FDOT Modifications to Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals (LTS-4)

July 2007

2 GENERAL FEATURES OF DESIGN

2.4 FUNCTIONAL REQUIREMENTS

2.4.2 Structural Supports for Signs and Traffic Signals

2.4.2.2 Size, Height and Location of Signs

Add the following:

Span type overhead sign structures in urban locations shall be designed either for the actual signs shown on the signing plans or for a minimum sign area of 120 sq. ft. (12 ft. W x 10 ft. H) per lane, whichever is the greater. If the signing plans require signs for only one traffic direction, the minimum sign area per lane requirement applies to the traffic lanes in this direction only.

Cantilever type overhead sign structures in urban locations shall be designed either for the actual signs shown on the signing plans or for a minimum sign area of 80 sq. ft. (8 ft. W x 10 ft. H) located at the end of the cantilever, whichever provides the more stringent load or stress at the location under consideration.

Figures 1 and ***2*** show how to apply the above minimum sign areas for span type overhead sign structures in urban locations.

Overhead signs in rural locations should be designed for the actual sign shown on the signing plans.

C2.4.2

Add the following:

For additional design information, refer to ***Plans Preparation Manual Chapters 7 and 29.***

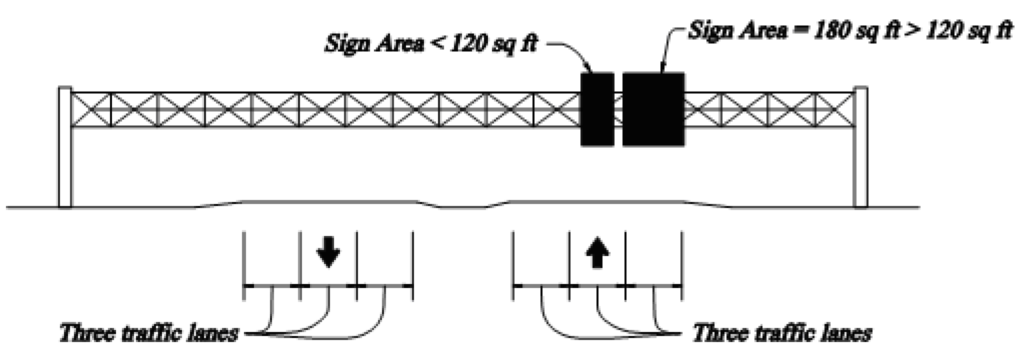

Figure 1 - Example: actual signs

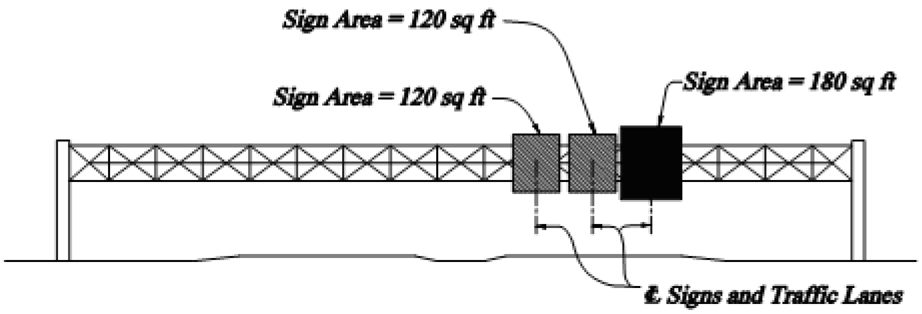

Figure 2 - Example: signs used in design

3 LOADS

3.8 WIND LOAD

Delete the last paragraph and add the following:

The use of Appendix C is not permitted.

3.8.2 Basic Wind Speed

Delete the entire paragraph including Figure 3-2, and add the following:

The wind loads shall be based on the wind speeds (mph) shown in FDOT Table 1.

C3.8.2

Add the following:

FDOT Table 1 was derived from the ASCE 7-05 wind speed map.

FDOT Table 1				
County (Dist)	**Basic Wind Speed (mph)**		**County (Dist)**	**Basic Wind Speed (mph)**
Alachua (2)	110		Lee (1)	130
Baker (2)	110		Leon (3)	110
Bay (3)	130		Levy (2)	130
Bradford (2)	110		Liberty (3)	130
Brevard (5)	130		Madison (2)	110
Broward (4)	150		Manatee (1)	130
Calhoun (3)	130		Marion (5)	110
Charlotte (1)	130		Martin (4)	150
Citrus (7)	130		Miami-Dade (6)	150
Clay (2)	110		Monroe (6)	150
Collier (1)	150		Nassau (2)	130
Columbia (2)	110		Okaloosa (3)	130
DeSoto (1)	130		Okeechobee (1)	130
Dixie (2)	130		Orange (5)	130
Duval (2)	130		Osceola (5)	130
Escambia (3)	150		Palm Beach (4)	150
Flagler (5)	130		Pasco (7)	130
Franklin (3)	130		Pinellas (7)	130
Gadsden (3)	110		Polk (1)	110
Gilchrist (2)	110		Putnam (2)	110
Glades (1)	130		St. Johns (2)	130
Gulf (3)	130		St. Lucie (4)	150
Hamilton (2)	110		Santa Rosa (3)	150
Hardee (1)	110		Sarasota (1)	130
Hendry (1)	130		Seminole (5)	130
Hernando (7)	130		Sumter (5)	110
Highlands (1)	130		Suwannee (2)	110
Hillsborough (7)	130		Taylor (2)	130

