

ORIGINATION FORM

THE INFORMATION BELOW IS TO BE PROVIDED BY THE ORIGINATOR

Modify Specification _____.
Section/File number

New Section _____ 458 _____.
Section number

Subject: Bridge Deck Expansion Joints

Origination date: 7/5/06

Originator: Charles Boyd

Office/Phone: Structures Design Office/414-4275

Email address/ charles.boyd@dot.state.fl.us

Userid: st986cb

Problem statement: A new specification has been developed to consolidate requirements and pay items for various types of commonly used bridge deck expansion joints. Section 458 works with Section 932. Duplicate notes on Design Standard Indexes 21100 and 21110 will be deleted for the 2008 Design Standards book.

Information source: Texas, Pennsylvania and Ohio DOT standards for bridge deck expansion joints. Manufacturers D.S.Brown, Watson Bowman and Dow Corning. Project specific expansion joint designs and obsolete FDOT standard drawings. ADA and Florida Accessibility Code for Building Construction. Liberty Mutual Insurance Company. Karen Byram, Specifications Office and Dean Perkins, Structures Design Office.

Background data: No FDOT standardized specifications have been developed for many types of bridge deck expansion joints. Pay items were scattered and inconsistently used. New standard drawings were developed to address detailing issues, and a new specification was developed to compliment the standard drawings.

Recommended

Usage Note: For use with common types of bridge deck expansion joints –Poured Joint, Poured Joint with Backer Rod, Strip Seal, Modular Joint, Finger Joint and Compression Seal.

**Estimated fiscal
impact, if
implemented:**

Design costs should decrease due to availability of standards and specifications and QPL listed products. No expected construction cost associated with implementation of the specification (requirements are already on Design Standards 21100 and 21110).

Implementation of these changes, if and when approved, will begin with the January 2007 letting.



Florida Department of Transportation

JEB BUSH
GOVERNOR

605 Suwannee Street
Tallahassee, FL 32399-0450

DENVER J. STUTLER, JR.
SECRETARY

MEMORANDUM

DATE: July 30, 2006
TO: Specification Review Distribution List
FROM: Duane F. Brautigam, P.E., State Specifications Engineer
SUBJECT: Proposed Specifications Change: 4580000-Bridge Deck Joints

In accordance with Specification Development Procedures, we are sending you a copy of a proposed specification change to Bridge Deck Joints.

This change was proposed by Charles Boyd of the State Structures Office to consolidate requirements and pay items for various types of commonly used bridge deck joints.

Please share this proposal with others within your responsibility. Review comments are due within four weeks and should be sent to Mail Station 75 or to my attention via e-mail at SP965DB or duane.brautigam@dot.state.fl.us. Comments received after August 27, 2006 may not be considered. Your input is encouraged.

DFB/dr

Attachment

COMMENTS:

Submitted by:

Phone #:

BRIDGE DECK JOINTS.**(REV7-20-06)**

PAGE 563. The following new Section is inserted after Section 455:

**SECTION 458
BRIDGE DECK EXPANSION JOINTS**

458-1 Description.

Furnish and install *bridge deck* expansion joints of the types and at the locations shown in the plans.

458-2 Types of Expansion Joints.

The types of expansion joints are designated as follows:

Poured Joint

Poured Joint with Backer Rod

Strip Seal

~~Modular Joint~~

——— ~~Finger Joint~~

——— ~~Compression Seal~~

458-3 Materials.

458-3.1 Poured Joint: Meet the requirements of Section 932 for *Joint Sealer or Low Modulus Silicone Sealant* poured joint material.

458-3.2 Poured Joint with Backer Rod: Furnish Poured Joint ~~W~~with Backer Rod Expansion Joint Systems *that meet the requirements of* in accordance with Specification Section 932 *for Type D Silicone Sealant* and that are listed on the Qualified Products List. Furnish joint systems consisting of *Type D Silicone Sealant* Poured Joint Material, Foam Backer Rods, Sidewalk Cover Plates (as required) and all associated miscellaneous components.

458-3.3 Strip Seal: *Meet the requirements of Design Index No. 21100.* Furnish Strip Seal Expansion Joint Systems *that are* in accordance with ASTM D5973, Specification Section 932 and that are listed on the Qualified Products List. Furnish joint systems consisting of watertight steel Edge Rails, Elastomeric Strip Seals, Sidewalk Cover Plates (as required) and all associated miscellaneous components.

