

NEW HAMPSHIRE DEPARTMENT OF TRANSPORTATION



BUREAU OF BRIDGE DESIGN



BDM CHAPTER 7 - REVISION HISTORY

Date of Revision	Action	Location of Change	Revision Description	Background
8/6/2019	Appendix 7.4-B1 - B15 Replace all pages.	pages 7.4-B1 - 7.4-B10	Removed details.	The details in the manual were difficult to update and hence were inconsistent with the details on the webpages. The details on the webpages are kept current. The Appendices give a link to the webpages.
11/14/2018	Section 7.4 Replace all pages.	Section 7.4.1, page 7.4-1	<p>Added new paragraph between 5 & 6th paragraphs: <i>All bridges with membrane and pavement shall have an asphaltic plug for crack control at the fixed ends. The detail shown on Appendix 7.4-B1 shall be included in the contract plans.</i></p> <p>Revised 3rd sentence to 6th paragraph: To: <i>If an expansion joint has a skew between 32 ° and 42 ° left ahead (either direction on the interstate) or near this range or the joint opening (inside extrusions) is greater than 4-in. (102-mm) in the longitudinal direction [AASHTO LRFD 4.5.3.2], communication shall be made with the Bridge Design Chief, Bureau of Bridge Maintenance, and the District Engineer on whether a plow protection plate should be placed on the expansion joint.</i></p> <p>From: If an expansion joint has a skew between 32° and 42° left ahead (either direction on the interstate) or near this range, communication shall be made with the Bridge Design Chief, Bureau of Bridge Maintenance, and the District Engineer on whether a plow protection plate should be placed on the expansion joint.</p>	Per AASHTO LRFD 4.5.3.2, expansion joints shall not have a gap opening greater than 4-in. A plow plate could be placed over the opening.

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11/14/2018	Section 7.4 Replace all pages.	Section 7.4.2, page 7.4-1, 2, 4, 5, 7 & 9	<p>Added "preformed closed cell" to 1st sentence</p> <p>Added to A. Asphaltic Plug Expansion Joint 1st sentence "with locating pin"</p> <p>Added to C. Strip Seal Expansion Joint "See Appendix 7.4-A8 for standard dimensions of the plow protection plate design."</p> <p>Updated Figures 7.4.2-5 & 7.4.2-5</p> <p>Revised E. Modular Expansion Joint 2 paragraph last 2 sentences: To: Single-support bar systems have not meet AASHTO required manufacturer testing. Therefore, only multiple-support bar systems are allowed and shall have a full-penetration welded connection between the center beams and support bars. From: Practical center beam span lengths limit the use of multiple support bar systems for larger movement range modular expansion joints. Multiple support bar systems typically become impractical for more than nine seals or for movement ranges exceeding 27 in. Hence, the single support bar concept typifies these larger movement range modular expansion joints.</p> <p>Added F. Preformed Closed Cell Expansion Joint Added Figure 7.4.2-10</p>	Updated pictures with revised plow plate detail and picture and finger joint detail. Added preformed closed cell paragraph, detail, and picture.
11/14/2018	Section 7.4 Replace all pages.	Section 7.4.4, page 7.4-11	<p>Added bullet to 3rd paragraph:</p> <ul style="list-style-type: none"> For highly skewed bridges, a 3-D analysis shall be performed to determine the thermal movement of the bridge, the orientation and type of bearings, and the transverse and longitudinal translation the expansion joint shall be designed for. 	
11/14/2018	Section 7.4 Replace all pages.	Section 7.4.5, page 7.4-12	<p>Added check box:</p> <p><input type="checkbox"/> Cut and weld connection of the angles and plates at the crown or break-in-slope.</p>	Designers shall pay close attention to the fabrication of the armored joint at breaks-in-slope. The fabrication becomes difficult with skews and plates welded to the angles may be required to meet the geomtery.
11/14/2018	Section 7.4 Replace all pages.	Section 7.4.6, page 7.4-12	<p>Revised 3rd check box:</p> <p>To: <input type="checkbox"/> The following note is located on the Reinforcement Notes:</p>	

