2007 Interim Changes

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The fourth edition of the AASHTO *LRFD Bridge Design Specifications* was published at the beginning of this year. This 2007 edition incorporates all of the interim changes since the publication of the third edition in 2004, and the new items approved by the AASHTO Subcommittee on Bridges and Structures (SCOBS) at their Annual Meeting in 2006. The items are identified as Agenda Items 8 through 15A and are reviewed in this article and will continue in the next edition of *ASPIRE.*™

Agenda Item 8 includes revisions to LRFD Article 5.10.11.4.1 relating to seismic performance of concrete bridges in Seismic Zones 3 and 4. The term "seismic hoop" is defined as a noncontinuously wound tie with a closure made using a butt weld or mechanical-closure coupler as a potentially superior alternative to spirals and to distinguish these seismic hoops from traditional AASHTO-defined hoops. Further, these revisions no longer permit lap splices anywhere in longitudinal column reinforcement in Seismic Zones 3 and 4. Commentary is added about the advantages of seismic hoops over spirals and the rationale for eliminating lap splices in these columns.

Fatigue stress range limits for welded wire reinforcement are added to the limits for reinforcing bars in Article 5.5.3.2 through Agenda Item 9. An adaptation of the traditional equation for fatigue stress range limits is extended to welded wire reinforcement without a cross weld in the high-stress region, while a new more restrictive equation is presented for welded wire reinforcement with a cross weld in the high-stress region. Both equations eliminate the current (r/h) term for deformed reinforcement by substituting the suggested value of 0.3, which has been almost universally assumed in practice.

Perhaps, the most significant change for concrete bridges is the addition of a simplified procedure for shear resistance using the modified compression field theory (MCFT) approach of the *LRFD Specifications*. Agenda Item 10 adds a more traditional approach for the shear resistance of concrete members, wherein the lesser of V_{ci} and V_{cw} comprises the concrete contribution to shear resistance instead of the iterative approach of the MCFT model. This new simplified model is analogous to the shear resistance model of the AASHTO *Standard Specifications for Highway Bridges*. While simpler to apply, the new alternative shear-resistance model can also be relatively conservative.

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In the 2006 Interim Revisions, the equations for the determination of shrinkage and temperature reinforcement of LRFD Article 5.10.8 were modified. Agenda Item 11 provides additional clarification in this article for the maximum shrinkage and temperature reinforcement spacing and for situations where this reinforcement is not required due to thinness of the component.

Changes were also made in 2006 Interim Revisions to the manner in which resistance factors, ϕ, for prestressed and nonprestressed members are determined. Instead of determining the resistance factor based upon the type of loading, ϕ is now determined by the strain condition at a cross section at nominal resistance. Consequently, the linear variation of ϕ between axial load levels of 0.0 and $0.10f'_cA_g$ is no longer applicable. Agenda Item 12 removed it from Fig. C5.10.11.4.1b-1. The proposed change requires that ϕ for the cross section at nominal flexural resistance with zero axial load be calculated to establish the starting point for the interpolation of ϕ for column design in Seismic Zones 3 and 4. This is consistent with the changes made in 2006, since reduced ductility is compensated by increased over-strength (i.e., a reduced ϕ factor). The change also provides for the potential use of prestressed concrete columns.

Agenda Item 13, which updates LRFD Article 5.14.1.4, provides extensive revisions to the specification and commentary for bridges composed of simple span, precast girders made continuous. These revisions are based upon the latest research findings as reflected in National Cooperative Highway Research Program Report 519.

Agenda Items 14 through 15A relating to concrete bridges from the 2006 AASHTO SCOBS meeting will be reviewed in the next issue.