——— ~~458-3.4 Modular Joint:~~ Meet the material requirements of the plans and or Special Provisions.

——— ~~458-3.5 Finger Joint:~~ Meet the material requirements of the plans and or Special Provisions.

——— ~~458-3.6 Compression Seal:~~ Meet the material requirements of the plans and or Special Provisions.

458-4 Construction Methods.

458-4.1 General: Install the expansion joint in accordance with the specific requirements of this Article, the plan details and ~~or with the details shown on the Design Standards for the particular type of expansion joint called for.~~

458-4.2 Poured Joint: Install the joint at the locations *and in accordance with the details* shown in the plans. ~~Follow the plan details, notes and or Special Provisions.~~

458-4.3 Poured Joint with Backer Rod:

458-4.3.1 Shop Drawings: Submit shop drawings for Sidewalk Cover Plates (as required) showing all materials and project specific details and dimensions.

458-4.3.2 Sidewalk Cover Plate Fabrication: *Hot-dip galvanize Sidewalk Cover Plates after shop fabrication in accordance with Section 962 and the manufacturer's recommendations.*

458-4.3.23 Installation:

(a) When casting the Bridge Deck, Approach Slab or Raised Sidewalk adjacent to the joint at temperatures other than 70° ~~degrees~~-F, adjust Dim. "A" as shown on the Design Standard *Index No. 21110* at 70° ~~degrees~~-F by the amount of the adjustment per 10° ~~degrees~~-F shown in Structures Plans, Poured Expansion Joint Data Table. For temperatures above 70° ~~degrees~~-F decrease the opening, ~~f~~For temperatures below 70° ~~degrees~~-F increase the opening.

(b) Install Poured Joint with Backer Rod in accordance with *the* manufacturer's recommendations, when the joint opening is between 1 3/4" and 2 1/4" and after deck profiling and grooving operations are completed. Place Poured Joint Material only when the ambient temperature is between 55° ~~degrees~~-F and 85° ~~degrees~~-F and is expected to rise for the next three hours minimum to provide for adequate joint opening and compression of the Poured Joint Material during curing.

458-4.4 Strip Seal:

458-4.4.1 Elastomeric Seals: Furnish continuous heavy duty bridge deck Elastomeric Seals sized to perform satisfactorily for the opening range shown in accordance with the manufacturer's recommendations. Minimum movement classification is 4". Seal shall be supplied by the manufacturer of the Edge Rails. Field vulcanization is not permitted. Shop vulcanization is permitted only on horizontal turns on skewed bridges at upturn ends where the horizontal turn angle is greater than 35 degrees.

458-4.4.2 Edge Rail and Sidewalk Cover Plate Fabrication:

(a) Perform all shop welding in accordance with the Bridge Welding Code ANSI/AASHTO/AWS D1.5. ~~(current edition).~~ Do not weld to surfaces in contact with the Elastomeric Seal or the top surface (riding surface) except as shown *in the Shop Splice Detail*. Do not weld inside seal cavity. ~~See Shop Splice Detail on the Design Standard or plan sheets.~~

(b) Fabricate Edge Rail Assemblies in one piece including upturns, except where *the* length or configuration prohibits shipping or proper installation or where phase construction requires separate assemblies. Shop splice sections of Edge Rail to obtain *the* required length by partial penetration double v-groove welds on prepared beveled edges and seal welds as shown in the Shop Splice Detail. Weld all around the joint as far as practical to achieve a watertight seal. Do not use short pieces of Edge Rail less than 6'-0" long unless required at curbs, sidewalks or phase construction locations. ~~See also Installation Notes.~~

(c) Hot-dip galvanize Edge Rail Assemblies and Sidewalk Cover Plates after shop fabrication in accordance with Section 962 ~~of the Specifications and~~ *the* manufacturer's recommendations.

(d) Furnish temporary or sacrificial support brackets, bolts, clamps, etc. that are capable of resisting shipping, handling and construction forces without damage to the Edge Rail Assemblies or galvanized coating and are adjustable to account for variable temperature settings. Do not use temporary or sacrificial support brackets, bolts, clamps, etc. between the faces of the Edge Rails.

