
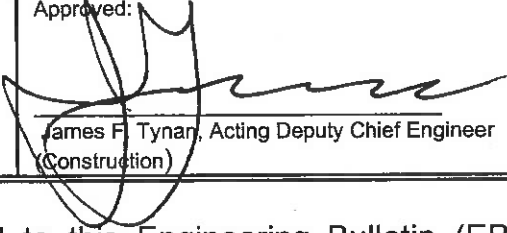


To:		New York State Department of Transportation <b>ENGINEERING          BULLETIN</b>	<b>EB</b> 00-042
Expires one year after issue unless replaced sooner			
<b>Title: REVISIONS TO CONSTRUCTION INSPECTION MANUAL, SECTIONS 203 AND 551</b>			
Distribution: <input type="checkbox"/> Manufacturers (18) <input checked="" type="checkbox"/> Main Office (30) <input type="checkbox"/> Local Govt. (31) <input checked="" type="checkbox"/> Regions/Agencies (32)	<input type="checkbox"/> Surveyors (33) <input checked="" type="checkbox"/> Consultants (34) <input checked="" type="checkbox"/> Contractors (39) <input type="checkbox"/> _____ ( )	Approved:  James F. Tynan, Acting Deputy Chief Engineer (Construction)	6-26-00 Date

**EFFECTIVE DATE:** The materials attached to this Engineering Bulletin (EB) are effective immediately.

**PURPOSE:** The purpose of this EB is to transmit revisions for the Construction Inspection Manual (CIM), Section 203-00-Excavation and Embankment, and Section 551-00-Pile and Pile Driving Equipment.

**TRANSMITTED MATERIALS:** Replace the current pages numbered 6 and 7 of CIM Section 203-00 with the revised pages 6 and 7 that are attached. Also, replace the current pages numbered 1 and 2 of CIM Section 551-00 with the revised pages 1 through 4 that are attached.

**BACKGROUND:** As part of the Department's goal of completing projects in a timely manner, it is essential to use products such as Controlled Low Strength Material, (CLSM) which decrease installation time and effort when compared with conventional materials. Modifications to Section 203-00 of the CIM were made so that it is consistent with a new Standard Sheet for CLSM that was recently issued by EB 00-004, and new guidelines for the use of CLSM as backfill material as outlined in Chapter 9 of the Highway Design Manual and issued by EI 99-039.

Revisions to Section 551-00 are due to the Department's continuous improvement process where more comprehensive Pile Driving Guidelines have been developed for Field Engineers and Inspectors.

**CONTACT:** Questions concerning the Excavation and Embankment portions of this EB should be directed to Judith Stone of the Geotechnical Engineering Bureau at (518) 457-4722 and questions concerning Pile and Pile Driving Equipment should be directed to Lawrence Callahan, Main Office Structures Division at (518) 457-7677.

**EXCAVATION AND EMBANKMENT**

- Determine the minimum effective compactive force per unit length of drum.

$$P.L.F. = \frac{\text{Unsprung Drum Weight (lbs)} + \text{Dynamic Force (lbs)}}{\text{Drum width (inches)}} \qquad 210 = \frac{3500 + 9088}{60}$$

- Determine maximum loose lift thickness.

From figure 203-3(B) 8 inches

- Determine new operating speed for 4 passes of the roller.

$$\text{Speed } X = \frac{(\text{Specified Speed}) \times (\text{Minimum passes @ } X)}{(\text{Specified Minimum passes})} \qquad 3 \text{ Passes} = \frac{4.5(4)}{6}$$

Once determined, the compaction equipment, operating frequency, maximum and actual lift thickness, and number of passes shall be recorded on MURK-1, "INSPECTORS DAILY REPORT."

For items which have density requirements, minimum densities shall be verified with compaction control tests performed on the job by the project's earthwork inspection personnel. These tests shall be performed in conformance with the procedures contained in the appropriate Departmental publication in effect on the date of the advertisement for bids (References: STM-6, 9 or 10). The Regional Geotechnical Engineer can specify the appropriate test(s).

Test results shall be documented on MURK-1, "INSPECTOR'S DAILY REPORT," and Forms SM-384A, (Exhibit 203E) "COMPACTION CONTROL DATA SHEET," SM-417B, (Exhibit 203F) "FIELD COMPACTION DATA SHEET - SAND CONE OR VOLUMETER APPARATUS," AND/OR SM-418B, (Exhibit 203G) "FIELD COMPACTION DATA SHEET - NUCLEAR DIRECT TRANSMISSION." Retests of previously failing tests should be cross referenced to the original tests. A copy of the SM-417B shall be submitted to the Regional Geotechnical Engineer for their files.

