



Florida Department of Transportation

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MIKE DEW
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STRUCTURES DESIGN BULLETIN 17-06

ROADWAY DESIGN BULLETIN 17-07

(FHWA Approved: June 19, 2017)

DATE: June 19, 2017

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

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

COPIES: Brian Blanchard, Courtney Drummond, Tim Lattner, David Sadler, Rudy Powell, Amy Tootle, Dan Sheer, Gregory Schiess, Trey Tillander, Stephanie Maxwell, Jeffrey Ger (FHWA)

SUBJECT: Design of Traffic Signal Span Wire Supports

This bulletin outlines a revised Department policy on traffic signal span wire structures analysis and design.

REQUIREMENTS

- 1. Replace the table shown in ***FDOT MODIFICATIONS TO LRFD SPECIFICATIONS FOR STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS, LUMINAIRES AND TRAFFIC SIGNALS (LRFDLTS-1)*** Section 3.8.7 with the following:

Traffic Signals - no ability to swing		1.2
Traffic Signals - installed on 2-wire, 2-point connections	Without Backplates	0.8
	With Backplates	0.7
Solar Panels - installed with a tilt angle between 15 and 30 degrees		2.1 (positive) 1.8 (negative)

- 2. Replace ***FDOT MODIFICATIONS TO LRFD SPECIFICATIONS FOR STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS, LUMINAIRES AND TRAFFIC SIGNALS (LRFDLTS-1)*** Section C 3.8.7 with the following:

C 3.8.7

On span wire systems where signals and signs are allowed to swing, varying C_d as a function of swing angle was included in the original ATLAS Program (Hoit and Cook 1997). Simplified drag coefficients for traffic signals installed with the ability to swing under controlled experimental conditions (i.e. no wind gust effects) has been suggested through research (Cook 2007). Current FDOT drag coefficients are based on parametric studies conducted in FDOT research report Dual Cable Supports for Wide Intersections (Contract C9G79, Sunna, 2015)

ATLAS is a span wire software program distributed by the University of Florida Bridge Software Institute (BSI). Do not consider uplift in the design of cable supported traffic signal systems designed using LRFD ATLAS and constructed using FDOT Design Standards. To simplify design, the drag coefficients required by the FDOT have been adjusted to account for uplift. Accordingly, ATLAS v7 no longer permits user input for uplift of cable supported traffic signal systems.

The coefficients given for solar panels are approximately the same as those given in ASCE 7-10, Figure 27.4-4 for inclined mono-sloped roofs. See simplified illustration in FDOT Figure 3.8.7-1.

3. Add the following to ***FDOT MODIFICATIONS TO LRFD SPECIFICATIONS FOR STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS, LUMINAIRES AND TRAFFIC SIGNALS (LRFDLTS-1)*** Section 3.10:

Hisham Sunna and David Johnson, AYRES Associates, Dual Cable Supports for Wide Intersections, FDOT Contract C9G79, October 2015.

4. Add the following new section to ***FDOT MODIFICATIONS TO LRFD SPECIFICATIONS FOR STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS, LUMINAIRES AND TRAFFIC SIGNALS (LRFDLTS-1)***:

4.7 Analysis of Span Wire Structures

Add the following:

When designing box span wire configurations with FDOT two-point two-wire configurations, design each of the four spans as an individual span using wind loads acting perpendicular to the span. For the pole design, multiply the maximum pole moment from the individual span analysis by 1.3 to account for wind from variable directions and pole biaxial bending.

When suspended (hanging) box span systems with FDOT two-point two-wire configurations are required, the following attachments and support structure may be used without analysis if meeting the given geometry constraints.

- 1) Geometry:
 - a) Square or rectangular suspended box with corner angles 90 degrees \pm 15 degrees.
 - b) Angle of pole cables to hanging box cables 135 degrees \pm 15 degrees.
 - c) Maximum Pole-to-Pole distance at 220 feet.
 - d) Pole to hanging box cable length may not exceed 25 feet.
- 2) Attachments:
 - a) Signals: Maximum number of three-lens signals with back-plate per span:
 - i) For counties with LRFD Design Wind Speed = 160 mph: 4.
 - ii) For counties with LRFD Design Wind Speed = 140 mph: 6.
 - iii) For counties with LRFD Design Wind Speed = 120 mph: 6.
 - iv) For Allowable Stress Design, subtract 10 mph.
 - b) Signs per box span: for each 3' x 2' sign, subtract two signals from the maximum given in item a) above.
- 3) Support Structure:
 - a) Pole Type: PS-X as shown in FDOT Design Standard Index 17723
 - b) Cables: All cables ½" diameter meeting the requirements of FDOT Specification 634.
 - c) Cable Configuration: as shown in FDOT Design Standard Index 17727.

For intersections with geometry outside the values given above, a finite element analysis is required to determine the number of attachments allowed.

5. A *FY 2017-18 Design Standards Revision (DSR)* is released for [Instructions for Design Standards, Index 17725 \(IDS-17725\)](#).

BACKGROUND

To address software problems in the design of some two-point two-cable span wire configurations, the Department contracted a consultant¹ to develop a simplified design approach. The recommendations from this effort have been implemented in the LRFD ATLAS software program and FDOT *Structures Manual*. In coordination with the simplification effort, the program was also updated to the LRFD Design Specification.

[1] Hisham Sunna and David Johnson, AYRES Associates, Dual Cable Supports for Wide Intersections, FDOT Contract C9G79, October 2015.

IMPLEMENTATION

LRFD design criteria is required on all conventional projects that are currently at 30% plans or less. For all other conventional projects, Allowable Stress Design may be used. LRFD requirements are mandatory for all design build projects for which the advertisement has not been released.

The Florida Bridge Software Institute LRFD ATLAS Program v7.0 (<https://bsi.ce.ufl.edu/>) was released in June of 2017.

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RVR/AVP



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RACHEL D. CONE
INTERIM SECRETARY

MEMORANDUM

DATE: April 20, 2017

TO: Gevin McDaniel, Jeremy Fletcher, Rhonda Taylor, Paul Hiers, and Carlton Spirio

FROM: Michael A. Shepard, P.E., State Roadway Design Engineer *Michael Shepard*

COPIES: Tim Lattner, Shawn Trotman

SUBJECT: Delegation of Signature Authority

The following list establishes priority for signature authorization in the absence of the State Roadway Design Engineer. This authorization includes all documents requiring the signature of the State Roadway Design Engineer.

1. Gevin McDaniel, P.E., Roadway Design Standards Administrator
2. Jeremy Fletcher, P.E., Roadway Quality Assurance Administrator
3. Rhonda Taylor, P.E., State Pavement Design Engineer
4. Paul Hiers, P.E., Roadway Design Criteria Administrator
5. Carlton Spirio, P.E., State Drainage Engineer

This memo supersedes any previous signature authorizations for the State Roadway Design Engineer and shall remain in effect until rescinded by me.

MAS/st