(e) Clearly match mark corresponding Edge Rail Assemblies with joint location and direction of stationing.

(f) Submit shop drawings showing all ~~expansion~~-joint materials and project specific details and dimensions. Include name of manufacturer, seal model number, seal movement range and the assigned Qualified Products List Number.

458-4.4.23 Installation:

(a) Install the Edge Rail Assemblies at proper grade and alignment before or after deck planing ~~following~~ *in accordance with* the manufacturer's instructions. When installed after deck planing, install the Edge Rail Assemblies in the blockouts on a profile tangent between the ends of the deck and/or approach slab to within a +0" and -1/4" variation. When installed before deck planing, install the Edge Rail Assemblies 3/8", ~~plus or minus~~ $\pm 1/16"$, below the top surface of the deck or approach slab to compensate for concrete removal during planing.

(b) Bolt, weld or clamp Edge Rail Assemblies in position using temporary or sacrificial brackets as required. For phased construction, install Edge Rail Assemblies in a given subsequent phase so as to align with those installed in an adjacent prior phase after deflection and rotation due to deck casting of adjoining spans has occurred.

(c) For installation temperatures other than 70° ~~degrees~~ F, adjust the opening of the joint (Dim. "A") as shown on ~~the~~ Design Standard *Index No. 21100* by the amount of the adjustment per 10° ~~degree~~ F shown in Structures Plans, Expansion Joint Data table. For temperatures above 70° ~~degrees~~ F decrease the opening; ~~for~~ *For* temperatures below 70° ~~degrees~~ F, increase the opening.

(d) After galvanizing has been completed, do not weld ~~to, or~~ within 2" of, Edge Rail surfaces that will be exposed in the completed structure. Do not weld expansion joint components to or electrically ground to reinforcing steel or structural steel. Seal field butt joints and empty shipping and erection holes with caulk before placing deck concrete.

(e) Protect galvanized Edge Rail Assemblies during screeding operations per *the* manufacturer's recommendations. Provide temporary blocking material in the Edge Rail seal cavities to prevent concrete intrusion during deck pour and finishing.

(f) Loosen any temporary or sacrificial support brackets, bolts, clamps, etc. that span across the joint after initial set of concrete, but not later than two hours after conclusion of concrete placement.

(g) Install Elastomeric Seal after completion of deck casting. Remove all joint form material and blocking material prior to installing Elastomeric Seal. Field install Elastomeric Seal in accordance with manufacturer's recommendations. Thoroughly coat all contact surfaces between the Elastomeric Seal and the Edge Rail seal cavities with an adhesive lubricant before setting Elastomeric Seal in place.

~~—————~~ **458-4.5 Modular Joint:** Install the joint at the location(s) shown in the plans. Follow the plan details, notes and or Special Provisions.

~~—————~~ **458-4.6 Finger Joint:** Install the joint at the location(s) shown in the plans. Follow the plan details, notes and or Special Provisions.

~~458-4.7 Compression Seal:~~ Install the joint at the location(s) shown in the plans. Follow the plan details, notes and or Special Provisions.

458-5 Method of Measurement.

458-5.1 General: The quantities to be paid will be plan quantity for the length of each type of joint constructed and accepted.

458-5.2 Measurement of ~~Expansion Joint Length and~~ *for* -Payment: The length of each type of ~~expansion~~ joint to be paid for will be plan quantity completed and accepted.

458-6 Basis of Payment.

458-6.1 Basic Items of ~~Expansion Joints.~~ The Contract unit price per foot ~~[meter]~~ for ~~Expansion Joints~~ will be full compensation for all work and materials necessary for the complete installation. Such price and payment will include, but not be limited to, the following specific incidental work:

(a) Any work required to clean and prepare the adjacent bridge deck, deck block out or deck joint gap.

(b) Any necessary repairs to the galvanizing on metallic joint components.

(c) Any additional work or materials required for non standardized or special construction or installation techniques.

(d) Any cost of erection and removal of any temporary supports which may be necessary for ensuring proper alignment and positioning of the ~~expansion~~ joint relative to the bridge deck.

458-6.2 Payment Items: Payment shall be made under:

Item No. 458 - 1- Bridge Deck Expansion Joint – per linear foot.

~~Item No. 2548 - 1 — Bridge Deck Expansion Joint — per linear meter.~~