

VIRGINIA DEPARTMENT OF TRANSPORTATION

STRUCTURE AND BRIDGE DIVISION

INSTRUCTIONAL AND INFORMATIONAL MEMORANDUM

GENERAL SUBJECT: VDOT Modifications to AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaries, and Traffic Signals	NUMBER: IIM-S&B-90
SPECIFIC SUBJECT:	Date: Oct. 20, 2014
	SUPERSEDES: None
DIVISION ADMINISTRATOR APPROVAL: /original signed/ Kendal R. Walus, P.E. State Structure and Bridge Engineer Approved: October 20, 2014	

Changes are shaded.

The following VDOT Modifications to the AASHTO *Standard Specifications for Structural Supports for Highway Signs, Luminaries, and Traffic Signals*, 1994 and 2001, are effective for projects with an Advertisement date after March 10, 2015.

Variance from the VDOT Modifications and the specifications shall require a design waiver and shall be requested in writing to the State Structure and Bridge Engineer. The request shall include appropriate documentation citing the specific section reference number, what is being requested and the reason for the waiver. Areas requiring a design exception shall follow the procedures as outlined in the current L&D IIM 227 utilizing the LD Form 440 addressed to the State Structure and Bridge Engineer.

See current IIM-S&B-89 for maximum span limits on ancillary structures and moratorium on bridge mounted sign structures.

Lighting, signal, and pedestal poles; sign posts; and overhead (Span, cantilever and butterfly) sign structures not designed to support variable message signs shall conform to the requirements of the 1994 Edition of AASHTO *Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals*.

Overhead (Span, cantilever and butterfly) sign structures that support variable message signs shall conform to the requirements of the 2001 AASHTO *Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals* and the following clarifications:

- Basic wind speed shall be used. The alternate method for wind pressures provided in Appendix C shall not be used.
- When the installation location of the structures lies between isotachs, the basic wind speed shall be determined by using the higher adjacent isotach.
- Any optional design parameters indicated in the AASHTO specification that are “allowed when acceptable to the owner” shall not be used.

The following applies to both the 1994 and 2001 AASHTO *Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals*:

FOUNDATION DESIGN:

(This section provides guidance/modifications on the AASHTO Standard Specifications for Highway Bridges, 1996; 1997 and 1998 Interim Specifications as referenced in the AASHTO *Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals*.)

Geotechnical Design: The factor of safety shall be as follows:

MINIMUM FACTORS OF SAFETY			
	Drilled Shaft		Spread Footing
	Overhead Sign Structures and all other types of ancillary structures except for Mast arm traffic Signals	Mast arm traffic Signals	
Tip resistance/Bearing pressure	1.75	1.75	2.0
Torsion/Sliding/Skin Friction	2.0 ⁽¹⁾	1.3 ⁽¹⁾	1.2 ⁽²⁾
Overturning (Broms Method)	2.25	2.25	1.5

((The factors of safety shown above already account for the 1.33/1.40 group overload/overstress factor. No reduction shall be applied to the design loading used in the analysis.))

- (1) Torsion Resistance shall be evaluated as specified by the AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS (Version adopted by current I&IM-S&B-80) Section 10.8.3.5- Nominal Axial Compression of Single Drilled Shafts. A value of 1.0 shall be used in lieu of the resistance factors as shown in Table 10.5.5.2.4-1.
- (2) Passive resistance shall be reduced by 50% to limit foundation movement.

Geotechnical Design: In capacity calculations for the foundation design of a drilled shaft, the soil resistance of the top 1.5 feet shall be neglected in the analysis for torsion/skin friction/tip resistance. The full length of the shaft from the ground surface to the tip may be used in overturning/horizontal deflection. The remainder of the shaft may be assumed to be fully effective in supporting applied loads.

Horizontal Deflection: In lieu of Broms method, COM624P or other commercially available software may be used to evaluate the overturning of shafts and to estimate shaft deflections. The total horizontal deflection shall be limited to 0.5 inches at the ground level and the tip of the pile deflection shall not exceed -0.1 inches. The loading used in the analysis shall not be reduced by the allowable overload/overstress factor.

Additional VDOT modifications to the AASHTO Standard Specification may be found at the following web location:

<http://www.virginiadot.org/business/resources/VDMASD.pdf>

CC: Chief Engineer
Deputy Chief Engineer
State Location and Design Engineer
State Structure and Bridge Engineer
State Traffic Engineer
State Operations Engineer
Assistant State Structure and Bridge Engineers
Assistant State Traffic Engineer – Traffic Control Devices
District Structure and Bridge Engineers
State Traffic Design Program Manager
Regional Operations Directors
Regional Operations Maintenance Managers
Regional Traffic Engineers
FHWA – Bridge Section