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| **SUPERSEDED BY EI 09-027 EFFECTIVE 5/06/10** | | *New York State Department of Transportation* **ENGINEERING INSTRUCTION** | **EI 08-035** |

Title: **SECTION 733 – EARTHWORK MATERIALS**

Distribution:

- ☐ Manufacturers (18)
- ☒ Local Govt. (31)
- ☒ Regional/Agencies (32)
- ☐ Surveyors (33)
- ☒ Consultants (34)
- ☒ Contractors (39)
- ☐ _____( )

Approved:

Robert L. Sack, P.E.
Deputy Chief Engineer (Research)

24 SEP 08
Date

**ADMINISTRATIVE INFORMATION:**

- This Engineering Instruction (EI) is effective beginning with projects submitted for the letting of May 7, 2009.
- Superseded issuance(s): This EI does not supersede any previous issuances.
- Disposition of issued materials: The information transmitted by this issuance will reside in the Standard Specifications.

**PURPOSE:** The purpose of this EI is to issue new Section 733 *Earthwork Materials* of the Standard Specifications.

**TECHNICAL INFORMATION:**

- The revised Standard Specification Section 204 *Controlled Low Strength Material (CLSM)* is being issued concurrently via EI 08-034.
- The Construction Inspection Manual (CIM) Section 204 *Controlled Low Strength Material (CLSM)* will be issued separately at a later date.
- To embrace the future that is SiteManager, the Geotechnical Engineering Bureau is changing how some of its specifications are written to align them with most Standard Specifications, which separate materials from pay items. Section 733 is being assigned the material specifications related to earthwork. This change also will align the specifications with SiteManager methodology in defining its Material Codes and Pay Items, with Items referring to one or many Materials.
- §733-01 is created and assigned the material specifications relating to controlled low strength material.
- The Standard Specification §733-01 includes the following:
  1. The provision for the Department to perform Quality Assurance (QA) testing on CLSM is outlined.
  2. A Basis of Approval section. Approval of CLSM mix design will be based on a certification of the unconfined compressive strength of the proposed material.
  3. A Basis of Acceptance section. Acceptance will be based on the following:
     A. Satisfactory completion of field tests, including spread diameter and cylinder casts and;
     B. Satisfactory results from cylinder breaks, confirming that the unconfined compressive strength meets the specification requirements.

**IMPLEMENTATION:**

- The Main Office Design Quality Assurance Bureau will insert these standard specification shelf notes beginning with projects submitted for the letting of May 7, 2009.

**TRANSMITTED MATERIALS:**

- Standard Specification shelf notes of *Section 733 Earthwork Materials.* Both metric and US Customary shelf notes are attached.

**BACKGROUND:**

- To achieve the Department's goal of completing construction projects in a timely manner, it is essential to use products which decrease installation time and effort over conventional materials. CLSM is used primarily as a self-leveling backfill material and does not require compaction. It is much lower in strength than concrete, making future excavation possible. Due to the self-compacting properties of the material, construction personnel and equipment are not required in confined spaces for compaction operations. As a result, the width of excavations can be decreased, laid back slopes eliminated and flagging operations reduced.

- The Department is implementing Trns·port SiteManager, including both Construction and Materials functionality. Implementation of standard AASHTO software enables SiteManager to allow revising this agency's practices to be more consistent with industry-accepted best practices. The revisions to the Standard Specifications are to conform to SiteManager's methodology in defining its Material Codes and Pay Items.

**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, rromer@dot.state.ny.us. Questions or comments regarding the technical aspects of the Standard Specification Subsection should be directed to Don Dwyer, P.E., of the Geotechnical Engineering Bureau at (518) 457-4724, ddwyer@dot.state.ny.us.

Make the following changes to the Standard Specifications dated May 4, 2006:

Page **993**, **Delete** SECTION 733 AND 734 (VACANT) and **Replace** it with the following:

## SECTION 733 – EARTHWORK MATERIALS

## §733-01 – CONTROLLED LOW STRENGTH MATERIAL (CLSM)

**QUALITY ASSURANCE PROGRAM.** The Department maintains a Quality Assurance (QA) program instituted by the Geotechnical Engineering Bureau (GEB) for controlled low strength material (CLSM). The Department will sample and test CLSM and, if the material is found to not meet specification requirements, reject said material.

Three (3) specimens (cylinders) will be cast for each batch in accordance with this specification and tested for unconfined compressive strength. A batch is defined as the amount of material that can be mixed at one time.

**SCOPE.** This specification covers the material requirements and methods of testing CLSM generally used as a replacement for compacted soil backfill in sites where performing compaction is difficult and labor intensive.

**GENERAL.** Provide CLSM with a mix design based on the unconfined compressive strength requirements of the specification. Design the CLSM mix so that it sets within the time stated in the contract documents. If no set time is required, design the set time to meet Contractor's operational requirements.

**MATERIAL REQUIREMENTS.**

**A. MATERIAL.** Provide CLSM containing cement and water. At the Contractor's option, it may also contain fly ash (unless the No Fly Ash item is specified), aggregate, or chemical admixtures in any proportions such that the final product meets the strength and flow consistency requirements included in this specification.

