

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION

subject: New Bridge Design Standard
Practice-New Strip Seal
Expansion Joint System

memorandum

date: June 9, 2010

to: Mr. Thomas A. Harley
Bureau Chief
Bureau of Engineering and
Construction

from: Julie F. Georges
Prin. Eng. - Cons. Design Bridge
Bureau of Engineering and
Construction

Described below is a proposed new Bridge Design Standard Practice which addresses the following concern:

The current Strip Seal Expansion Joint System has a history of performing poorly, primarily related to the steel extrusions pulling away from the elastomeric concrete headers.

Proposed new practice:

A new Strip Seal Expansion Joint System has been developed to handle the movement (3" - 4") of the previous Strip Seal Expansion Joint System, while eliminating the concerns regarding its poor performance by replacing the elastomeric headers with concrete headers.

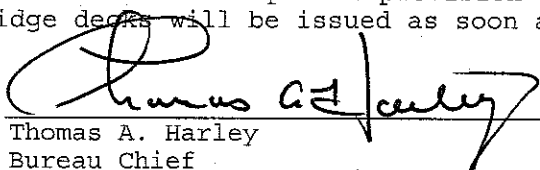
The new bridge plates are attached, as well as the new owned special provision. The Bridge Design Manual will be revised accordingly.

Implementation:

It is requested that the Office of Construction inventory projects in construction where Strip Seal Expansion Joint Systems were planned and the deck has not been cast to implement this new Strip Seal Expansion Joint System.

It is recommended that all projects in design will use the new Strip Seal Expansion Joint System.

Specific details and a new special provision for providing the new joint system in existing bridge decks will be issued as soon as it is available.

APPROVED BY: 
Thomas A. Harley
Bureau Chief

DATE: June 11, 2010

cc: Joseph E. Chilstrom, Federal Highway Administration

Attachments

- Julie F. Georges/dm
- bcc: Thomas A. Harley-Rabih Barakat
- Lewis Cannon-James Connery
- James H. Norman
- Scott Hill
- Timothy M. Wilson - Julie F. Georges
- Joseph A. Cancelliere
- Bartholomew P. Sweeney
- Timothy Fields
- Bryan Reed
- Mark D. Rolfe
- Ravi Chandran
- Robert P. Zaffetti
- Richard Van Allen
- Robert Raiola

FROM THE DESK OF
JULIE F. GEORGES

JUN 21 2010

G. ABRAMOWICZ	
B. SWEENEY	
T. FIELDS	
COPY TO CJM	
PENDING	
COPY TO RL	

FROM THE DESK OF

NAME	FYI	PLS DO	PLS SEE ME
JUN 15 2010			
BRIDGE			
LOCAL ROADS			
STATE ROADS			
FILE			

S:/Condes/BR/Georges/Bridge Standard Practice/Chief Eng acceptance of std practice-
New strip seal joint

Maura, Denise

From: Fields, Timothy D.
Sent: Friday, June 04, 2010 2:14 PM
To: Georges, Julie F.
Subject: FW: Strip Seal Joint

Attachments: SK-4 NEW CONSTRUCTION.pdf; SK-1 NEW CONSTRUCTION.pdf; SK-2 NEW CONSTRUCTION.pdf; SK-3 NEW CONSTRUCTION.pdf; 0520xxxxStripSealExpansionJointSystem.doc



0520xxxxStripSealE SK-1 NEW SK-2 NEW SK-3 NEW
xpansionJoin... ISTRUCTION.pdf (1) ISTRUCTION.pdf (3) ISTRUCTION.pdf (5)

Julie,

Dave is going to revise the blockout detail in the parapet to show it as optional as we discussed. I'll forward it to you as soon as Dave has completed the change. I think we should make the official bridge manual change after we complete the plates for joint installation on existing bridge decks.

Tim

-----Original Message-----

From: Hiscox, David
Sent: Wednesday, May 19, 2010 10:29 AM
To: Fields, Timothy D.
Cc: Georges, Julie F.
Subject: Strip Seal Joint

Tim,

Attached are sketches and a specification for a strip seal joint in concrete headers with all of the revisions we discussed.

