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| To:   |  | <i>New York State<br/>Department of<br/>Transportation</i><br><b>ENGINEERING<br/>INSTRUCTION</b>           | <b>EI</b><br><b>05-041</b> |
| Title: <b>PRECAST CONCRETE PAVEMENT SLAB SYSTEMS – STANDARD SPECIFICATION</b>   |  |  |                            |
| Distribution:<br><input checked="" type="checkbox"/> Manufacturers (18)<br><input checked="" type="checkbox"/> Local Govt. (31)<br><input checked="" type="checkbox"/> Agencies (32)          |  | Approved:<br><br><u>/s/ Robert L. Sack</u><br>Robert L. Sack, Deputy Chief Engineer,<br>Technical Services |                            |
| <input type="checkbox"/> Surveyors (33)<br><input checked="" type="checkbox"/> Consultants (34)<br><input checked="" type="checkbox"/> Contractors (39)<br><input type="checkbox"/> _____ ( ) |  | <u>21DEC05</u><br>Date   |                            |

**ADMINISTRATIVE INFORMATION:**

- This Engineering Instruction (EI) is effective beginning with projects submitted for the letting of 09/07/2006.
- No EIs or Engineering Bulletins are hereby superseded.
- The shelf note transmitted by this EI, 704-15 Precast Concrete Pavement Slab Systems, will be incorporated into a future revision of the Standard Specifications.

**PURPOSE:** To issue a new specification for precast concrete pavement slab production.

**TECHNICAL INFORMATION:** The following are issued concurrently:

- EI 05-043, Precast Concrete Pavement Slab Systems - Design Guidance.
- EI 05-042, Precast Concrete Pavement Slab Systems – Special Specification.

The Materials Bureau will generate an approved list of precast concrete pavement slab systems and their designers.

**IMPLEMENTATION:**

- The Design Quality Assurance Bureau will insert the transmitted shelf note into contract proposals beginning with projects submitted for the letting of 09/07/2006.
- Standard Specification §704-15 Precast Concrete Pavement Slab Systems, is approved by this EI.

**TRANSMITTED MATERIALS:** A shelf note, 704-15 Precast Concrete Pavement Slab Systems, is attached to this EI.

**BACKGROUND:** Precast concrete slabs have been used in New York since 2000 without any governing specifications. The transmitted shelf note details production requirements.

**CONTACT:** Address questions concerning this issuance to the Materials Bureau. Current contacts are James Reidy ([jreidy@dot.state.ny.us](mailto:jreidy@dot.state.ny.us)) at (518) 457-4591, Michael Brinkman ([mbrinkman@dot.state.ny.us](mailto:mbrinkman@dot.state.ny.us)) at (518) 457-4584, or William Cuerdon ([wcuerdon@dot.state.ny.us](mailto:wcuerdon@dot.state.ny.us)) at (518) 485-5278.



Make the following changes to the Standard Specifications of January 2, 2002.

Page 7-45, line 41, **insert** the following:

## **“704-15 PRECAST CONCRETE PAVEMENT SLAB SYSTEMS**

**SCOPE.** This specification covers material and fabrication requirements for precast concrete pavement slab systems. Approved systems can be supplied by any manufacturer appearing on the Department’s Approved List entitled “Precast Concrete Manufacturers Approved for QC/QA Production – Groups 1 & 6,” provided they obtain approval from the system designer.

**SYSTEM APPROVAL.** For Approved List consideration, the system designer must submit the following information to the Materials Bureau. After the Materials Bureau reviews the submitted information, the system designer will be required to perform a trial installation as detailed herein.

**A. Fabricator Standard Drawings.** Apply §704-03, Precast Concrete – General. Include the following details:

- Transverse joint support type, locations, spacing, and the mechanism used to transfer loads across transverse joints after slabs are placed.
- Longitudinal joint tie type, locations, spacing and the mechanism used to tie adjacent slabs together.
- Lifting insert type, location, positioning, and capping or backfill method.
- Grout port type, location, positioning, and capping or backfill method.

