# SEISMIC JOINT (TYPE II, HALF CHANNEL)

<table>
<thead>
<tr>
<th>XS Sheet Numbers</th>
<th>xs8-100-1 thru xs8-100-9</th>
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<tbody>
<tr>
<td>Description of Component</td>
<td>The Seismic Joint is based on a very simple concept and can be used for service and/or seismic demands. The Joint can accommodate large translational movements in the longitudinal and transverse directions, large rotations about the vertical axis, and limited vertical movements by allowing rotation about the transverse axis at its pinned end. Limited rotation about the longitudinal direction is also permitted due to flexible rubber washers at the pin. Unlike other joints systems, it shifts potential joint damage away from the critical joint opening, therefore preventing joint collapse and traffic disruption even after a major seismic event.</td>
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<tr>
<td>Standard Drawing Features</td>
<td>The Seismic Joint is a steel plate sliding system and comes in a modular form. Each module covers a half traffic lane and is made of i) a Box/Channel Assembly, ii) the Support Plate, iii) the Deck Plate and iv) the elastomeric sealant. The Deck Plate spans the joint opening and slides over the Support Plate. The elastomeric sealant accommodates the service demands and it is considered a sacrificial element at seismic. Since the sealant is located away from the joint opening on the bridge deck, the joint is still able to carry traffic after a major seismic event and the sealant could be replaced at a later time.</td>
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</table>
| Design/General Notes | • A minimum Deck Plate thickness $T_d$ equal to to 2 inches is required for joint openings from 2 to 4 feet at 70 °F. For larger openings contact the Joint Seals & Bearings Specialist  
• $xs\ 8\-100\-8$. The construction sequence is included. Any alternative construction sequence shall be reviewed and approved by the Engineer.  
• $xs\ 8\-100\-9$. An optional barrier detail is provided. The Engineer shall provide barrier details approved for the project.  
• Access to the Channel Assembly is provided from the joint opening. |
| Additional Drawings Needed to Complete PS&E | $xs\-100\-1$ Joint information Table must be filled by the Engineer.  
Joint opening @ 70 °F, $\min \alpha_{70(\text{in})} = \max(\ 24", \ (\text{SEE (seismic) closing} + (\text{temp. rise}))$)  
For $24" \leq \alpha_{70} \leq 48"$ then $\min T_d=2"$;  
Deck plate length, $L_d$ (in) ={(13 5/8", channel seat) + (joint opening @ 70 °F) + (creep & shrinkage) + (temp. drop) + (SEE (seismic) opening) + 4") * (1/cos\(\text{skew}\)),  
Note that the Deck plate is made of a steel plate and is covered by a polyester concrete overlay. |
### User Guide to Bridge Standard Detail Sheets

**For Seismic Joint Type II Half Channel Oct2016**

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- **cx**
- **10/10/2016**

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<table>
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<tr>
<th><strong>Contract Specifications</strong></th>
<th>Current Nonstandard Specifications are available from the Division of Engineering Services. If these are unavailable then you may contact the Senior Technical Specialist for Joint Seals &amp; Bearings.</th>
</tr>
</thead>
</table>
| **Restrictions on Use of Standard Drawings** | • The Seismic Joint Type II Half Channel may be used when the Service (non-seismic) Movement Rate (MR) demand is greater than 4 inches.  
  • The minimum joint opening available at 70 °F shall be 24 inches for access to the Channel/Box Assembly from the joint opening. |
| **Special Considerations** | • Seismic joints must be completely assembled at the fabrication plant including painting, application and curing of the polyester concrete overlay.  
  • Each joint module is assembled at its rest position (70 °F)  
  • The installation of the joint shall take place after 1) constructing concrete barriers or bike paths, 2) placing deck overlays and 3) installing utilities  
  • Each joint module is assembled at the shop, shipped and installed as one unit. |
| **Design Example** | Given: skew = 25° at joint location, Temp. 3”/3”, Cr & Sh=2”, SEE=14”/18”,  
  Joint opening @ 70 °F, min α70 (in) = max( 24”, (SEE (seismic) closing + (temp. rise)))= max(24”, (14” + 3”))=24”  
  Since 24”≤ a70 <48” then select Td=2”  
  Deck plate length, Ld (in) ={(13 5/8”, channel seat) + (joint opening @ 70 °F) + (creep & shrinkage) + (temp. drop) + (SEE (seismic opening) + 4") * (1/cos(skew))= (13 5/8” + 24” + 2” + 3” + 18” + 4") * (1/cos (25°))= 71.3” |

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**Length of RMREJ:** \((MR \text{ (long)}) \times (1/cos\text{(skew)})\); select a RMREJ from the current list of qualified suppliers (Trelleborg, Watson Bowman Acme).

Support plate length, \(L_s\) (in) =\([\text{(creep & shrinkage)} + \text{(temp. drop)} + \text{(SEE (seismic) opening) + 4")}] \times (1/cos\text{(skew)}) + \text{(Lr, RMREJ)}\).

To account for the skew at the joint location, the joint capacity is increased by \(1/cos\text{(skew)}\).

xs8-100-2 thru 4 and 6 should be adjusted to the joint skew and the geometry of the external modules of the project.

xs8-100-7 shall be edited to project specific geometry.

Xs8-100-9: at joint opening @70 °F, min overlap length (in) ={(creep & shrinkage) + (temp. drop) + 12”}

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**XS8-100 User Guide For Seismic Joint Type II Half Channel Oct2016.Docx**  
10/10/2016
<table>
<thead>
<tr>
<th></th>
<th>MR (long)) = (3” (temp. drop) + 3” (temp. opening) + 2” (creep &amp; shrinkage)) = 8”;</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Length of RMREJ: (MR (long)) * (1/cos (skew))= 8” * (1/cos (25˚))= 8.827”</td>
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<tr>
<td></td>
<td>From the available supplier lists we select a RMREJ with MR =9”, Length, Lr= 35.4” and thickness Tr = 3.75”.</td>
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<tr>
<td></td>
<td>The Deck plate is made of a 2” thick steel plate and is covered by a (3.75”-2”) 1.75” thick polyester concrete overlay.</td>
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<tr>
<td></td>
<td>Support plate length, Ls (in) =[(creep &amp; shrinkage) + (temp. drop) + (SEE (seismic) opening) + 4”] * (1/cos(skew)) + (Lr, RMREJ)=</td>
</tr>
<tr>
<td></td>
<td>= {(2” + 3” + 18” + 4”) * (1/cos (25˚)) + 35.4”}= 65.2”</td>
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