

5.4 DECK CLOSURE POUR WAITING PERIOD

5.4.1 GENERAL

The purpose of this memo is to guide the Project Engineer toward a minimum waiting period required to achieve good long-term performance of the concrete deck in the bay containing a closure pour for a bridge widening or staged construction. Additionally, there are instances where a closure pour may not be necessary, as described in Section 5.4.3 below.

This memo is intended for conventional cast-in-place (CIP) construction and does not address the closure pour waiting period for steel or precast girder structures. For more information, refer to Structure Technical Policy 5.4.

When a closure pour is required for a bridge widening or staged construction, the waiting period should be determined as specified in this memo and shown on the plans.

The waiting period defers the final connection of the widening or staged bridge until sufficient vertical and horizontal long-term dead load and prestress deflection have occurred. The waiting period reduces the stress build-up in the deck closure caused by the differential displacement after the deck connection is made. The required waiting period for the closure pour depends on the bay width, the instantaneous deflection, and the time-dependent behavior of the CIP concrete superstructure.

The design methodology recommended in this memo is based on the UCD research report (Hung and Chai, 2011) with the concept that the differential deflection capacity of the deck containing the closure pour must be greater than the anticipated long-term differential deflection after the closure pour is placed. The long-term deflections are based on the deflection factors described in BDM 5.23.

5.4.2 DEFINITIONS

Closure pour — A concrete deck slab pour for the remaining deck between the widening or staged bridge and the existing bridge to accommodate the differential deflections caused by creep, shrinkage and elastic shortening.

Waiting period — The minimum required time, in days, before placing the deck closure pour, beginning from the last falsework release.

Bay width — The clear distance at the deck level between the webs. For slab bridges, it is the clear distance between the edge of widened or staged slab and the existing slab.

Instantaneous deflection — The maximum calculated elastic deflection of the widening or staged girder/slab due to the dead load plus prestressing (if applicable). The dead load deflection is based on the weight of the girders and deck after the falsework has been released. The instantaneous deflection is calculated using a modulus of elasticity of concrete, E_c , as specified in AASHTO-CA BDS. The calculated deflection assumes no connection to the existing bridge or previously constructed stage.



5.4.3 NO CLOSURE POUR

Per STP 5.4, a closure pour for a bridge widening or staged construction is not required when the maximum instantaneous dead load deflection or dead load plus prestress deflection (if applicable) of the widening or staged bridge is 0.25" or less.

5.4.4 WAITING PERIOD CRITERIA

For CIP prestressed concrete or CIP reinforced concrete, a deck closure pour waiting period should be selected from Figures 5.4.4-1 to 5.4.4-4 when the following requirements are satisfied:

- The deck thickness as well as the bar reinforcing specified in BDM 9.4 are used in the closure pour bay.
- The bay width is 3'-0" minimum.

The waiting period specified in STP 5.4 is required when any of the above requirements are not satisfied or if this memo is not used to set a waiting period. However, the Project Engineer may elect to reduce these periods by demonstrating sufficient strength by time dependent analysis.

For concrete slab bridges, a closure pour waiting period is selected from Figures 5.4.4-1 to 5.4.4-4 using a bay width equal to 3 ft.

Figures 5.4.4-1 to 5.4.4-4 must be supplemented with the following requirements and limitations:

- The closure pour waiting period need not exceed 60 days.
- The minimum waiting period for CIP prestressed concrete construction is 10 days.
- The minimum waiting period for CIP reinforced concrete construction is 15 days.
- For CIP reinforced concrete girders or slabs, the instantaneous deflection due to the dead load is multiplied by a factor of 1.33.
- For bay widths larger than 14 ft, a bay width equal to 14 ft is to be used.
- Figures for staged construction assume 365 days between the end of stage 1 and the beginning of stage 2. If fewer days are required between stages, use of Figures 5.4.4-1 and 5.4.4-2 is conservative. If more than 365 days are required between stages, the waiting period should be determined using Figures 5.4.4-3 and 5.4.4-4.
- If falsework is left in place for at least 28 days, the instantaneous deflection values may be reduced by 25%.