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11/14/2018	Section 7.4 Replace all pages.	Section 7.4.7, page 7.4-15, 16	Added Section 7.4.7 Angle/Plate Connection Fabrication Detailing at All Breaks-in-slope	Fabrication issues with armored expansion joints with skew have been brought to our attention. All armored expansion joints with a skew shall be reviewed and detailed for fabrication at a break-in-slope.
11/14/2018	Appendix 7.4-A3 Replace all pages.	Appendix 7.4-A3, page 7.4-A3-2	Added last bullet: <ul style="list-style-type: none"> • <i>Minimum joint openings that are ≤ 1-in. shall use $\frac{3}{8}$ x $\frac{3}{8}$-in. stop bars. The $\frac{1}{2}$ x $\frac{1}{2}$-in. stop bars would close onto each other at the minimum joint opening.</i> 	
11/14/2018	Appendix 7.4-A4 Replace all pages.	Appendix 7.4-4, page 7.4-A4-1	Added to 2nd bullet: <i>"If need a 5" seal, a special provision is required since it will be a proprietary item."</i>	
11/14/2018	Appendix 7.4-A5 Replace all pages.	Appendix 7.4-A5, page 7.4-A5-2	Updated Section A-A detail.	
11/14/2018	Appendix 7.4-A6 Replace all pages.	Appendix 7.4-A6, page 7.4-A6-1, 5, 6	Added last two bullets to page 1: <ul style="list-style-type: none"> • <i>Support boxes and boars shall be designed by the Manufacturer utilizing multiple support bar systems and full-penetration welded connection between the center beams and support bars. No single-support bar with yoke (stirrup) will be allowed.</i> • <i>The modular joint plans shall show multiple-support bars on the plan view.</i> Removed 1st bullet under C. Calculate Expansion joint Gap, "T" Added to page 6: <i>"Calculate without load factor, γTU"</i>	
11/14/2018	Appendix 7.4-A7	Appendix 7.4-A7	Added Preformed Closed Cell Expansion Joint Limitations and design examples	
11/14/2018	Appendix 7.4-A8	Appendix 7.4-A8	Added Appendix 7.4-A-8 Plow Protection Plate Standard Design Data	The plow protection plate has been finalized after discussions with Bridge Maintenance to provide an opening that can be cleaned out. Added standard design data for drawing plow protection plates.
11/14/2018	Appendix 7.4-A9	Appendix 7.4-A8	Added Appendix 7.4-A-8 Plow Protection Plate Standard Design Data	
11/14/2018	Appendix 7.4-A9 Replace all pages	Appendix 7.4-A8	Renumbered Appendix 7.4-A8 NHDOT Temperature Expansion Tables To: Appendix 7.4-A9 NHDOT Temperature Expansion Tables	

