

1.2.1.3 Intermediate Cross Frames

Design

If needed, provide and design cross frames for all stages of construction and the final condition.

Detailing

In choosing between intermediate cross frames of "K" or "X" form, the "X" form should generally be used when the ratio of the beam spacing to the frame depth is less than 2 and the "K" form when it is greater than 2. When the depth of the frame approaches 3' or less, a solid plate diaphragm should be considered.

Maintenance requirements should also be considered in the cross frame design. Adequate clearance for sandblasting and painting should be provided. Inaccessible areas should be avoided. It may also be necessary to provide for maintenance walkways and/or utilities through the cross frames.

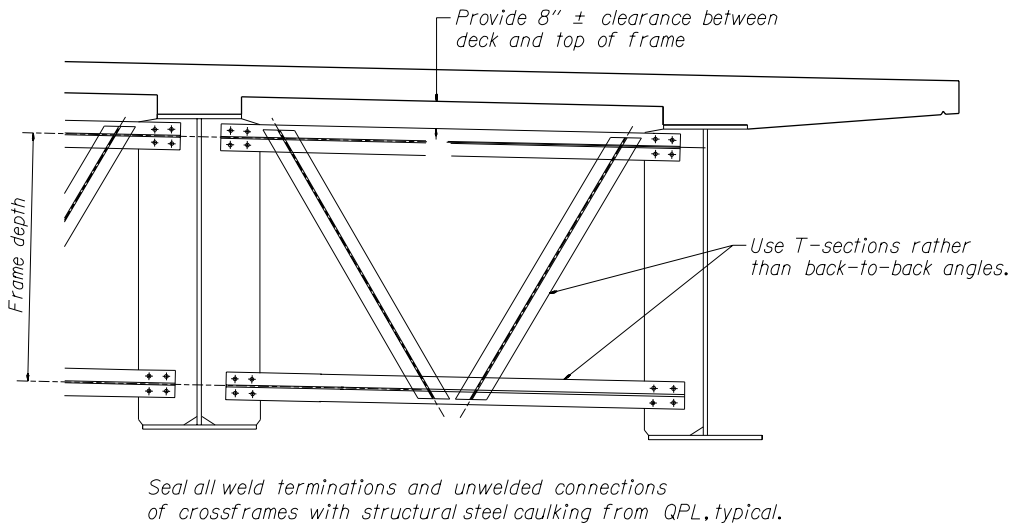


Figure 1.2.1.3A

1.2.1.3 Intermediate Cross Frames - (continued)

Rigidly connect cross frames to the top and bottom flanges to prevent web distortions and cracking. Stiffeners shall be welded to compression and tension flanges as shown on figures 1.2.1.3B, C and D. The ends of welds shall end about 1/4" away from the edge (snipe, clip, etc.) to avoid a poor quality weld termination.

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Do not stagger intermediate cross frames in skewed or curved steel plate girders. Where two adjacent plate girders have significant differential deflection, such as the first row of cross frame from the end bents, do not use the "K" or "X" type of cross frames. Use details shown on Figure 1.2.1.13B. Check fatigue requirements of all welded connections.

Provide intermediate cross frames between the box girders. Submit a request for a design deviation to the State Bridge Engineer when a project requires omitting intermediate cross frames or diaphragm between steel tub or box girders.

Connection Plates for Bracing Members - Cope diaphragm connection plates welded to both the web and flange of a plate girder a minimum of 1-1/2" to prevent intersection of the two welds. Avoid lateral connection plates for lateral bracing which will be connected to the web of the plate girder or box girders. Lateral connection plate shall be bolted to the flange of the steel girder, when is required, cope it so as to be clear of any transverse web stiffener or diaphragm connection plate.

