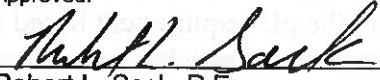


SUPERSEDED BY EB 15-031 EFFECTIVE 9/28/15		New York State Department of Transportation ENGINEERING INSTRUCTION	EI 13-006
Title: STANDARD SPECIFICATION §733-02 MECHANICALLY STABILIZED EARTH SYSTEM BACKFILL MATERIAL			
Target Audience: ☐ Manufacturers (18) ☒ Local Govt. (31) ☒ Agencies (32) ☐ Surveyors (33) ☒ Consultants (34) ☒ Contractors (39) ☐ _____ ()		Approved:  Robert L. Sack, P.E. Deputy Chief Engineer (Research) 1 MAY 13 Date	

ADMINISTRATIVE INFORMATION:

- This Engineering Instruction (EI) is effective beginning with projects submitted for the letting of September 5, 2013.
- This EI modifies a portion of EI 09-027.
- The revisions issued with this EI will be incorporated into the next update of the Standard Specifications.

PURPOSE: The purpose of this EI is to revise Standard Specification §733-02 *Mechanically Stabilized Earth System Backfill Material*.

TECHNICAL INFORMATION:

- Crushed portland cement concrete from highway reconstruction projects or construction demolition sites is trucked to an aggregate supplier equipped with crushers, and processed into recycled portland cement concrete aggregate (RCA). After processing, the recycled material is nearly indistinguishable from granular material obtained from naturally occurring sources.

In 1988 New York State passed the Solid Waste Management Act, regulating the use of RCA. This law could have considered the placement of this material to be construed as creating a landfill, subjecting its use to a permitting process with a lengthy checklist for control procedures. However, because this material had been successfully used since 1982, the New York State Department of Environmental Conservation (NYSDEC) considers RCA to be essentially free from contaminants. RCA is considered to be pre-determined Beneficial Use Determination (BUD) in regulation 6 NYCRR 360-1.15 (b)(11). Producers of RCA must register with the NYSDEC.

- The parameters influencing corrosion of the Mechanically Stabilized Earth System (MSES) straps are contained within the environment in which the metal is placed: i.e.
 - (1) Soil – includes soil resistivity, pH, dissolved salts, redox potential and total acidity.
 - (2) Air – soil compaction, and
 - (3) Water – degree of saturation, dissolved salts.

pH is a measure of the activity of the solvated hydrogen ion and is defined as the decimal logarithm of the reciprocal of the hydrogen ion activity in a solution. Values of soil pH are referred to as the intensity factor. The corrosion model developed to predict the rate of metal loss identifies a pH range to be between 5 – 10.

Concrete typically has a pH between 12 – 13. This inherent characteristic places RCA outside the range of the corrosion model, which identifies very strongly alkaline material (pH greater than 10) as generally associated with significant corrosion rates.

- The revision to the Standard Specification includes the following:
 1. Eliminates Type C from consideration.

The specification for "Type C" RCA required a pH in the range of 5 – 10 to be consistent with the corrosion model for predicting the rate of metal loss. As stated above, this requirement cannot be met due to the inherent characteristics of RCA. Therefore, Type C is being eliminated from the specification to prevent assumptions that this material can be produced.

However, if a Contractor wishes to use RCA for MSES backfill, "Type D" RCA is still a viable option. The gradation of Type D is a revision to the gradation for a natural material. This revised gradation produces a free-draining material and as such, it eliminates one of the parameters for corrosion (water). Therefore, even though RCA has high pH, the Department has allowed an increase to the pH requirement based on this amendment in the corrosion model. This is identified in the specification which allows "Type D" RCA to possess a pH in the range of 5 – 12.5.

IMPLEMENTATION:

- The Main Office Design Quality Assurance Bureau will insert this standard specification revision into contract proposals beginning with projects submitted for the letting of September 5, 2013.

TRANSMITTED MATERIALS: Revisions to Standard Specification §733-02 *Mechanically Stabilized Earth System Backfill Material*. Both metric and US Customary revisions are attached.

BACKGROUND: MSES's are internally stabilized fill structures comprised of natural select granular backfill (reinforced backfill), precast concrete panels (facing), subsurface drainage system, and high-strength, metallic or polymeric inclusions (reinforcement) to create a reinforced soil mass. Stability of these systems is achieved by the weight of the reinforced soil mass resisting the overturning and sliding forces generated by the lateral stresses from the retained soil behind the reinforced mass.

MSES walls require a high quality backfill for durability, good drainage, constructability, and good soil reinforcement interaction which can be obtained from well graded, granular materials. The high quality backfill requirements provided in the MSES specification have established minimum or maximum electrochemical index properties to coincide with design procedures for the maximum corrosion rates associated with those properties. Backfills incorporated with buried steel elements of MSES walls which fall outside these ranges provide the potential for a reduced lifespan of the structure along with increased maintenance costs.

CONTACT: Questions or comments regarding this issuance should be directed to Randall J. Romer, P.E., of the Geotechnical Engineering Bureau at (518) 457-4714, or via e-mail at randy.romer@dot.ny.gov. Questions or comments regarding the technical aspects of the revision to the Standard Specification should be directed to Don Dwyer, P.E., of the Geotechnical Engineering Bureau at (518) 457-4724, don.dwyer@dot.ny.gov.

**§733-02 – MECHANICALLY STABILIZED EARTH SYSTEM
BACKFILL MATERIAL**

Make the following changes to the Standard Specifications dated May 1, 2008 and May 4, 2006 as modified by EI 09-027 and EI 11-001:

Delete MATERIAL REQUIREMENTS B. GRADATION 3. Type C entirely and **Replace** it with the following:

3. Type C. Vacant.