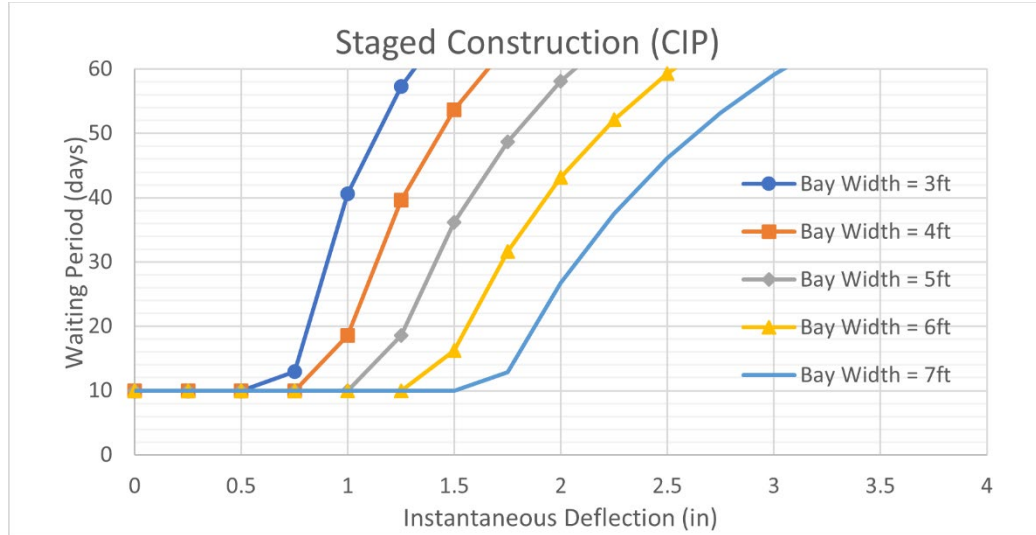


Figure 5.4.4-1 Waiting Period for CIP Staged Construction for Bay Widths from 3 ft to 7 ft

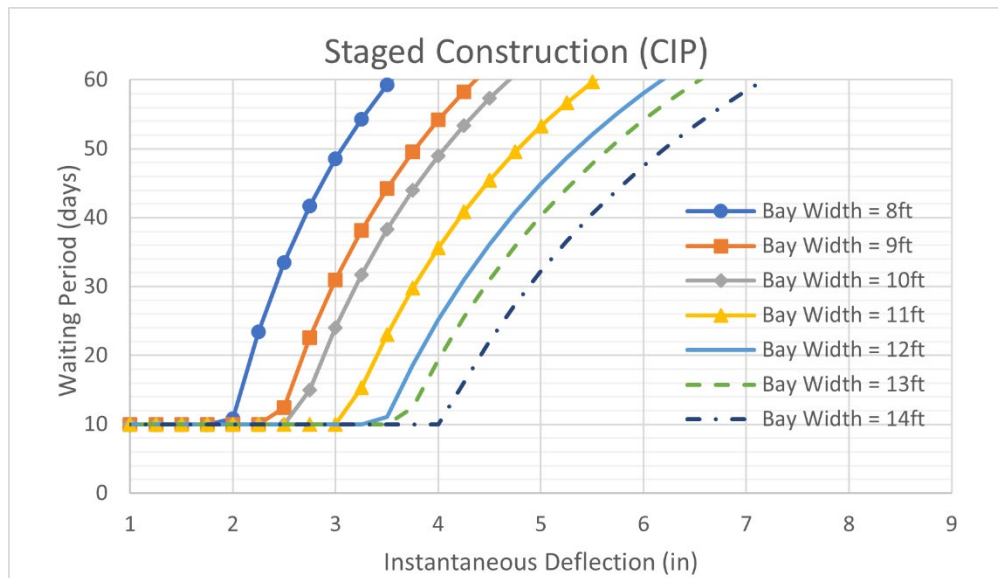


Figure 5.4.4-2 Waiting Period for CIP Staged Construction for Bay Widths from 8 ft to 14 ft