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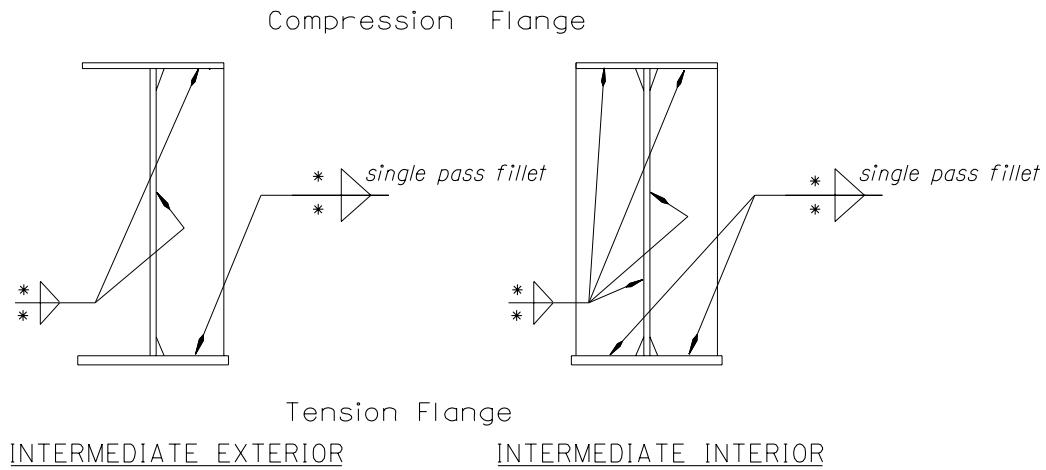
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1.2.1.3 Intermediate Cross Frames - (continued)



* Size fillet welds in accordance with AASHTO LRFD minimum welds sizes shall not be less than $\frac{1}{4}$ " for $t \leq \frac{3}{4}$ " or $\frac{5}{16}$ " for $t > \frac{3}{4}$ ".

Compression and Tension flanges reverse near interior bent of continuous girder.

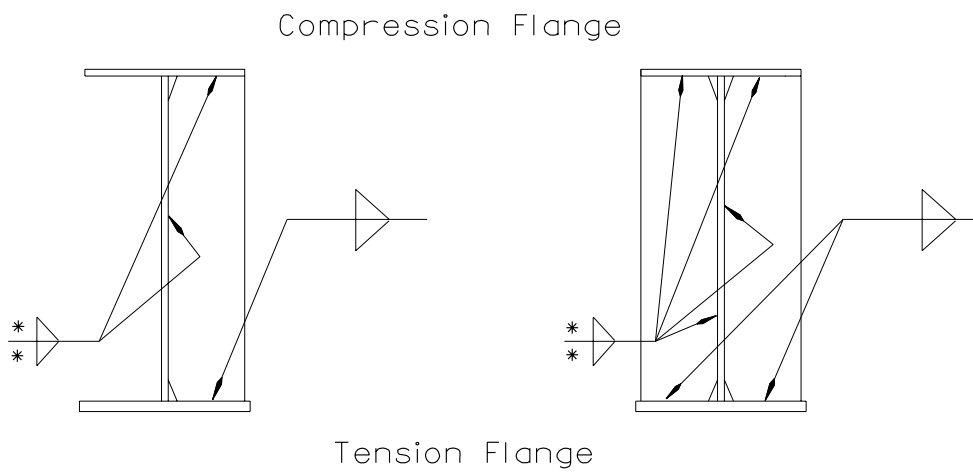
Seal all weld terminations and unwelded connections of crossframes and stiffeners with structural steel caulking from QPL, typical.