203-3.15 Fill and Backfill at Structures, Culverts, Pipes, Conduits and Direct Burial Cables

Controlled Low Strength Material (CLSM) is often an acceptable alternative to compacted soil backfill. CLSM consists of cement, water and, at the contractor's option, fly ash, aggregate or chemical admixtures in any proportions such that the final product meets the strength and flow consistency requirements included in the specification. The mix is proportioned to be self leveling and does not require compaction. It is much lower in strength than concrete, making future excavation possible. After set, CLSM has the characteristics of compact, undisturbed soil.

**EXCAVATION AND EMBANKMENT**

## Guidelines for Placement and Inspection of Controlled Low Strength Material (CLSM):

- A - Narrower trench widths can be employed when using CLSM instead of soil backfill due to the self-compacting properties of the material. Therefore, construction personnel and equipment are not required to be in the trench for compaction operations. Some installations, however, may require that construction personnel temporarily occupy the trench to make adjustments to the alignment of the pipe. In this case, all OSHA requirements will be followed.
- B - In situations where CLSM is used as backfill around lightweight pipe, flotation of the pipe may occur. To counteract the buoyancy of a watertight pipe as the CLSM is placed, partially fill the pipe with water as necessary for weight. Anchors, straps and gravel bags are also used to weight the pipe, but these methods are less desirable, as arching between the anchor points can occur.
- C - When placing CLSM, pour the material onto the top of the pipe at the center. This will help hold the pipe down and ensure even placement rates of CLSM on opposite sides of the pipe.
- D - Do not place CLSM in contact with aluminum pipe, including connections, fixtures, etc., unless the aluminum has been coated with an approved primer. Do not place CLSM containing fly ash in contact with cast iron pipes.
- E - Where the distance between the top of pipe elevation and the top of subgrade elevation is less than 0.6 m, use CLSM for the backfill material to top of subgrade elevation.
- F - CLSM should be kept encapsulated with soil, as it is highly erodible and disintegrates when left exposed to the environment.
- G - Refer to the current Special Specification, NYSDOT Highway Design Manual, the Regional Geotechnical Engineer and Standard Sheet No. 203-6R1 for additional construction details of CLSM.
- H - CLSM can support traffic within several hours of placement. Set up times can be shortened with the use of accelerators. The required set up times are determined by the designer and shown on the plans, or specified by the contractor in accordance with the MPT scheme and needs of the project.

203-3.16 Borrow

As per the specification, any offsite borrow source must be approved by the Engineer-in-Charge prior to its use. Permission to use construction and demolition (C&D) materials from off-site locations must be critically reviewed as existing NYSDEC regulations severely restrict the type of C&D material that can be allowed for embankment construction. Also, it may be necessary for a mining permit to be acquired by the contractor. The recognized danger is that crushed or shredded, and therefore, unrecognizable C&D material is an ideal medium to conceal the disposal of

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§551-00

PILE AND PILE DRIVING EQUIPMENT

Construction personnel involved in pile driving must pay close attention to the applicable sections of the Plans, Specifications, and the New York State Steel Construction Manual (NYS SCM). Construction Supervisors and Engineers-In-Charge (EIC's) must assure that Inspection Staff are trained and knowledgeable regarding their assignment and that good supervision oversight practices are employed for these particularly critical structural items.

To ensure that piles are installed in accordance with all contractual and procedural requirements, the following discussion of key requirements is provided:

- Familiarization with Plans and Specifications.

Engineers and Inspectors shall review contract documents to determine pile capacities, estimated pile lengths and, where appropriate, minimum driven pile lengths. They should also check for special requirements regarding dynamic or static pile load tests, and waiting periods (where a pile may sit for up to 24 hours before it is restruck). They shall determine if piles are to be driven to a resistance or to a predetermined length. Bored-in piles have special requirements outlined in the specification.

- Submittal of Form BD 138M, Pile and Driving Equipment Data.

**The Contractor must submit to the Deputy Chief Engineer (Structures), D.C.E.S., Form BD 138M for approval.** The form shown as Exhibit 551-A&B can be obtained from the Regional Office. All information listed on Form BD 138M shall be submitted as applicable to the D.C.E.S. Each separate combination of pile and pile driving equipment proposed by the Contractor shall require the submission of a corresponding Form BD 138M. Refer to Section 551-1.03 of the Standard Specification and Notes on the Contract Plans. The D.C.E.S. will transmit the "driving criteria" based on the analysis of the proposed equipment and the soil the piling is to be driven in.