Provide materials meeting the requirements of Table 733-01A *CLSM Material Requirements*:

| TABLE 733-01A CLSM MATERIAL REQUIREMENTS | |
|---|---|
| **Material** | **Subsection** |
| Portland Cement, Type 1 or Type 2 | §701-01 |
| Water | §712-01 |

If used, provide materials meeting Table 733-01B *Requirements for Optional CLSM Material:*

| TABLE 733-01B REQUIREMENTS FOR OPTIONAL CLSM MATERIAL | |
|---|---|
| **Material** | **Subsection** |
| Aggregate Gradation | §703-07 *Concrete Sand* |
| Fly Ash | Provide fly ash that complies with the requirements of §711-10 *Fly Ash*. Waive the loss on ignition requirement. |
| Chemical Admixtures | Provide admixtures that comply with §711-08 *Admixtures*. The mix may include high air generators manufactured for CLSM. |

**B. UNCONFINED COMPRESSIVE STRENGTH.** Provide CLSM with a mix design generating an unconfined compressive strength in Table 733-01C *CLSM Unconfined Compressive Strength:*

| TABLE 733-01C CLSM UNCONFINED COMPRESSIVE STRENGTH | |
|---|---|
| **Test Age** | **Unconfined Compressive Strength** |
| 28 days | 275 kPa $\leq q_u \leq$ 1030 kPa |

**SAMPLING AND TESTING.**

**A. SPREAD DIAMETER.** Provide CLSM that has, at the time of placement, a minimum diameter spread of 200 mm as determined by a Department Representative in accordance with ASTM D6103 *Standard Test Method for Flow Consistency of Controlled Low Strength Material (CLSM).*

**B. CYLINDER CAST.** A Department Representative will cast three (3) specimens (cylinders) for each batch of CLSM for QA testing.

**BASIS OF APPROVAL.** Mix designs will be approved based on certification of the unconfined compressive strength meeting the requirements of the specification.

**BASIS OF ACCEPTANCE.** CLSM material will be accepted on the jobsite upon submission of an approved mix design to the Engineer. For CLSM batched through a batch plant, material will also be accepted on the jobsite by delivery ticket. Each delivery ticket shall identify the Suppliers name, date, NYSDOT contract number, item number and quantity.

CLSM material will be accepted as part of the contract quantities upon successful completion of the field tests and QA program indicating the material conforms to the specification.

## SECTION 734 (VACANT)

Make the following changes to the Standard Specifications dated May 1, 2008:

Page **1049**, **Delete** SECTION 733 AND 734 (VACANT) and **Replace** it with the following:

## SECTION 733 – EARTHWORK MATERIALS

## §733-01 – CONTROLLED LOW STRENGTH MATERIAL (CLSM)

**QUALITY ASSURANCE PROGRAM.** The Department maintains a Quality Assurance (QA) program instituted by the Geotechnical Engineering Bureau (GEB) for controlled low strength material (CLSM). The Department will sample and test CLSM and, if the material is found to not meet specification requirements, reject said material.

Three (3) specimens (cylinders) will be cast for each batch in accordance with this specification and tested for unconfined compressive strength. A batch is defined as the amount of material that can be mixed at one time.

**SCOPE.** This specification covers the material requirements and methods of testing CLSM generally used as a replacement for compacted soil backfill in sites where performing compaction is difficult and labor intensive.

**GENERAL.** Provide CLSM with a mix design based on the unconfined compressive strength requirements of the specification. Design the CLSM mix so that it sets within the time stated in the contract documents. If no set time is required, design the set time to meet Contractor's operational requirements.

**MATERIAL REQUIREMENTS.**

**A. MATERIAL.** Provide CLSM containing cement and water. At the Contractor's option, it may also contain fly ash (unless the No Fly Ash item is specified), aggregate, or chemical admixtures in any proportions such that the final product meets the strength and flow consistency requirements included in this specification.

Provide materials meeting the requirements of Table 733-01A *CLSM Material Requirements*:

| TABLE 733-01A CLSM MATERIAL REQUIREMENTS | |
|---|---|
| **Material** | **Subsection** |
| Portland Cement, Type 1 or Type 2 | §701-01 |
| Water | §712-01 |

If used, provide materials meeting Table 733-01B *Requirements for Optional CLSM Material:*

| TABLE 733-01B REQUIREMENTS FOR OPTIONAL CLSM MATERIAL | |
|---|---|
| **Material** | **Subsection** |
| Aggregate Gradation | §703-07 *Concrete Sand* |
| Fly Ash | Provide fly ash that complies with the requirements of §711-10 *Fly Ash*. Waive the loss on ignition requirement. |
| Chemical Admixtures | Provide admixtures that comply with §711-08 *Admixtures*. The mix may include high air generators manufactured for CLSM. |

**B. UNCONFINED COMPRESSIVE STRENGTH.** Provide CLSM with a mix design generating an unconfined compressive strength in Table 733-01C *CLSM Unconfined Compressive Strength:*

| TABLE 733-01C CLSM UNCONFINED COMPRESSIVE STRENGTH | |
|---|---|
| **Test Age** | **Unconfined Compressive Strength** |
| 28 days | 40 psi $\leq q_u \leq$ 150 psi |

## SAMPLING AND TESTING.

**A. SPREAD DIAMETER.** Provide CLSM that has, at the time of placement, a minimum diameter spread of 8 in. as determined by a Department Representative in accordance with ASTM D6103 *Standard Test Method for Flow Consistency of Controlled Low Strength Material (CLSM).*

**B. CYLINDER CAST.** A Department Representative will cast three (3) specimens (cylinders) for each batch of CLSM for QA testing.

**BASIS OF APPROVAL.** Mix designs will be approved based on certification of the unconfined compressive strength meeting the requirements of the specification.

**BASIS OF ACCEPTANCE.** CLSM material will be accepted on the jobsite upon submission of an approved mix design to the Engineer. For CLSM batched through a batch plant, material will also be accepted on the jobsite by delivery ticket. Each delivery ticket shall identify the Suppliers name, date, NYSDOT contract number, item number and quantity.

CLSM material will be accepted as part of the contract quantities upon successful completion of the field tests and QA program indicating the material conforms to the specification.

## SECTION 734 (VACANT)