contractor installed joint excluding traffic control is \$130.00 per linear foot. With the State providing all labor and traffic control the cost of materials and mixing equipment plus a technical representative is approximately \$80.00 per linear foot.

PRELIMINARY CONCLUSION: The joint design described appears well suited for the replacement of deteriorated sawed and sealed joints on many of the state bridges. If it performs well, consideration should be given to specifying the system on contract rehabilitation projects and purchasing of the materials for use by state maintenance bridge forces.

FOLLOWUP: The FLEXCON 2000 joint sealing system installed on joint number two of I91 bridge 18 southbound will be inspected at least annually to determine its effectiveness and service life.