The Inspector shall verify that the equipment is the same as that on Form BD 138M and the piles are those shown on the Contract Plans. Piles shall be furnished with prefabricated or commercial shoes, as detailed on the Contract Plans, or as approved by the D.C.E.S. Refer to Section 551-3.01.C.1.a&b. of the Standard Specifications and details on the Contract Plans. A Welding Procedure Specification (WPS) is required to be submitted to the D.C.E.S.

- Material Deliveries.

Deliveries of all pile material are to be recorded on the Inspector's Daily Report and Material Acceptance Record. Material Certifications must be referenced by the Manufacturer or Supplier to special project shipments. Payment quantities cannot exceed the quantity of acceptable material in the documented deliveries.

- Pile Inspection.

The Inspector shall check for:

- Material certification.
- Piles are straight and of proper size.
- Prefabricated or commercial shoes as detailed on plans or as approved by D.C.E.S. should be on every pile. Shoes shall be attached in accordance with WPS (approved by D.C.E.S.).
- Markings on pile so Inspector can reference length during driving.
- Special pile coatings where required by plans.

- Welding.

Pile welding shall be in accordance with the provisions of the New York State Steel Construction Manual (SCM). All procedural directives discussed in Section 564, Structural Steel for "Structural welding-Field" of this Manual are applicable to welding of piles on site. If the Contractor chooses to subassemble any portion of the pile by welding off site, the Contractor should be directed to notify the Structures Division, Metals Engineering Unit (MEU) at (518) 457-4525 of the type and location of work so that the appropriate Quality Control approvals are obtained and In-Process Quality Assurance (QA) inspection by the State can be arranged, when necessary.

For all Field Welding, Inspectors shall verify:

- The Contractor's QC Program has qualified and adequate staff.
- There is an approved WPS for each joint type and position to be welded.
- Welders are NYS certified for the work to be performed.
- Welding parameters are followed, including preheating and drying electrodes prior to their use.

Refer to Section 551-3.01.C.2.a of the Standard Specifications; Subsections 302, 306, 704, 708, 711 and 811 of the SCM and Section 564 of this Manual for additional information on welding.

- Pile Splices.

**Full length piles shall always be used where practicable.** When unavoidable, piles shall be spliced as detailed on the Contract Plans. The number, locations, and actual details shall be subject to the approval of the D.C.E.S. Refer to Section 551-3.01.C.2.a&b. and details on the Contract Plans.

- Site Condition.

- The Inspector shall ensure the contractor follows required procedures for working in the vicinity of overhead utilities, as described in MURK 1C, Safety & Health Program Manual, Part III-B.1.
- Underground utilities shall be identified and marked out, as described in MURK 1C, III-B.1.
- Piles shall be driven starting from the center of the foundation and proceeding outward or starting at the outside row and driving progressively across the foundation.
- The Inspector shall oversee building condition surveys if required, when a nearby building may be sensitive to vibrations from the pile driving operation.
- The Inspector shall monitor railroad tracks, if required. The Inspector shall notify D.C.E.S. regarding leaving sheeting in permanently when it is in a loose granular soil and close to railroad tracks.

- Hammer Inspection.

The Inspector shall check:

- Hammer and cushion on project are the same as that on Form BD 138M.
- Hammer operates properly with correct ram stroke, correct blow rate and with certain hammers, the correct chamber pressure.
- Hammer strikes pile squarely.

- Pile Driving Records.

Copies of Pile Driving records (form BD-25M and Form BD-26M) should be transmitted to the Regional Office, the Geotechnical Engineering Bureau, and D.C.E.S. at the end of driving or sooner if requested by D.C.E.S. Refer to Exhibits 551-C&D for samples of these forms.

- General - Contact D.C.E.S. at (518) 457-7677 when:

- Driving piles in or adjacent to a stream crossing and the estimated length or minimum tip elevation is not achieved.
- Conflicts occur with existing piles left in place.
- Excessive variation between estimated length and actual length.
- Hard driving for extended lengths.
- Pile misalignment and or relocation.

**REFERENCES:**

NYS STEEL CONSTRUCTION MANUAL, §302, §306, §704 & §811  
STANDARD SPECIFICATION §564  
CONSTRUCTION INSPECTION MANUAL §564-00, STRUCTURAL WELDING - FIELD  
PILE DRIVING INSPECTOR'S MANUAL  
STATIC PILE LOAD TEST MANUAL, GCP-18  
MURK 1C, III-B.1, ELECTRICAL AND UTILITY SAFETY