FDOT Table 1				
County (Dist)	**Basic Wind Speed (mph)**		**County (Dist)**	**Basic Wind Speed (mph)**
Holmes (3)	130		Union (2)	110
Indian River (4)	150		Volusia (5)	130
Jackson (3)	110		Wakulla (3)	130
Jefferson (3)	110		Walton (3)	130
Lafayette (2)	110		Washington (3)	130
Lake (5)	110			

3.8.3 Importance Factor

Add the following Wind Importance Factor to Table 3-2:

Recurrence Interval Years	V = 85-100 mph	V > 100 mph	Alaska
1.5	0.45	0.20	---

Delete Table 3-3 and add the following FDOT Table 3-3:

FDOT Table 3-3 Minimum Design Life	
Design Life	Structure Type
50-year	Overhead sign structures
	Luminaire support structures >50' hgt.
	Mast Arms
	Monotubes
	Steel Strain Poles
25-year	Luminaire support structures ≤ 50' hgt.
	Concrete Strain Poles
10-year	Roadside sign structures
1.5-year	Temporary construction signs

A 1.5-year design life (Ir=0.2) for temporary construction signs shall only be used with a 150 mph design wind speed.

C.3.8.3

Add the following:

A 1.5-year design life has been added for temporary construction signs. The importance factor is calculated based on "Wind Speed for Design of Temporary Structures" by D.W. Boggs and J.A. Peterka, Structures Congress, 1992, Compact Papers, ASCE, 1992.

Florida has traditionally designed Luminaire support structures, 50 feet in height and less, and strain poles for a 25 year design life.

Concrete strain poles are designed for zero tension stress, therefore a twenty-five year design life is appropriate.

5 STEEL DESIGN

5.15 WELDED CONNECTIONS

5.15.1 Circumferential Welded Splices

Delete the last sentence and add the following:

On steel sign and signal structures, no circumferential welds are permitted on the uprights or arms with the exception of the base plate socket weld. Circumferential welds are also permitted at the flange plate connections on tubular truss members.

5.16 BOLTED CONNECTIONS

Add the following:

Design all pole to arm connections on Mast Arm structures as "through bolted". Tapped connections are not permitted.

5.17 ANCHOR BOLTS

Add the following:

All sign, signal, and lighting structures designed for a minimum service life of 50 years (wind speed based on a 50-year mean recurrence interval) shall use a minimum of six, Grade 55, ASTM F1554 anchor bolts at the pole to foundation connection.

5.17.1 Types

Delete c) and add the following:

Both Adhesive anchors and Dywidag bars are not permitted.

5.17.6 Additional Considerations

5.17.6.1 Wind-Induced Cyclic Loads

Add the following:

Structures designed using FDOT Design Standards for overhead tri-chord sign trusses and Mast Arms do not require analysis using Section 11.

C5.17.6.5

Add the following:

There has been no significant damage reported to Mast Arms and overhead tri-chord sign trusses designed and built using FDOT Design Standards.

5.17.6.4 Bending Stress in Anchor Bolts

Change "should" to "shall" in the sentence.

5.17.6.5 Use of Grout

Add the following:

Grout pads underneath the baseplates in double-nut moment joints of miscellaneous highway structures (i.e. mast arms, overhead sign

C5.17.6.5

Add the following:

Inspections have shown that a poorly functioning grout pad is worse that no grout pad at all. For poles without a grout pad beneath the structures, high mast lights, steel strain poles and monotube structures) shall be considered by each FDOT District Office. Each FDOT District Office shall establish a policy as to when and/or where these pads shall be installed.

base plate, the double-nut moment joint requires adequate tensioning of the anchor bolts. It is critical that the nuts beneath the base plate, typically referred to as leveling nuts, are firmly tightened and locked to prevent loosening. This locking mechanism is accomplished through the turn of the nut method specified in FDOT Specification 649 or a properly place grout pad.

11 FATIGUE DESIGN

11.1 SCOPE

Add the following:

When using FDOT Design Standards for overhead tri-chord sign trusses and Mast Arms, analysis using Section 11 is not required.

C11.1

Add the following:

There has been no significant damage reported to Mast Arms and overhead sign trusses designed and built using FDOT Design Standards.

13 FOUNDATION DESIGN

13.6 DRILLED SHAFTS (07/07)

Add the following:

Drilled shafts are the preferred foundation type on high mast light poles, span overhead signs, mast arms, monotubes, and steel strain poles. When designing Mast Arm drilled shafts for torsion using the FDOT Design Standard and FDOT Mast Arm Program, an 85 mph wind speed may be used.

For drilled shafts, ensure a minimum reinforcement spacing of six inches to allow for proper concrete consolidation.

C13.6

Add the following:

Using an 85 mph wind speed for torsion, the drilled shaft lengths resulting from the conservative torsion analysis methods found in the FDOT Mast Arm Program, produce reasonable results.