
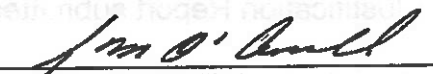


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| To: n-30-1-87728- Design Quality Assurance Bureau BY SUPERSEDED EB 00-024 EFFECTIVE 3/14/04 |  | New York State Department of Transportation ENGINEERING INSTRUCTION | EI 99-025 |
| TITLE: GUIDELINES - USE OF MECHANICALLY STABILIZED EARTH SYSTEMS TO SUPPORT BRIDGE ABUTMENTS | | | |
| Distribution: <input type="checkbox"/> Manufacturers (18) <input type="checkbox"/> Surveyors (33) <input checked="" type="checkbox"/> Main Office (30) <input checked="" type="checkbox"/> Consultants (34) <input type="checkbox"/> Local Govt. (31) <input type="checkbox"/> Contractors (39) <input checked="" type="checkbox"/> Regions/Agencies (32) <input type="checkbox"/> _____ () | Approved:  J. M. O'CONNELL Deputy Chief Engineer (Structures) | | |
| Date: <u>7-15-99</u> | | | |

Administrative Information:

This policy is effective immediately and supersedes EI 86-11. It will also supersede the February 2, 1990 J.M. O'Connell memorandum with the subject - *Mechanically Stabilized Earth Systems*. This information will be included in the next revision of the *Bridge Manual* - Article 3.5.5, Selection Guidelines and Article 11.5.1.4, Mechanically Stabilized Earth Systems (MSES) and also in the NY Blue Pages for Section 7 of the *NYSDOT Standard Specifications for Highway Bridges*.

Background:

In the early 1980's NYSDOT issued a series of special specifications which established the basis for two companies furnishing this product to the Department on construction projects. In 1986 the Department wrote and issued EI 86-11 which contained Section 554 to the *Standard Specifications* and guidance for use of MSES. Then on February 2, 1990 a J.M. O'Connell memorandum restricted the use of MSES to support bridge abutments due to seismic performance concerns. With the printing of the 1995 *Standard Specifications*, Section 554 was updated and metricated.

We have now gained some experience in the response of MSES in seismic events and it appears due to their flexible nature, they perform satisfactorily. Also AASHTO has established seismic design specifications for MSES. With this information now available, the Department is updating the guidance for use and design of MSES to support bridge abutments.

Usage Guidelines:

The Mechanically Stabilized Earth System to support bridge abutments shall be added to Selection Guidelines in the *Bridge Manual*, Article 3.5.5 with the following provisions:

1. The use of this type wall system is most efficient when the height of the wall supporting the bridge abutment is 4.6 m or greater. When the use of this system includes wingwalls and/or retaining walls the average height of the entire

system should be 3.0 m or greater.

2. The project site should be substantially a fill area. If extensive excavation is required, this type of system would be inappropriate.
3. No utility of any nature, may be placed within or underneath the reinforced zone.
4. Railroad involvement requires Railroad approval. A copy of the railroad's acceptance letter of this type of construction should accompany the Structure Justification Report submitted to the Structures Division.
5. In waterway areas where the anticipated depth of scour falls below the practical location of the concrete leveling pad, the use of this type system within the affected waterway area will not be approved. If the concrete leveling pad can be founded on sound rock or the MSES can be located a substantial distance from the affected area of scour the use of this system could be considered.
6. Additional guidance for the use of MSES can be found in the *NYSDOT Standard Specification for Highway Bridges*, Section 5 - Retaining Walls, under Article 5.2.1, Selection of Wall Type.

Design Parameter Guidelines:

In addition to design guidelines outlined in Section 7 - Substructures (Article 7.5.4), of the *NYSDOT Standard Specifications for Highway Bridges*, the following criteria have been adopted by New York State:

- ▶ As a preliminary starting point for determining the span length, the \pm of bearings shall be located a distance of 2.3 m behind the front face of the MSES .
- ▶ A minimum distance of 0.6 m shall be provided between the back of the MSES panels and the front face of the abutment footing.
- ▶ The top of the MSES panel in front of the abutment footing shall be set 0.3 m above the berm elevation.
- ▶ A minimum vertical clearance of 1.2 m shall be provided between the bottom of the superstructure and the berm in front of the abutment footing.

Review and Approval:

The MSES should be considered as an option for all bridge substructures and developed as a part of the Structure Study Plan, comparing it with other options and the project objectives, i.e., structure cost, functionality, construction time, aesthetics or other project specific parameters. The best option shall then be progressed in the Structure Justification Report through the normal review and approval procedure as

described in Section 3 of the *Bridge Manual*.

Contacts:

Any questions regarding this usage criteria shall be directed to T.D.Quinn of the Structures Division Bridge Preliminary Engineering Unit at (518) 457-4551.

Any questions regarding Mechanically Stabilized Earth System Designs should be directed to Todd Dickson of the Geotechnical Engineering Bureau at (518) 457-4723.