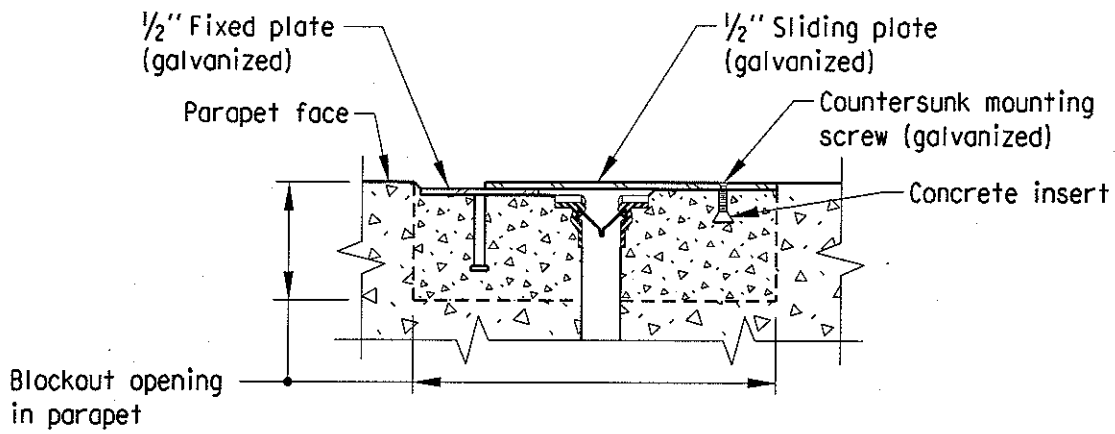
Some assumptions:

- 1) This is only for new construction type installation (i.e.--new deck and parapets) where a blockout can be formed in the deck ends and parapet for later installation.
- 2) The specification only covers installation of the strip seal. Concrete and rebar will have to be covered under like items in the Contract (i.e.--Class "F" Concrete, and rebar though the Designer will have to provide an item for the galvanized rebar).
- 3) You don't want the revisions to the Bridge Design manual at this time as these are simply the spec and details needed for the implementation of the new policy.

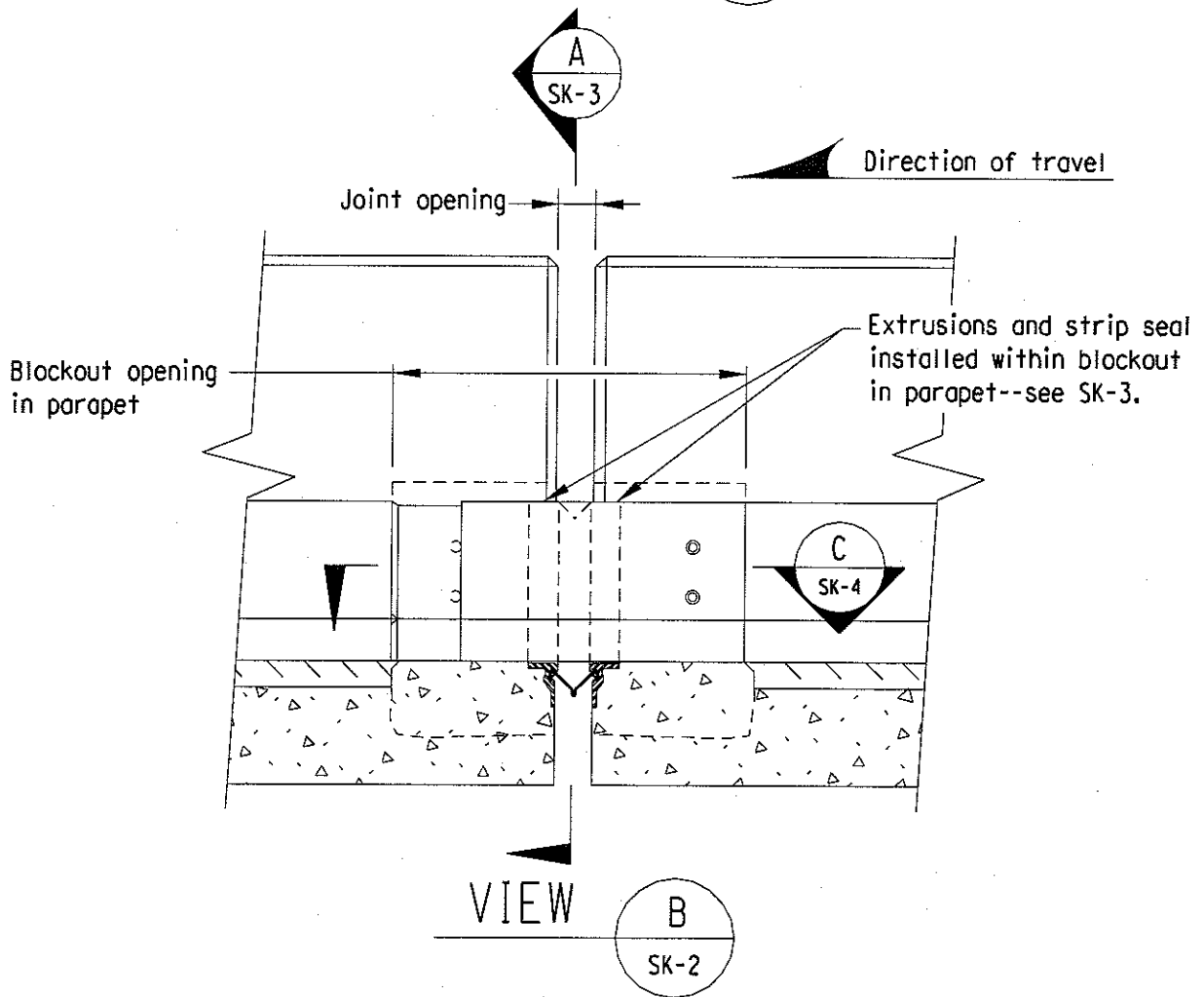
If you want the revised BDM pages--I can send those too.

