

## IOWA DEPARTMENT OF TRANSPORTATION

To Office Bridges and Structures

Date August 17, 2006

Attention All Employees

Ref No. 521.1

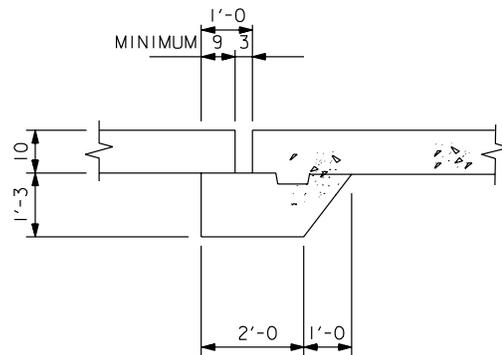
From Gary Novey

Office Bridges and Structures

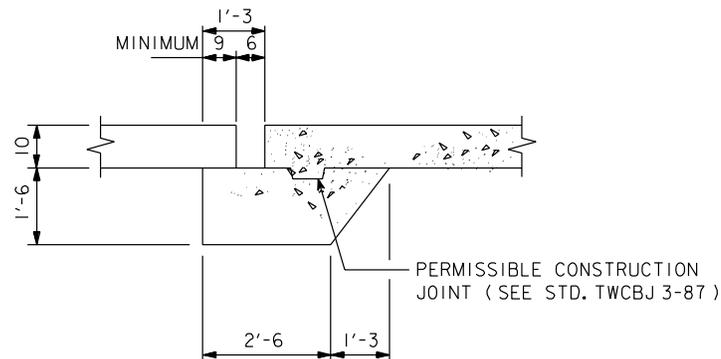
Subject: Method's Memo No. 152 (Maximum Joint Openings for Bell Joints)

In a recent project for a reinforced box culvert (Adair 100) an issue was brought to my attention related to culvert settlement. The project was a cast-in-place twin 12 ft x 12 ft box culvert with a predicted settlement of 1 ft 4 in. Calculations showed a bell joint opening of 4 5/8 inches would result from this settlement.

The office's two standards bell joint details show a total bearing length of 1 ft 0 in and 1 ft 3 in for bell joints for 12 x 12 culverts (See details below and culvert standards). For this situation with a 4 5/8 in opening, the remaining length that the culvert would have to bear on would be 10 3/8 in. For this project the bearing length was acceptable.



Bell Joint with 1'-0 Support



Bell Joint with 1'-3 Support

As a rule of thumb for future projects a minimum acceptable bearing length that would be allowed is 9 inches. This would allow maximum openings of 3 inches on standard bell joints with 12 inch support length and 6 inches for standard bell joints with 1 ft 3 in supports lengths. See details.

Please bring it to my attention when situations are found where the 9 inches of support cannot be met. Alternatives such as: over-excavation, geopiers, or non-standard bell joints will need to be discussed with the Soils Section of Design.

GAN/dgb/bj