September 19, 2002

MEMORANDUM

TO: District Structures Design Engineers
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District and Central Office Construction Engineers
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SUBJECT: Temporary Design Bulletin C02-15
(Reference: New Direction for Florida Post-Tensioned Bridges – Corven Engineering, Inc)
Strategy 5 – Multiple Tendon Paths
Effective 8/1/02



To emphasize the importance of the Department's new directions for post-tensioned structures which increase the durability and level of performance of these structures, the Department of Transportation is issuing Temporary Design Bulletins C02-11 thru 15.

Because of experiences in the past with tendon section loss due to corrosion, the Department of Transportation has decided to address the internal redundancy of post-tensioned structures by providing multiple tendon paths. Multiple tendon paths will increase the number of tendons in post-tensioned spans and components and will provide more structural strength in the event a tendon is lost compared to current practices. The policy and related issues are outlined below. The document containing each these requirements is listed in [] after each requirement.

1. The minimum number of tendons across critical sections is shown in the following table: [SDG 7.11.1, Table 7.4]

| Post Tensioned Bridge Element | Minimum Number of Tendons |
|---|---|
| Mid Span Closure Pour – C.I.P. and Precast Balanced Cantilever Bridges | Bottom slab – 2 per web<br>Top slab – 1 per web (4-0.6 inch diameter minimum) |
| Span by Span Segmental Bridges | 4 tendons per web |
| C.I.P. Multi-Cell Bridges | 3 tendons per web |
| Spliced I-Girder Bridges | *3 per girder |
| Unit End Spans - C.I.P. and Precast Balanced Cantilever Bridges | 3 tendons per web |
| Diaphragms - Transverse Post-Tensioning | 6 if strength is provided by P.T. only<br>4 if strength is provided by combination of P.T. and mild reinforcing |
| Diaphragms – When Vertical Post-Tensioning is Required | 4 ** |
| Segments – (When Vertical Post-Tensioning is Required) | 2 per web |

* 3 girders minimum per bridge.
** 2 per additional cell

2. Provide the following minimum number of tendons for post-tensioned substructure elements: [SDG 5.4, Table 5.1]

| Post-Tensioned Bridge Element | Minimum Number of Tendons |
|---|---|
| Hammerhead Pier<br>Straddle Beams<br>C-Pier Column (Bars only)<br>C-Pier Cap<br>C-Pier Footing (Bars only) | 6 |
| Hollow Precast Piers<br>I-Section Precast Piers | 8 |

3. All balanced cantilever bridges shall utilize a minimum of 4 positive moment external draped continuity tendons (2 per web) that extend to adjacent pier diaphragms. [SDG 7.11.1]

4. Provisions shall be made in the diaphragms, deviation blocks and other components of the superstructure for the future strengthening of segmental structures. Future strengthening shall be externally draped post-tensioning strands and shall be sized in accordance with AASHTO for the construction and service life of the structure. [to be clarified in SDG]