Please print out and we can discuss.

Dave H.



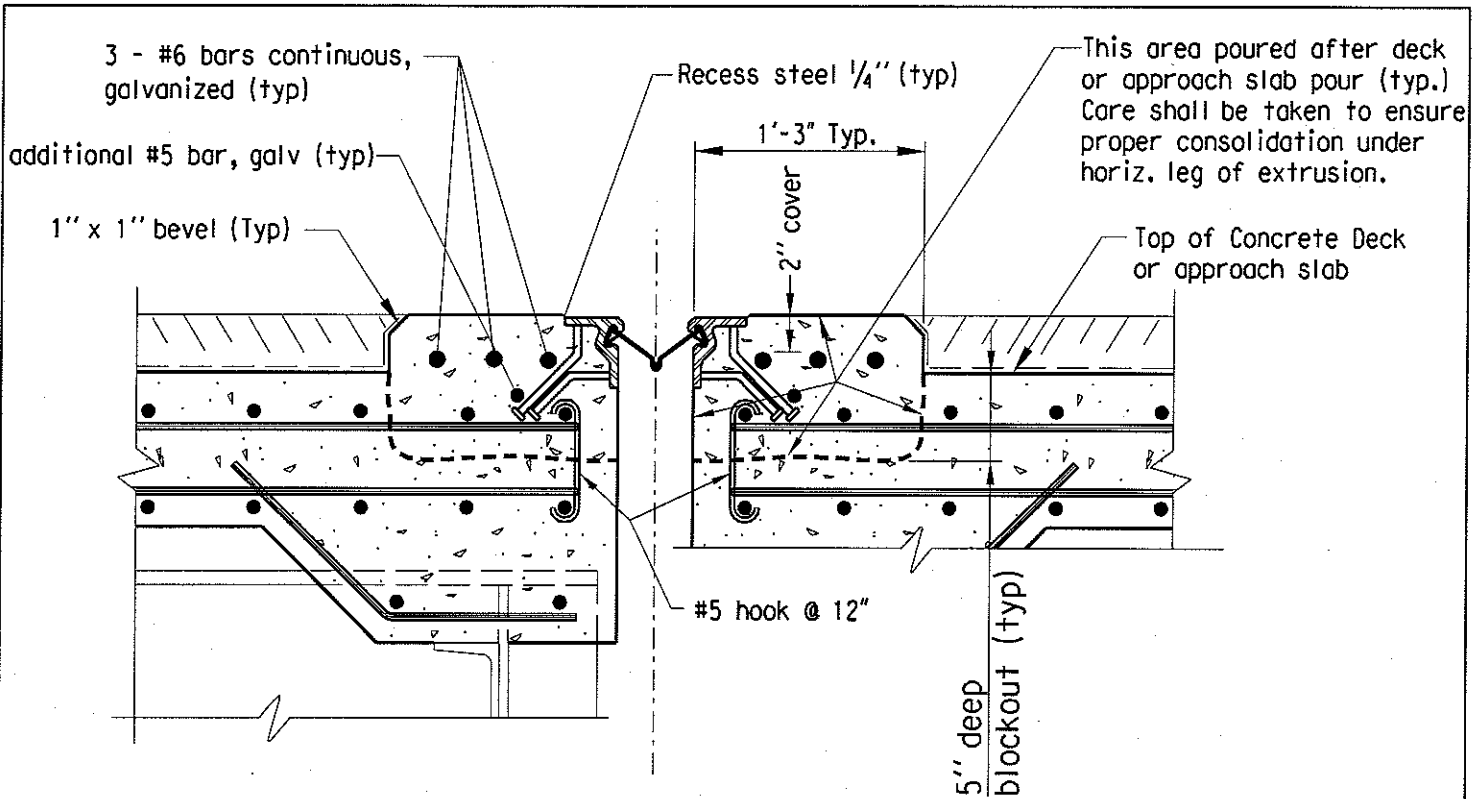
SECTION C



JOINT TREATMENT AT CONCRETE PARAPET

STRIP SEAL IN CONCRETE HEADER
 EXPANSION JOINT SYSTEM -- NEW CONSTRUCTION

SK-4

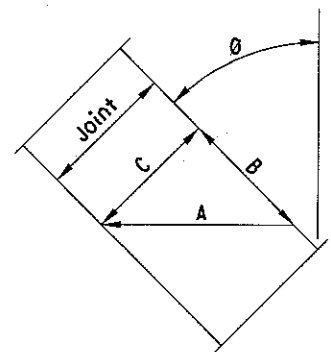


Note To Designer: Pay item includes only furnishing and installing the elements of the strip seal joint. Other materials and work shown above (concrete, reinf., etc..) must be accounted for with separate items and quantities.

DESIGN INFORMATION:

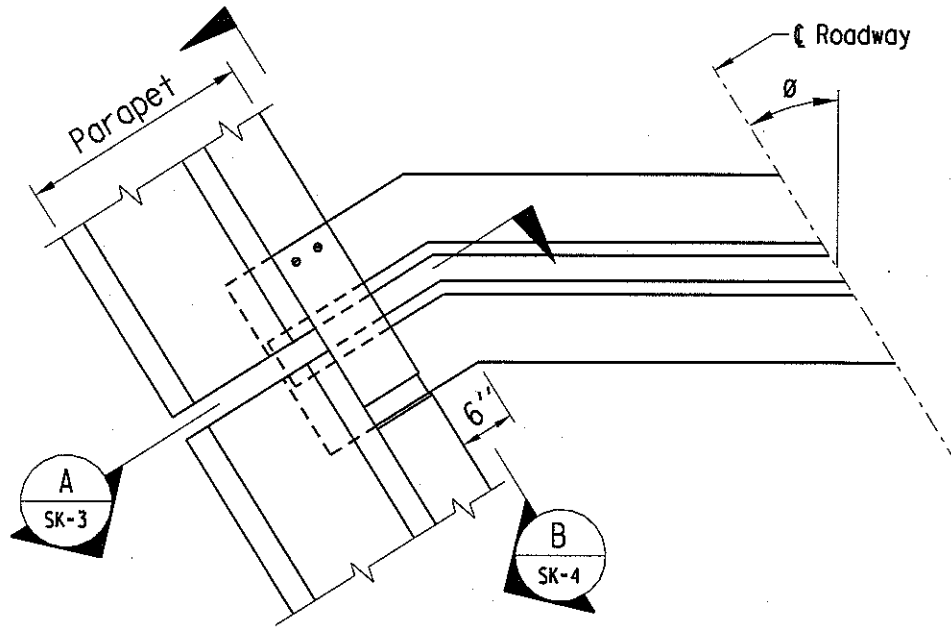
1. Concrete headers with strip seals shall be used at expansion joints with computed movements between 3" and 4".
2. The temperature range used for computation of movement shall be in accordance with Section 10.1 of the CTDOT Bridge Design Manual.
3. The strip seal movement capacity and opening @ 50deg F. shall be determined by the Designer in-accordance with approved product information.
4. The Designer shall consider the effects of skew when determining the strip seal movement capacity. The movement rating of the gland shall be greater than or equal to the computed movements along the skew, normal to the joint or along the centerline of bridge. Additionally, review anticipated movements for conformance with manufacturer's recommendations.

