



Florida Department of Transportation

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MIKE DEW
SECRETARY

STRUCTURES DESIGN BULLETIN 17-08

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DATE: July 12, 2017

TO: District Directors of Transportation Operations, District Directors of Transportation Development, District Design Engineers, District Construction Engineers, District Structures Design Engineers

FROM: Robert V. Robertson, P. E., State Structures Design Engineer

COPIES: Brian Blanchard, Courtney Drummond, Tim Lattner, David Sadler, Rudy Powell, Amy Tootle, Daniel Scheer, Gregory Schiess, Jeffrey Ger (FHWA), Rafiq Darji (FHWA)

SUBJECT: Pretensioned/Post-Tensioned I-Beams and U-Girders

This bulletin introduces a new load combination for pretensioned/post-tensioned I-Beams and U-Girders. It also introduces newly developed concept drawings and details for pretensioned/post-tensioned U-Girders utilizing a combination of bonded and unbonded post-tensioning tendons meeting the Department's mandate for replaceable tendons with flexible filler. These concept drawings are available on the Department's Invitation to Innovation website: <http://www.fdot.gov/structures/innovation/UBEAM.shtm>.

REQUIREMENTS

1. Add the following to *Structures Design Guidelines* Section 2.1.1 Load Factors and Load Combinations:

C. For pretensioned/post-tensioned I-Beams and U-Girders, in addition to the load combinations required by *LRFD*, satisfy the following limit state neglecting strand tendons that are grouted with cementitious material:

$$1.25(D) + 1.75(LL) \leq 1.4(RN^*)$$

Where:

D = All applicable permanent load components of *LRFD* Table 3.4.1-1

LL = All applicable transient load components of *LRFD* Table 3.4.1-1

RN* = Nominal capacity (moment or shear) at any section using only the replaceable strand tendons with flexible filler, all permanent bar tendons, mild reinforcing steel and pretensioning strands.

2. Add the following to *Structures Design Guidelines* Section 4.7 Pretensioned/Post-Tensioned I-Beams:
 - E. Use strain compatibility to determine section capacities utilizing bonded and unbonded post-tensioning tendons, mild reinforcing steel and pretensioning strands.
3. Add the following to *Structures Design Guidelines* Section 4.8 Pretensioned/Post-Tensioned U-Girders:
 - C. Use strain compatibility to determine section capacities utilizing bonded and unbonded post-tensioning tendons, mild reinforcing steel and pretensioning strands.

COMMENTARY

The details presented in the new U-Girder concept drawings are necessary due to the use of flexible filler as corrosion protection for the post-tensioning tendons and are conceptual only. All designs based on these details must be prepared by a professional engineer licensed in the state of Florida and shall conform to AASHTO *LRFD* and the FDOT *Structures Manual*.

IMPLEMENTATION

These requirements are effective immediately on all design-bid-build projects in the pre-design phase. These requirements may be implemented immediately on all design-bid-build projects in Design Phase I, II, III or IV at the discretion of the District.

These requirements are effective immediately on all design-build projects for which the advertisement has not been released. Design-build projects for which the advertisement has been released are exempt from these requirements unless otherwise directed by the District.

CONTACT

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