**B. Installation Instructions.** Provide installation instructions, including any special equipment, to address the following.

**1. Subbase Preparation.** Instructions for any recommended subbase preparation.

**2. Slab Installation.** Instructions for lifting, moving, protecting, lowering, and adjusting the slabs into position.

**3. Bed and Level Slabs.** Instructions to ensure slabs are fully supported by underlying layers at the correct line, grade, and cross slope while meeting contract smoothness requirements. Slabs may be either:

- Placed on a precisely graded bedding layer and grouted in-place to fill any small, isolated voids between the slabs and bedding layer (grade-supported).
- Placed or held near final position and jacked into place (grout-supported).
- Placed by other methods approved by the Director, Materials Bureau.

For grade-supported slabs, include all pertinent bedding and leveling instructions, including:

- Bedding material composition and gradation.
- Bedding grout mix design and anticipated strength gain. Bedding grouts must develop a minimum compressive strength of 4 MPa in 12 hours.
- Method used to place the bedding material and grout beneath the slab.
- Method used to ensure complete bedding when placed.

For grout-supported slabs, include all pertinent bedding and leveling instructions, including:

- Material properties, composition, mix design, and anticipated strength gain of any slab-jacking material.
- Method used to place the slab-jacking material beneath the slab.
- Method used to ensure complete slab contact with jacking material when placed.

**4. Backfilling Pavement Hardware.** Instructions to completely encase load transfer devices, longitudinal joint ties, lifting inserts, and grout ports. Include all pertinent information, including:

- Material properties, composition, mix design, and anticipated strength gain of any backfill material that is not named in Backfill Material for Pavement Hardware, or, revised instructions for those materials if the manufacturer's instructions are not followed.
- Method used to place backfill material.
- Method used to ensure complete hardware encasement.

Subsequent to system approval, any change to approved installation instructions must be submitted to, and approved by, the Director, Materials Bureau, to maintain Approved List status. The Department reserves the right to require additional trial installations if the changes are deemed significant.

**C. Trial Installation.** Perform a trial installation at a facility agreeable to the Regional Materials Engineer that is within a 1-hour drive of a Regional Materials Laboratory. Ensure Materials Bureau and Regional Materials personnel are present. Place 4 (minimum) 3.67 m x 3.67 m slabs simulating 2 lanes of traffic. Provide a drill rig, with operator, capable of retrieving 100 mm diameter cores through any portion of the slab, and a technician capable of fabricating test specimens in accordance with Test Method NY 701-13P, C, Concrete Repair Material. As a minimum, the following will be evaluated:

**1. Bedding Grout Properties and Completeness of Placement.** Fabricate 24 cubes meeting Test Method NY 701-13P, C, Concrete Repair Material.

**2. Leveling Material Properties and Completeness of Placement.** Fabricate 24 cubes meeting Test Method NY 701-13P, C, Concrete Repair Material.

**3. Backfill Material Properties and Completeness of Placement.** If a material identified in this specification as Backfill Material for Pavement Hardware (under Material Requirements) is used in accordance with the manufacturer's written instructions, no further material testing is required. If a different material is used (or if a material is not used in accordance with the manufacturer's instructions), fabricate a sufficient amount of test specimens to determine the properties identified in Table 704-15-1, Backfill Material Requirements, when tested in accordance with Test Method NY 701-13P, C, Concrete Repair Material.

**4. Dimensions and Tolerances.** Slabs must conform to the Fabricator Standard Drawings and be capable of being placed in an essentially true plane.

**5. Instruction Completeness.** Manufacturer's instructions must accurately reflect the processes used in the trial installation.

**6. Load Transfer Efficiency (LTE).** The Department reserves the right to conduct falling weight deflectometer testing to determine LTE at the joints. Poor LTE ( $\leq 70\%$ ) is cause for rejection.

