



South Carolina
Department of Transportation

BRIDGE DESIGN MEMORANDUM – DM0108

TO: RPG Structural Engineers
Structural Design Consultants

DATE: January 8, 2008

RE: Design of Prestressed Concrete Girders

The first and second paragraphs of Section 15.5.6.1 of the *SCDOT Bridge Design Manual* shall be replaced with the following:

This Section addresses the general design theory and procedure for precast, prestressed (pre-tensioned) concrete girders. Although SCDOT design requirements differ somewhat, design examples can be found in Chapter 9 of the *PCI Bridge Design Manual*.

Where practical, multiple span bridges composed of precast, prestressed concrete girders should be detailed as continuous with continuity diaphragms at interior supports to eliminate expansion joints in the deck slab. When precast, prestressed concrete girders are detailed as continuous for live load and superimposed dead load, the following apply:

- All structural components shall be designed for the more critical condition of either assuming a fully effective connection at the continuity diaphragm (fully continuous span) or assuming complete loss of continuity (simple spans).
- Restraint moments caused by girder creep and shrinkage may be neglected.
- A positive moment connection shall be provided with a factored resistance, ϕM_n , of not less than $1.2 M_{cr}$, as specified in AASHTO LRFD Article 5.14.1.4.9. See the *SCDOT Bridge Drawings and Details* (available at the SCDOT website) for preferred details of positive moment reinforcement in girders.
- The specification of the minimum age of the precast girder when continuity is established is not required.
- The requirements of AASHTO LRFD Articles 5.14.1.4.6, 5.14.1.4.7, and 5.14.1.4.8 shall apply.
- The design of continuity diaphragms at interior supports may be based on the strength of the concrete in the girders when the ends of girders are directly opposite each other across a continuity diaphragm.



Sections 15.5.3.1 and 15.5.3.3 of the *Manual* shall be revised as indicated below:

- a. Section 15.5.3.1 shall be replaced with the following:

Tensile stress limits for fully prestressed concrete members shall conform to the requirements for "Other Than Segmentally Constructed Bridges" in LRFD Article 5.9.4. Projects located in Beaufort, Berkeley, Charleston, Colleton, Dorchester, Georgetown, Horry, and Jasper Counties shall be designed using the stress limits for severe corrosive conditions. Projects located in all other counties shall be designed using the stress limits for moderate corrosion conditions.

- b. The last paragraph of Section 15.5.3.3 shall be replaced with the following:

In analyzing stresses and/or determining the required length of debonding, stresses shall be limited to the values in LRFD Article 5.9.4. Projects located in Beaufort, Berkeley, Charleston, Colleton, Dorchester, Georgetown, Horry, and Jasper Counties shall be designed using the stress limits for severe corrosive conditions. Projects located in all other counties shall be designed using the stress limits for moderate corrosion conditions.

Please note these revisions in your copy of the *Manual*. The *Manual* will be updated at a later date to reflect these requirements.



E. S. Eargle
Preconstruction Support Engineer

cc: Bridge Construction Engineer
Bridge Maintenance Engineer
FHWA Structural Engineer
Preconstruction Support Managers
Regional Production Engineers
RPG Design Managers

File: PC/BWB