2010 Interim Revisions Related to Concrete Structures Part 2

by Dr. Dennis R. Mertz,
professor of civil engineering,
University of Delaware

The 5th Edition of the AASHTO *LRFD Bridge Design Specifications* was published recently. This new edition includes five interim revisions related to concrete structures that the American Association of State Highway and Transportation Officials (AASHTO) Subcommittee on Bridges and Structures (SCOBS) considered and adopted at their annual meeting in New Orleans, La., in July of 2009. Technical Committee T-10, Concrete Design, developed Agenda Items 9, 10, 12, 14, and 15 over the past several years and moved them to the subcommittee ballot for consideration in New Orleans. Agenda Items 9, 10, and 12 were reviewed and discussed in the previous issue of *ASPIRE*™. The final two items are described in this article.

Agenda Item 14 deals with crack-control reinforcement for the strut-and-tie model of Article 5.6.3.6. This reinforcement controls crack widths and ensures ductility so that the development of straight concrete struts is possible. While the ratio of reinforcement area to concrete area is still taken as not less than 0.003 in each direction, the first sub-item provides equations that clarify the zones over which the reinforcement is required. Many designers consider this amount of steel to be extreme. Recent research suggests that 0.003 is appropriate but this revision may reduce the required reinforcement through more precise specification of the application of the provisions. The second sub-item includes a modification to the commentary and adds a figure illustrating the distribution of crack-control reinforcement in a concrete strut.

Agenda Item 15 modifies Article 5.8.3.4.2 and includes four sub-items. The first sub-item clarifies the definition of ε_s in the notation for use in Article 5.8.3.4.2. Previously, the definition stated that the strain was in the nonprestressed tensile reinforcement when the strain should be a function of both the nonprestressed and the prestressed tensile reinforcement present in the section. The second sub-item clarifies this definition in the article itself.

Previously, Article 5.8.3.4.2 required the designer to ignore nonprestressed reinforcement terminated at a distance less than the development length from the section under consideration, while elsewhere in the article the designer is allowed to logically use the nonprestressed reinforcement in proportion to its development. Sub-item 3 of Agenda Item 15 eliminated this contradiction. Finally, sub-item 3 and sub-item 4, added absolute-value signs to two comparisons of M_u to $(V_u - V_p)d_v$, so that the proper comparison is made.