θ = Skew Angle
 A = movement along l Bridge
 B = movement along Skew $B = A \sin \theta$
 C = movement normal to joint $C = A \cos \theta$

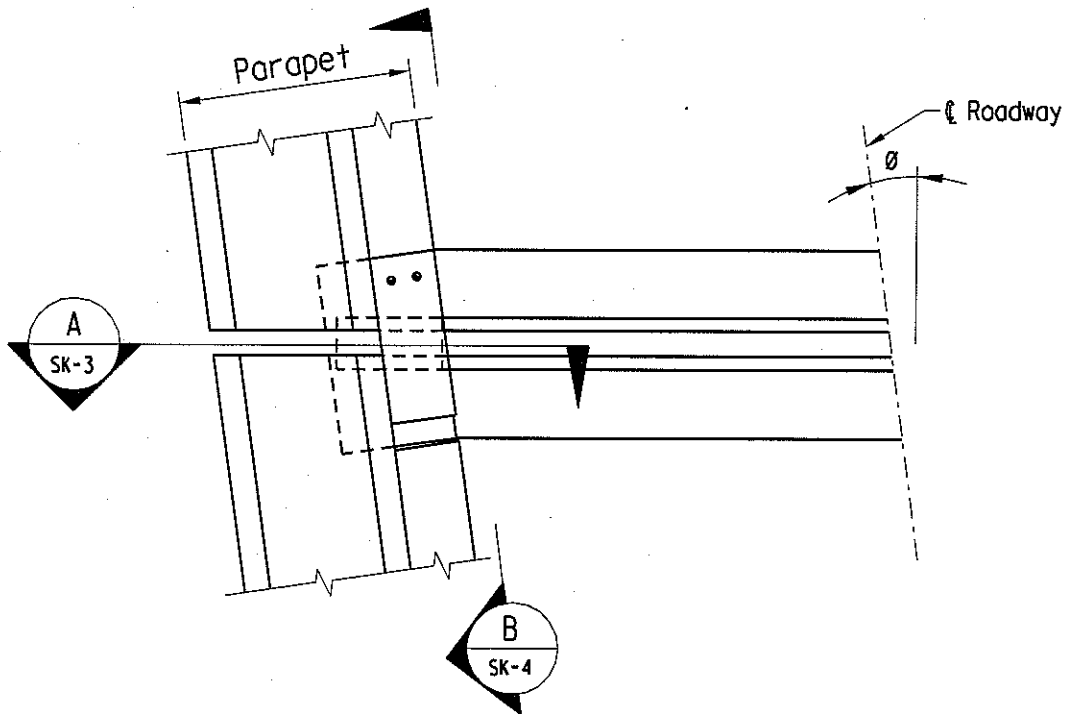


STRIP SEAL IN CONCRETE HEADER
 EXPANSION JOINT SYSTEM - - NEW CONSTRUCTION

SK- 1



JOINT TREATMENT AT GUTTERLINE -- $\emptyset > 35$



JOINT TREATMENT AT GUTTERLINE -- $\emptyset \leq 35$

STRIP SEAL IN CONCRETE HEADER
EXPANSION JOINT SYSTEM -- NEW CONSTRUCTION

SK-2

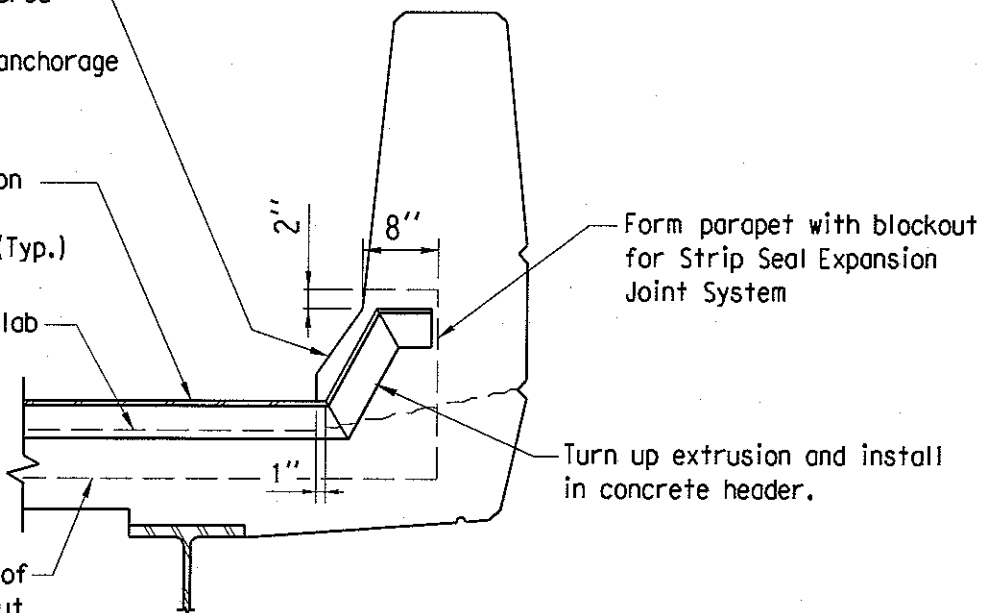
Concrete curb to be poured with joint header.

Note: Cover plate and anchorage not shown for clarity.

Strip Seal Expansion Joint System in Concrete Headers (Typ.)

Top of deck slab

Bottom limit of header breakout.



SECTION

A

JOINT TREATMENT AT CONCRETE PARAPET

DESIGN INFORMATION

1. This plate shall be used in conjunction with drawings SK-2 and SK-4.

STRIP SEAL IN CONCRETE HEADER
EXPANSION JOINT SYSTEM - - NEW CONSTRUCTION

SK-3

ITEM #0520XXXA – STRIP SEAL EXPANSION JOINT SYSTEM

Description: Work under this item shall consist of furnishing and installing the Strip Seal Expansion joint system as shown on the plans, as directed by the Engineer, and in accordance with these specifications.

Materials: The following Strip Seal expansion joint systems are qualified for use under this item:

Strip Seal Expansion Joint System	Manufacturer
Wabo StripSeal with Type M or Type Q steel rails, and SE-400 or SE-500 glands	Watson Bowman & Acme Corp. 95 Pineview Drive Amherst, NY 14228
D.S.Brown Co. Steelflex Strip Seal with Type SSCM2 steel rail and the A2R-400 gland	D.S. Brown Company 300 East Cherry Street North Baltimore, OH 45872
RJ Strip Seal System with Type M rails and the S-400 gland	R.J. Watson Inc. P.O. Box 85 East Amherst, NY 14051

Additionally, the joint system components shall conform to the following:

Steel Extrusions: The extrusions shall conform to the requirements of ASTM A588.

Extrusion Anchorage: The steel extrusions shall be anchored in both the deck and curb areas with anchors spaced a maximum 6" on center. The anchorages shall be headed stud anchors, a minimum 1/2" diameter and 6" long, and conform to the requirements of Article M.06.02-12 of the Form 816.

Strip Seal Gland: The gland shall be extruded polychloroprene.

A Materials Certificate will be required in accordance with article 1.06.07 certifying the conformance of the strip seal expansion joint system components to the requirements set forth in this specification.

Other joint systems which utilize a strip seal set in steel extrusion with dual sets of anchors set 6" on center will be considered for use under this item provided sufficient product documentation is furnished. Such documentation may consist of other State approvals or proof of

successful performance of a completed test installation. Approval is at the discretion of the Engineer.

