

EXPERIMENTAL PROJECT - USE OF  
PREFORMED, COMPRESSED, NEOPRENE SEALS IN  
JOINTS OF CONCRETE BRIDGE DECKS

INITIAL--PRECONSTRUCTION REPORT

Report No. 1  
July 22, 1964

Reported by: Ronald D. Hughes, Research Engineer  
Kentucky Department of Highways

Project No. I64-2(24)4  
Third Street to Preston Street  
Jefferson County, Kentucky

Termini, Station Numbers and Mileages

Ramp A - Sta. 7+91.04 to Sta. 14+56.23, 0.153mi.  
Ramp B - Sta. 5+00.00 to Sta. 17+43.92, 0.286mi.  
Main-Line - Sta. 248+52.00 to Sta. 269+27.58, 0.476mi.

## Nature and Objectives of Experiment

Two types of seals are proposed for installation in contraction and construction joints in Ramp A, Ramp B, and the Main-Line structures from Third Street to Preston Street on Project I64-2(24)4, Jefferson County. The majority of contraction and construction joints are to be sealed with the preformed, compressed, neoprene seals. Specific joints in each structure will be sealed with cold-applied, elastomeric-type, joint-sealing compound; and these will be used as control joints for evaluation of the preformed, compressed, neoprene seals. Installation of all seals will be observed, and inspections will be made periodically. The performance of mastic-type sealants in joints in structures in the general vicinity of this construction will be observed, and comparisons will be made with the experimental seals. A companion study will be made on Project No. US724-(2), Fayette County, where the Newtown Road crosses over the New Circle Road. Preformed, compressed, neoprene seals are proposed for both the northbound and southbound structures. The primary basis for analysis will be:

- (a) Time-in-service before leakage is detected.
- (b) Condition of slabs adjacent to joints.
- (c) Condition of piers and (or) slabs below joints.
- (d) Incompressibles encroaching into (or) onto the sealants.

The principal objectives of the project are: 1) to monitor and to document the installation and performance of preformed, compressed, neoprene seals in joints in a concrete bridge deck, and 2) to compare the performance of these seals with the performance

of conventional sealants.

#### Construction Methods

The equipment to be used in the placement of the seals shall be at the option of the contractor. The primary objective is that all seals be placed in accordance with the plans, specifications, and (or) special provisions.

Preformed, compressed, neoprene seals and cold-applied, elastomeric-type sealant will be placed in contraction and construction joints as specified on the plans for Ramp A, Ramp B, and the Main-Line structures at station 255+00, Project No. I64-2(24)4, Jefferson County. The beginning and ending stations for Ramp A, Ramp B, and Main-Line structures respectively are: 7+91.04 and 14+56.23, 5+00.00 and 17+43.92, 248+52.00 and 269+27.58. The general layout of the site is shown on the accompanying sketch. The general layout of Project No. US724-(2) is not included; however, surveillance and reporting on the project will be similar to that for Project No. I64-2(24)4.

The preformed, compressed, neoprene seals shall conform to the Kentucky Department of Highways' Special Provision for Preformed Joint Seals. The cold-applied, elastomeric-type sealant to be used in joints in the specified structures shall conform to the Department's Special Provision for Joint Sealing Compound (Cold-Applied, Elastomeric Type). Mastic-type sealants placed in joints in structures near the specified project shall conform to the Department's applicable specifications for the sealants specified for those structures. The quan-

ties of each type and (or) size of sealant specified for joints in Ramp A, Ramp B, and the Main-Line structures are contained in the following table.

Structure	Lineal Feet			
	Preformed, Compressed, Neoprene			Cold-Applied, Elastomeric Type
	7/16"x3/4"	1 5/8"x1 5/16"	2"x2"	
Ramp A	66	66	-	26
Ramp B	210	60	-	34
Main-Line	2368	225	71	75

Anticipated Traffic

The projected ADT for 1975 is 67,000 and the design, hourly volume (DHV) used was 2640 to 3500 for 6 lanes with the direction distribution (D) being 52 to 56 percent. The design speed is 50 mph, and K = 10 percent was used.

