

TO: All Design Staff  
FROM: Bijan Khaleghi  
DATE: September 19, 2012  
SUBJECT: Slab Shrinkage

The purpose of this memorandum is to clarify slab shrinkage effects for precast-prestressed concrete bridges with cast-in-place concrete decks.

The effect of deck shrinkage shall be analyzed by considering it as an external force applied to the composite section for the Service I, Service III, and Fatigue I limit states. This force is applied at the center of the deck with an eccentricity from the center of the deck to the center of gravity of the composite section. This force causes compression in the top of the girder, tension in the bottom of the girder, and an increase in the effective prestress force (an elastic gain). The deck shrinkage strain shall be computed as 50% of the strain determined by LRFD Equation 5.4.2.3.3-1. The PGSuper software will be updated to accommodate deck shrinkage effects.

**Background:**

It is important to differentiate elastic gains from prestress losses. Elastic gains are simply part of the elastic response of a beam to applied loads. When gross section properties are used in the analysis, elastic gains must be calculated explicitly and added back into the prestress.

It is unlikely that the full calculated force from deck shrinkage will occur because of the presence of deck cracking and deck reinforcement. PCI recommends that 50% of deck shrinkage should be considered.

If you have any questions regarding these issues, please contact Richard Brice at 360-705-7174 ([BriceR@wsdot.wa.gov](mailto:BriceR@wsdot.wa.gov)) or Bijan Khaleghi at 360-705-7181 ([KhalegB@wsdot.wa.gov](mailto:KhalegB@wsdot.wa.gov)).

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