Construction Methods: Before fabricating any section of the expansion joint, the Contractor shall submit shop drawings to the Engineer for approval in accordance with Article 1.05.02. These drawings shall include but not be limited to the following information:

- a. The name of the manufacturer.
- b. Strip seal, steel extrusion, and designations and model numbers.
- c. Details of a typical expansion joint section including the anchorage and method of temporary support.
- d. Plan of the joint showing the location and details of shop and field splices in the steel extrusions. All field splices will require a weld procedure be submitted on the form designated by the Department to the Engineer for review and approval.
- e. The complete details of the methods, materials and equipment proposed to be used in the installation.
- f. Details at the curbs and sidewalks.
- g. The maximum and minimum joint installation widths including an ambient temperature table for joint widths between 40° F and 90° F in 10° F increments.

Unless otherwise shown on the plans or indicated in the Special provisions, welding shall be done in accordance with ANSI/AASHTO/AWS D1.5 Bridge Welding Code. All field welders shall possess a valid welder certification card issued by the Department's Division of Materials Testing. If such person has not been engaged in welding operations on a Department project or project acceptable to the Department within a period of six months, or if he cannot produce an approved welding certification dated within the previous twelve months from a welding agency acceptable to the Engineer, he shall be required to re-qualify through examination. The Engineer may require re-examination of anyone whose quality of work he questions.

The steel extrusions shall be fabricated in sections and be made continuous by welding during placement. The strip seal shall be fabricated and installed in one piece. No field splicing of the seal will be permitted.

A competent technical representative of the manufacturer shall be present during the installation of the steel extrusions to provide the Contractor such aid and instruction as required to obtain a satisfactory installation, to the approval of the Engineer.

The strip seal expansion joint system shall be installed at the locations shown on the plans and in stages in accordance with the traffic requirements in the special provisions "Maintenance and Protection of Traffic" and "Prosecution and Progress".

The Contractor shall form the end of the concrete deck or approach slab and parapet or curb sections with block-outs of the sizes dimensioned in the contract plans so that the strip seal can be installed at a later date.

The steel extrusions and anchorage shall be sandblasted in accordance with SSPC-SP-7, Brush-Off Blast Cleaning, prior to placement. The extrusions shall be aligned with the deck cross slope and breaks in the cross slope. Both the leading and trailing sides of the extrusion shall be recessed ¼" below the adjacent headers as shown on the plans. The extrusions shall be firmly and accurately held in position prior to and during the placement of the concrete header by temporary supports. Adjacent sections of extrusion shall be butt welded together—provisions shall be made in the installation sequencing to maximize the weldable area. All field welding shall be accomplished by an AWS certified Welder.

Forms shall be used to keep the concrete from entering the open joint between the concrete deck slabs or parapet sections. The concrete shall be placed, with a trowel if necessary, to insure that it completely fills the header below the extrusion and to prevent honeycombing and voids. The headers shall be finished to match the final cross-slope and grade so that it will be flush upon installation of the final overlay.

Traffic shall not be permitted over the joint until proper curing of the concrete has occurred and has developed adequate strength in accordance with the Form 816.

After the extrusions and headers have been placed, the strip seal shall be installed in a continuous length along the deck and up the curbs. An adhesive lubricant shall be used to install the strip seal in the steel extrusions as required by the manufacturer. No field splices will be permitted.

Any section of the strip seal that is punctured, ruptured, cracked, bent or damaged in any other way shall be removed and replaced by the Contractor at no additional cost to the State.

All work shall be done in accordance with the special provisions for "Maintenance and Protection of Traffic" and "Prosecution and Progress" contained elsewhere within.

Method of Measurement: This work will be measured for payment by the number of linear feet of strip seal, installed and accepted, measured from gutterline to gutterline, unless otherwise noted in the plans, along the centerline of the joint. Strip seal gland and steel extrusion installed in the parapet or curb turn-up section will not be measured for payment but shall be considered included in the general cost of the work.

Rev. Date 05/10

Basis of Payment: This work will be paid for at the contract unit price per linear foot for "Strip Seal Expansion Joint System", complete in place, which price shall include all materials, equipment, tools, and labor incidental thereto.