Discussion

Adequate sealing of joints in concrete bridge decks is a continuing maintenance problem. Conventional sealants used in conjunction with copper or plastic waterstops are in many instances only partially effective in preventing leakage of water through the joints. The foreign matter that becomes embedded in mastic-type sealants and metal waterstops tend to cause spalling of concrete adjacent to the joints. Bridge piers become stained, and some are scaling as a direct result of leakage through the joints and onto the piers. Progressive scaling leads to structural deterioration and the staining is unsightly. In-

terest in effective sealing of bridge deck joints is threefold, that is: 1) to prevent spalling, 2) to prevent scaling, and 3) to prevent staining. Rubber inserts have been acclaimed for this purpose but have not yet proven to be wholly satisfactory.

Preformed, compressed, neoprene seals offer a logical approach to the problem of effective joint sealing. The typical neoprene seal is an extruded, honey-combed strip of neoprene rubber designed so that its width is greater than that of the joint to be sealed. Generally, the filler strip or the joint itself is coated with liquid neoprene prior to installation of the seal. The liquid neoprene acts primarily as a lubricant to aid in installation of the compressed strip and as an adhesive. Once in place, the tendency of the strip to return to its original width exerts pressure against both faces of the joint. Ideally, the result is a positive seal which prohibits entry of water, sand, stone, and other incompressible materials that could cause cracking and slab deterioration upon expansion of the slabs. Unlike mastic-type seals, the neoprene seals do not flow out on hot days or exhibit cracks and permeable voids on cold days.

In November, 1948, the Kentucky Department of Highways installed prefabricated, cast-in-place, neoprene, joint seals in a concrete pavement on U.S. 27, Campbell County, Project No. F367(10). These seals proved quite unsatisfactory; they were cast-in-place and were not pre-compressed. Findings of the study are reported in: "Prefabricated Neoprene Joint Sealer U.S. 27, Campbell County," Division of Research, Kentucky Department of Highways. In October of 1962,

