



## Florida Department of Transportation

CHARLIE CRIST  
GOVERNOR

605 Suwannee Street  
Tallahassee, FL 32399-0450

STEPHANIE KOPELOUSOS  
INTERIM SECRETARY

March 9, 2007

TO: District Directors of Production, District Design Engineers, District Structures and Facilities Engineers, District Maintenance Engineers, District Structures Design Engineers

FROM: Robert Robertson, State Structures Design Engineer

COPIES: Ananth Prasad, Lora Hollingsworth, Timothy Lattner, Larry Jones, Larry Sessions, Marcus Ansley, Andre Pavlov, Lex Collins, Tom Andres, Rafiq Darji, Rudy Powell, Jonathan Van Hook, Jeffrey Ger (FHWA)

SUBJECT: Temporary Design Bulletin C07-3  
Minimum Reinforcement (LRFD 5.7.3.3.2) (LRFR 6.5.7 and D.6.6.3.3)

This design bulletin clarifies the use of the minimum reinforcement requirements for both design and load rating of bridge girders. These clarifications will be integrated into the "Structures Manual" Volumes 1 and 8.

### REQUIREMENTS

Apply the minimum reinforcement requirements in Article 5.7.3.3.2 of the AASHTO LRFD Bridge Design Specifications and Articles 6.5.7 and D.6.6.3.3 of the Manual for Condition Evaluation and Load and Resistance Factor Rating (LRFR) of Highway Bridges to all sections being analyzed except at the ends of simply supported bridge girders. The length of the girder from the simply supported end for which the minimum reinforcement will not be checked is defined below. Do not check the minimum reinforcing for prestressed concrete girders for a distance equal to the bonded development length (e.g. for 270 ksi strand with  $f_{pe} = 157$  ksi,  $\frac{1}{2}$ " dia. strand yields 11.0 feet and 0.6" dia. yields 13.2 feet ) from the ends of the simply supported girder. Do not check the minimum reinforcing for reinforced concrete girders for a distance equal to 2.5 times the superstructure depth from the centerline of bearing of the simply supported end. For span lengths less than 27 feet for simple span bridges, check the minimum reinforcement at mid-span.

## **COMMENTARY**

The use of a minimum reinforcement check was developed to insure a ductile failure mode for lightly reinforced deep beams. Bridge girders are slender and do not generally meet the definition of a deep beam. Deep beams are defined as members having a clear span less than 4 times the overall depth (as defined by ACI). The use of the minimum reinforcing check has evolved in the specifications from checking the critical section to checking every section. This evaluation at every section is justified in buildings where heavy concentrated loads may be present near supports. In bridges, this condition does not exist and the critical section for bending is not near the support for simply supported bridge beams. The ends of simply supported bridge girders are dominated by shear, not bending moment. At these locations it is unnecessary to check minimum reinforcing for bending in an area dominated by shear.

## **BACKGROUND**

Applying the minimum reinforcing check to areas along the girders near the supports is unnecessary and will result in unnecessary reduction of the calculated load carrying capacity of existing bridges. Recent evaluation of bridges for widening resulted in the load rating being controlled by minimum reinforcing near the simple span supports.

## **IMPLEMENTATION**

The direction provided by this temporary design bulletin clarifies current policy and shall be implemented immediately for all load rating analyses of existing bridges and new bridge designs.

## **CONTACT**

Larry M. Sessions, P.E.  
Assistant State Structures Design Engineer  
850-414-4273