

TO: All Design Staff
FROM: Bijan Khaleghi
DATE: December 23, 2015
SUBJECT: Service III Live Load Factor for Prestressed Concrete Superstructure Elements

The purpose of this memorandum is to clarify the load factor for live load, γ_{LL} , for the Service III Load Combination. This factor shall be taken as 0.8 when the design requirements defined in Sections 5.6.1 and 5.6.2 of the WSDOT Bridge Design Manual are satisfied.

In special cases that deviate from the requirements of Sections 5.6.1 and 5.6.2 and have been approved by the WSDOT Bridge Design Engineer, γ_{LL} , shall be as specified in the AASHTO LRFD Bridge Design Specifications.

The Service III live load factor for load rating shall be 1.0.

Background:

The 2016 Interim Revisions to the AASHTO LRFD Bridge Design Specifications and the AASHTO Manual for Bridge Evaluation have made the Service III load factor for live load dependent upon the method by which prestress losses are estimated. The purpose of this change was to maintain a uniform level of reliability against cracking of prestressed concrete components as explained in LRFD C3.4.1.

The conservative nature of the design requirements defined in the WSDOT Bridge Design Manual provides sufficient protection against cracking and adequate long-term performance of prestressed concrete superstructure components.

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

cc: Mark Gaines, Bridge Construction – 47354
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BDM Revisions:

Add the following after the first paragraph in Section 3.5:

The design live load factor for the Service III Limit State load combination shall be as follows:

$\gamma_{LL} = 0.8$ when the requirements of Sections 5.6.1 and 5.6.2 are satisfied and stress analysis is based on gross section properties.

$\gamma_{LL} = 1.0$ when the requirements of Sections 5.6.1 and 5.6.2 are satisfied and stress analysis is based on transformed section properties.

In special cases that deviate from the requirements of Sections 5.6.1 and 5.6.2 and have been approved by the WSDOT Bridge Design Engineer, γ_{LL} , shall be as specified in the AASHTO LRFD Bridge Design Specifications.

The Service III live load factor for load rating shall be 1.0.

Replace 5.6.2I with the following:

Section Properties – Gross section properties (including the gross deck area transformed by the girder/deck modular ratio if applicable) shall be used for design of precast concrete girders including prestress losses, camber, and flexural capacity. Transformed sections (transforming reinforcement to an equivalent concrete area) may be used in special cases with the approval of the WSDOT Bridge Design Engineer.

Replace the “Dead and Live Load Factors” table under Section 13.1.1 with the following:

Bridge Type	Limit State	γ_{DC}	γ_{DW}	γ_p	Inventory	Operating	Legal &	γ_{LL}
					HL-93	HL-93	NRL Loads	
Reinforced Concrete	Strength I	1.25	1.50	--	1.75	1.35	Table 13.1-1	--
	Strength II	1.25	1.50	1.0	--	--	--	Table 13.1-1
Prestressed Concrete	Strength I	1.25	1.50	1.0	1.75	1.35	Table 13.1-1	--
	Strength II	1.25	1.50	1.0	--	--	--	Table 13.1-1
	Service III	1.00	1.00	1.0	1.00	--	1.0	1.0
	Service I	1.00	1.00	1.0	--	--	--	1.0
Steel	Strength I	1.25	1.50	1.0	1.75	1.35	Table 13.1-1	--
	Strength II	1.25	1.50	1.0	--	--	--	Table 13.1-1
	Service II	1.00	1.00	1.0	1.3	1.0	1.30	1.0