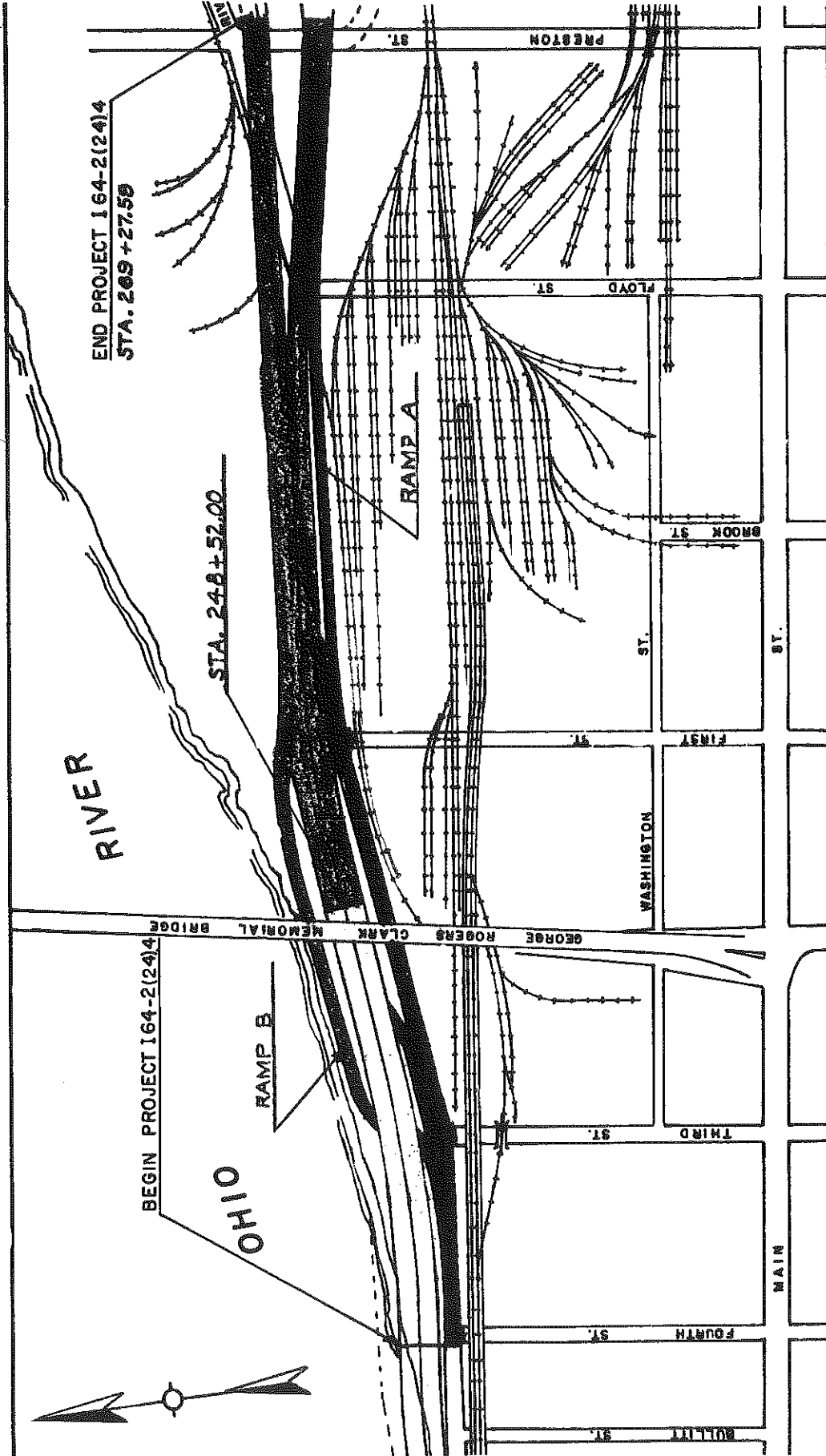
preformed, compressed, neoprene seals were placed on an experimental basis in one longitudinal and three transverse (Sta. 938+00 to Sta. 939+00, W.B. lane) concrete pavement joints on the Mountain Parkway, Powell County. To date these seals have proven to be satisfactory. In December, 1963, the original, mastic-type seals were removed from the joints of both structures carrying I264 traffic over U.S. 60 in Jefferson County. The old seals there were allowing water to leak onto the piers below the joints. Neoprene seals were inserted into the joints and were slightly countersunk.

The use of compressed, neoprene seals as an experimental feature on the proposed construction project was approved by the Bureau of Public Roads by a letter dated May 13, 1964; and due consideration has been given to comments offered therewith. Similarly, consideration has also been given to comments made by Mr. G. M. Williams, Director of Engineering and Operations, in Circular Memorandum dated March 13, 1964.

The proposed experimental work is authorized in accordance with P.P.M. 60-2, and the surveillance and reporting has been proposed under HPS-HPR-1(26) as KYHPR-65-35 and in accordance with P.P.M. 50-1.1.

Estimated Construction Starting Date

It is estimated construction will begin in September of 1964.



END PROJECT 164-2(24)4  
STA. 269 + 27.50

STA. 248 + 52.00

RIVER

BEGIN PROJECT 164-2(24)4

OHIO

RAMP B

RAMP A

GEORGE ROSEN CLARK MEMORIAL BRIDGE

WASHINGTON ST.

FIRST ST.

BROOK ST.

FLOYD ST.

PRESTON ST.

BULLITT ST.

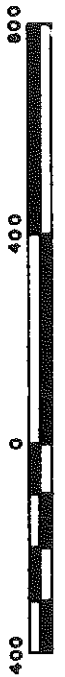
FOURTH ST.

THIRD ST.

MAIN



SITE PLAN



SCALE IN FEET