**MATERIAL REQUIREMENTS.** Apply §704-03, Precast Concrete – General, except as noted herein.

**A. Concrete.** Use concrete having a minimum 28-day compressive strength of 30 MPa unless noted otherwise in the contract documents or approved fabrication drawings. Use aggregate meeting the friction requirements of Sections 501, Portland Cement Concrete – General, and 502, Portland Cement Concrete Pavement, for precast slabs that will remain concrete surfaced. Friction aggregate type is identified in the contract documents by pay item.

**B. Reinforcement.** Use bars meeting §709-04, Epoxy-Coated Bar Reinforcement, Grade 420. As a minimum, fabricate slabs with single-mat reinforcement located in the bottom third of the slab. Provide 50 mm (minimum) concrete cover between the mat and the slab bottom. Fabricate mats using a size and spacing of steel (in both directions) that results in a steel area to cross-sectional area ratio of 0.0018 (minimum). Maximum bar spacing is 450 mm.

The manufacturer may provide additional reinforcement based on jobsite loading conditions. (A typical example is when slabs must be loaded before a bedding grout is placed.)

**C. Backfill Material for Pavement Hardware.** If the precast slab system requires a backfill material around pavement hardware, use DBR Retrofit Mortar, HD-50, Five Star Highway Patch, or an alternate prepackaged material submitted as an approved equal. If the brands named above are mixed in accordance with their manufacturer’s written instruction, no further testing is required. If the manufacturer’s written instructions are not followed, or if an alternate material is proposed for use, the material must meet Table 704-15-1, Backfill Material Requirements, when tested in accordance with Test Method NY 701-13P,C, Concrete Repair Material. Material submission instructions can be found at the Department’s web site, [www.dot.state.ny.us](http://www.dot.state.ny.us), under Approved List of Materials and Equipment Submission Instructions.

| <b>TABLE 704-15-1 BACKFILL MATERIAL REQUIREMENTS</b> |                |                |
|--|----------------|----------------|
| <b>Property</b>                                      | <b>Minimum</b> | <b>Maximum</b> |
| Compressive Strength, Opening to Traffic             | 17 MPa         | -              |
| Compressive Strength, 28 Day                         | 28 MPa         | -              |
| Expansion  | -              | 0.40 %         |
| Contraction  | -              | 0.05 %         |
| Freeze - Thaw Loss (25 cycles at 10% NaCl)           | -              | 1.0 %          |
| Bond Strength (to dry PCC)                           | 2.1 MPa        | -              |
| Initial Set Time                                     | 15 minutes     | -              |
| Chloride Content                                     | -              | 0.05 %         |
| Sulfate Content                                      | -              | 5.0 %          |

**DRAWINGS.** Apply §704-03 Precast Concrete – General, except as noted herein. Provide job-specific Fabricator Working Drawings, from the system designer, for each contract. Use these drawings, in conjunction with approved Fabricator Standard Drawings, to manufacture the pavement slabs. Copies of approved working drawings will be returned to the system designer. If the manufacturer is not the system designer, include the manufacturer’s name, address, and telephone number on the drawings.

**FABRICATION.** Apply §704-03, Precast Concrete – General, except as noted herein.

**Texture.** Apply §502-3.10, Texturing, to the top surface of the slab.

**Curing.** When membrane curing compound is the selected curing method and the slabs are exposed to sunlight while curing, use a white pigmented membrane curing compound from the Department's Approved List instead of a clear compound with fugitive dye.

**SAMPLING AND TESTING.** Apply §704-03, Precast Concrete - General.

**MARKING.** Apply §704-03, Precast Concrete - General.

**FINAL PRODUCTION INSPECTION.** Apply §704-03, Precast Concrete - General.

**SHIPPING.** Apply §704-03, Precast Concrete - General.

**BASIS OF ACCEPTANCE.** Apply §704-03, Precast Concrete – General, and the following:

- The system must appear on the Department's Approved List entitled "Precast Concrete Pavement Slabs Systems (§704-15)."
- Written approval from the system designer to use the approved system if the manufacturer is not the system designer."