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Date of Revision	Action	Location of Change	Revision Description	Background
11/14/2018	Appendix 7.4-B2 Replace all pages	Appendix 1.4-B2, page 7.4-B2-1	Added detail with partial deck panel	
11/14/2018	Appendix 7.4-B3 Replace all pages	all pages	Updated appendix to show current details. Added details with partial deck panel.	
11/14/2018	Appendix 7.4-B4 Replace all pages.	all pages	Updated appendix to show current details. Added details with partial deck panel.	
11/14/2018	Appendix 7.4-B5 Replace all pages.	all pages	Updated appendix to show current details.	
11/14/2018	Appendix 7.4-B6 Replace all pages.	all pages	Updated appendix to show current details.	
11/14/2018	Appendix 7.4-B8 Replace all pages.	all pages	Updated appendix to show current details.	
11/14/2018	Appendix 7.4-B9 Replace all pages.	all pages	Updated appendix to show current details.	
11/14/2018	Appendix 7.4-B10 Replace all pages.	all pages	Updated appendix to show current details.	
11/14/2018	Appendix 7.4-B11 Replace all pages.	all pages	Updated appendix to show current details.	
11/14/2018	Appendix 7.4-B12 Replace all pages.	all pages	Updated appendix to show current details.	
11/14/2018	Appendix 7.4-B13	all pages	Added appendix and details.	
11/14/2018	Appendix 7.4-B14	all pages	Added appendix and details.	
11/14/2018	Appendix 7.4-B15	all pages	Added appendix and details.	
12/28/2015	Appendix 7.4-B11 Replace all pages.	all pages	Updated details.	Changes are noted on the Bridge Details Revision History document.
12/28/2015	Appendix 7.4-B7 Replace all pages.	all pages	Updated details.	Changes are noted on the Bridge Details Revision History document.
12/28/2015	Appendix 7.4-B5 Replace all pages.	all pages	Updated sample plan.	Changes are noted on the Bridge Details Revision History document.
12/28/2015	Appendix 7.4-B4 Replace all pages.	all pages	Updated sample plan.	Changes are noted on the Bridge Details Revision History document.
12/28/2015	Appendix 7.4-B3 Replace all pages.	all pages	Updated details.	Changes are noted on the Bridge Details Revision History document.
12/28/2015	Appendix 7.4-B2 Replace all pages.	all pages	Updated details.	Changes are noted on the Bridge Details Revision History document.
12/28/2015	Appendix 7.4-B1 Replace all pages.	all pages	Updated details.	Changes are noted on the Bridge Details Revision History document.

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12/28/2015	Appendix 7.4-A6 Replace all pages.	page 7.4-A6-1	Updated details.	Revised note for plan and directed designer to use the Sample Project Notes.
		page 7.4-A6-3	Revised 2nd to last bullet to: <i>See Sample Project Notes for notes to be placed on the plans.</i> From: Notes shall be placed on the plans stating the following: 1. The modular bridge joint system shall have a range of movement of XX inches. The Contractor shall use modular bridge joint systems STM series by Watson-Bowman-Acme or D series by D.S. Brown. This design includes movement due to temperature, skew, and minimum installation.	Clarification
		page 7.4-A6-5	Added "factored" to B. Added "non-factored" to D.	Clarification
		page 7.4-A6-6	Added "factored" to B.	Revised note for plan and directed designer to use the Sample Project Notes.
12/28/2015	Appendix 7.4-A5 Replace all pages.	page 7.4-A5-4, 6	Added "non-factored" to D. Deleted notes on plans. Added "Use Sample Project Notes"	Actually calculating $M_{15^{\circ}\text{normal}}$
12/28/2015	Appendix 7.4-A4 Replace all pages.	page 7.4-A4-3, 5	Changed $M_{t \text{ longitudinal}}$ to $M_{15^{\circ}\text{normal}}$	Actually calculating $M_{15^{\circ}\text{normal}}$
12/28/2015	Appendix 7.4-A3 Replace all pages.	page 7.4-A3-2	Changed $M_{t \text{ longitudinal}}$ to $M_{15^{\circ}\text{normal}}$	Actually calculating $M_{15^{\circ}\text{normal}}$
		page 7.4-A3-5	Added \pm to 3 3/8" in uncompressed seal chart.	
		page 7.4-A3-5,7, 11	Added "and approved by the Design Chief." to paragraph	
2/2/2015	Appendix 7.4-A6 Replace all pages.	page 7.4-A6-1	Changed $M_{t \text{ longitudinal}}$ to $M_{15^{\circ}\text{normal}}$	Clarification and correction of equations. The minimum installation opening for the strip seal shall be 1.75" at 65°F for any future replacement. Bridge Maintenance requested the larger opening because of the difficulty of getting a replacement seal in the opening even at colder temperatures.
		page 7.4-A6-3	Added note: • <i>Minimum joint opening at installation of seal shall not be less than 1.75" normal to joint (Required for D.S. Brown Co. strip steals).</i>	
		page 7.4-A6-5 and 6	Added equation: $M_{\text{normal open}}$ and $M_{\text{normal close}}$ Revised part C. and D.	