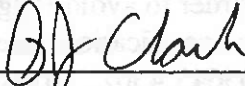


To: SUPERSEDED BY EI 14-023 EFFECTIVE 5/7/15		New York State Department of Transportation ENGINEERING INSTRUCTION	EI 99-038
Title: DESIGN LOADS FOR PERMANENT VARIABLE MESSAGE SIGNS			
Distribution: ☒ Manufacturers (18) ☐ Surveyors (33) ☒ Main Office (30) ☒ Consultants (34) ☐ Local Govt. (31) ☐ Contractors (39) ☒ Regions/Agencies (32) ☐ _____ ()		Approved:  P. J. Clark, Deputy Chief Engineer, Design Division 01/03/00 Date  Bruce Smith, Director, Highway Safety and Traffic Engineering Division 12/31/99 Date	

ADMINISTRATIVE. This Instruction takes effect immediately. It does not supersede any other Instructions.

PURPOSES. The purposes of this instruction are: to issue a new metric Standard Specification, Section 730-27; disapprove permanent variable message sign pay items; and provide instructions for contracts already let with the disapproved pay items.

BACKGROUND. Variable message signs have been permanently installed over and alongside heavily traveled highways in New York State. The specifications for these variable message signs only required them to withstand wind and dead loads. However, there are also other loads acting on these signs. The National Cooperative Highway Research Program project 10-38 (now Report 412) cited a study which found that trucks passing under signs produce a significant, transient upward wind load. This "vertical air blast" was identified as a likely cause of failure of several overhead sign structures. This study also determined that natural wind gusts can induce fatigue damage in overhead structures. Since nearly all of the varying loads on an overhead sign structure are transmitted to it from the signs, it follows that the signs too should be designed for the same varying loads.

The fatigue loads suggested by N.C.H.R.P. 10-38 were adopted by A.A.S.H.T.O. in the draft revision of its manual for designing overhead sign, luminaire and traffic signal structures. There have been other studies on truck blast from trucks passing under signs; such as the N.Y.S.D.o.T. Engineering Research and Development Bureau Special Report 55; the April, 1996 report by the University of Florida (Florida Dot Study No. 0728), and a two month study by Kevin Johns and Robert Dexter for New Jersey. These studies found wind loads on overhead signs from trucks were substantially less than what the N.C.H.R.P. study presumed. These reports were considered in developing the criteria in *NYSDOT Design Specifications for Overhead Sign Structures Carrying Variable Message Signs - October 1998* (issued by E.B. 98-50).

Variable message signs and the structures supporting them generally have not been designed for the fatigue loads identified in N.C.H.R.P. Report 412. Nor did the special specifications for variable message signs require them to be designed for ice, live and eccentricity of dead loads. Engineering Bulletin 98-50 announced the existence of *NYSDOT Design Specifications for Overhead Sign Structures Carrying Variable Message Signs - October 1998*, and gave directions for what to do about existing overhead sign structures carrying variable message signs. This Instruction is only for new variable message signs.

Changes to Specifications. This Engineering Instruction does not transmit the new specification; Addendum #2 adds a new Permanent Variable Message Sign specification subsection, §730-27. All specifications for variable message signs to be permanently installed over the roadway must refer to this specification subsection. Also, permanent variable message sign special specifications which do not include the fatigue requirements referred to in §730-27 should indicate in their title that they are for roadside-only use.

Disapproved Specifications. In order to avoid fatigue problems from bus and truck traffic, the following permanent variable message sign specifications are hereby disapproved:

03645.4501, 03645.4503, 05645.4502, 10645.9901,
10680.840113, 10680.840115,
10680.840204, 10680.840205, 10680.840206,
10680.840250, 10680.840251, 10680.840252, 10680.840253, 10680.840254,
10680.840294, 10680.840295, 10680.840296, 10680.840297, 10680.840298.

These disapproved special specifications may be re-approved on a project-by-project basis for use outside the Traveled Way after a cursory review.

Contracts already let: Variable message signs which do not have manufacturer's certification of having been built to withstand the loads in subsection 730-27 should not be placed over roadways carrying trucks or busses at highway speeds. For contracts still under construction with variable message signs that have not been manufactured, replace the disapproved items with items which do have the design loads of subsection 730-27. This could result in a claim for extra work. If the variable message signs have been manufactured, negotiate with the contractor to analyze what has been built against these design loads. If the variable message signs as built do not meet all the loads, retrofit or replace them by order-on-contract.

The analysis, and any retrofit drawings, must be signed and stamped by an Engineer licensed and registered to practice in New York State, and received by the E.I.C. If any retrofitting is done to bring the variable message signs into compliance with the new specifications, send a copy of the drawings to the Overhead Sign Unit of the Structures Design and Construction Division at the address below. This copy is for information, not approval. The information on these retrofits may be useful in the sign inspection program and in developing retrofits for older VMS units.

Contact. *NYSDOT Design Specifications for Overhead Sign Structures Carrying Variable Message Signs*

- October 1998 is available from Overhead Sign Unit
Structures Design and Construction Division
New York State Dep't of Transportation
1220 Washington Avenue
Albany, N.Y. 12232-0600
(518) 485-2768

For questions concerning fatigue analysis of overhead signs, telephone Richard Marriott of D.Q.A.B. at (518) 457-6393.