Index 21110 Poured Joint with Backer Rod Expansion Joint System

Design Criteria

AASHTO LRFD Bridge Design Specifications; ***Structures Design Guidelines (SDG)***

Design Assumptions and Limitations

Use Index 21110 in accordance with the requirements of ***SDG*** 6.3 and 6.4.

Plan Content Requirements

Show Poured Joint with Backer Rod Expansion Joints on Superstructure and Approach Slab detail sheets and other sheets as required. Label Expansion Joint by name or Index number. Show Sidewalk Cover Plates at all expansion joint locations that intersect with sidewalks.

Complete the "Poured Expansion Joint Data Table Index No. 21110" using the instructions provided and include the table in the plans. See Introduction I.3 for more information regarding use of Data Tables.

Instructions:

1. Total Design Movement is the absolute value of the total factored temperature movement (expansion and contraction), measured in the direction of movement. Note that creep and shrinkage may be neglected. See ***Instructions for Design Standards*** for Index 21100, Figures 1 through 4, for determining the Direction of Movement.
2. Include a value for Dimension A in the Data Table. Dimension A (measured perpendicular to the joint @ 70°F) is normally set at 2 inches for non-skewed joints. Set Dimension A to account for skews or smaller design movements while meeting the design limitations below:
   a. The design joint opening should be equal or greater than twice the factored joint contraction (including creep and shrinkage);
   b. The minimum factored joint opening in the direction of movement is ½ inch;
   c. The maximum factored joint opening in the direction of travel is 3 inches;
   d. The minimum joint opening recommended by manufacturers at the time of installation is 1 inch.
3. Dimension A adjustments for 10°F shall be based on the unfactored movements perpendicular to the centerline of the joint.

POURED EXPANSION JOINT DATA TABLE INDEX NO. 21110			Table Date 1-01-09
LOCATION	DIM. "A" @ 70°F	TOTAL DESIGN MOVEMENT	DIM. "A" ADJUSTMENT PER 10°F

NOTE:
Dim. "A" adjustment per 10°F shown is measured perpendicular to ℄ Expansion Joint. Work this table with Design Standards Index No. 21110.

Payment

Item number	Item description	Unit Measure
458-1-AB	Bridge Deck Expansion Joint	LF

Example

Given a bridge on a 45° skew, find Dimension A at 70° F.

Note: contraction and expansion are in the direction of movement and Dimension A is measured perpendicular to the joint opening. The maximum allowable opening in the direction of travel is 3 inches (See ***SDG*** Table 6.4-1).

The calculated movement is ±1 inch.

The minimum opening at 70° F in the direction of movement/travel is 2 * 1" = 2".

Two inches in the direction of movement = 1.4" (Say approximately 1.5" perpendicular to the joint).

Contraction/expansion perpendicular to the joint would be approximately 0.7" (Say 0.75" for simplicity).

Check if a Dim A of 1.5" meets the criteria.

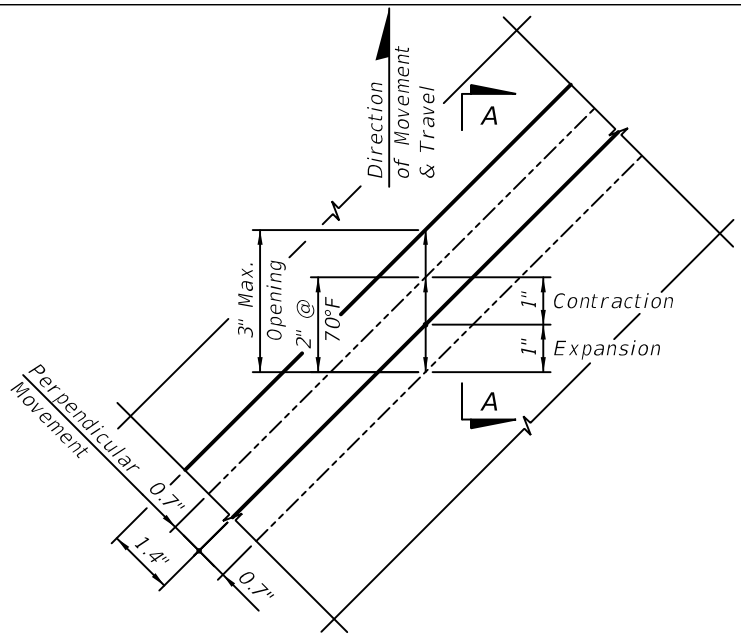
Dim A ≥ 2 * contraction: 2 * 0.7 =1.4 < 1.5" OK

Maximum opening in the direction of travel is < 3":

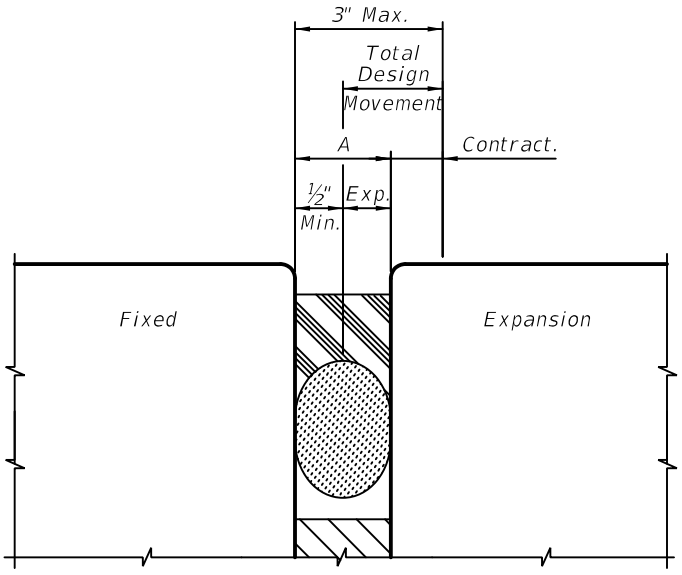
Converting back from perpendicular to direction of movement: Opening = 2.12 inches at 70° F, therefore the maximum opening = 2.12" + 1" = 3.12".

3.12" is within a reasonable construction tolerance of 3", therefore OK.

Use Dim A = 1½".



45° SKEWED JOINT



SECTION A-A THRU JOINT