DIAPHRAGM CONNECTION PLATES

Figure 1.2.1.3B

1.2.1.3 Intermediate Cross Frames - (continued)

CURVED GIRDER



INTERMEDIATE EXTERIOR

INTERMEDIATE INTERIOR

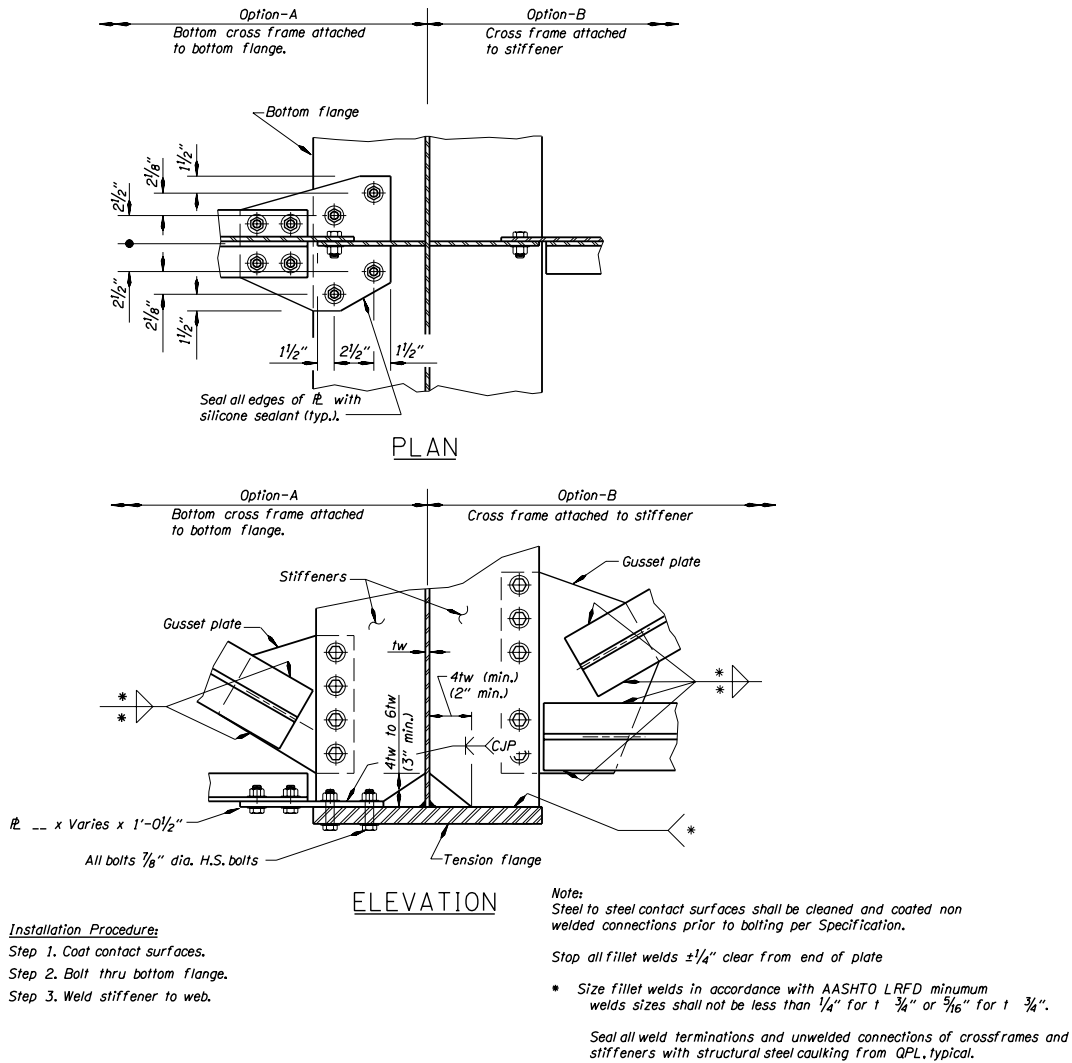
Compression and Tension flanges reverse near interior bent of continuous girder.

Seal all weld terminations and unwelded connections of crossframes with structural steel caulking from QPL, typical.

DIAPHRAGM CONNECTION PLATES

Figure 1.2.1.3C

1.2.1.3 Intermediate Cross Frames - (continued)



WELDED BRACKET DETAILS

Figure 1.2.1.3D

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