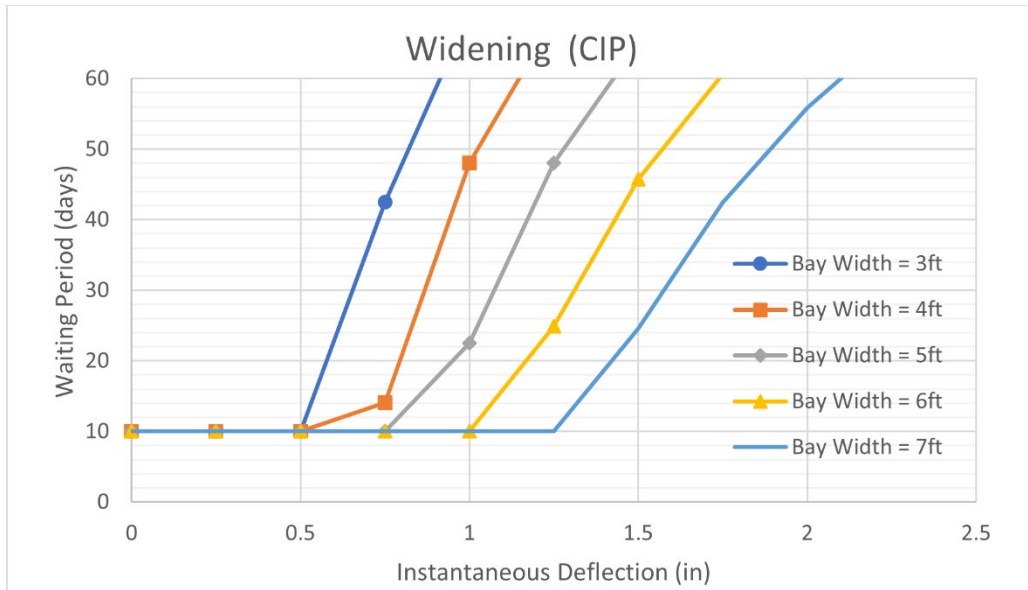


Figure 5.4.4-3 Waiting Period for CIP Widening Construction for Bay Widths from 3 ft to 7 ft

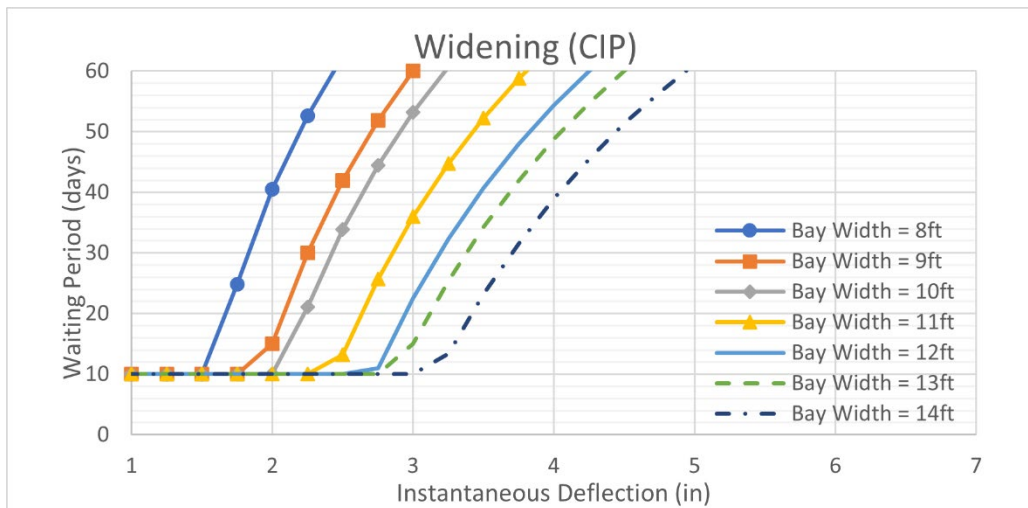


Figure 5.4.4-4 Waiting Period for CIP Widening Construction for Bay Widths from 8 ft to 14 ft



5.4.5 DESIGN PLAN NOTES

Per STP 5.4, the deck closure pour waiting period must be shown on the plans. A sample note is shown below:

“The Closure pour shall not be placed sooner than 10 days after the last falsework has been released.”

5.4.6 REFERENCES

1. Caltrans. (2021). *Bridge Design Memo 5.23, Hinge Curl*, California Department of Transportation, Sacramento, CA.
2. Caltrans. (2021). *Bridge Design Memo 9.4, Typical Deck, Typical Overhang, and Soffit Design*, California Department of Transportation, Sacramento, CA.
3. Caltrans. (2021). *Structure Technical Policy 5.4, Deck Closure Pour and Associated Requirements*, California Department of Transportation, Sacramento, CA.
4. Hung, H. J. and Chai, Y. H. (2011). *Shortening Closure Pour Waiting Time for Bridge Construction*, Report No. CA10-0928, University of California, Davis, California.