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Florida Department of Transportation

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DCE MEMORANDUM NO. 09-15
(FHWA Approved: 04/29/2015)

TO: **DISTRICT CONSTRUCTION ENGINEERS**

FROM: David A. Sadler, P.E., Director, Office of Construction for.

COPIES: Tom Byron, Bob Burleson, Nick Finch, Rafiq Darji

SUBJECT: **MASS CONCRETE**

Specification Subarticle 346-3.3 (Mass Concrete) has undergone significant revision and will be effective with January 2016 lettings. Substantive changes to the Specification include:

- Clarified the requirements for a Mass Concrete Control Plan
- Broadened conditions where reduced mass concrete monitoring may be requested by the contractor
- Provided conditions where the contractor may (at his option) omit mass concrete instrumentation and monitoring based on concrete member geometry, insulation, environmental classification and mix design

This memorandum serves as blanket approval to process a contract change to incorporate the attached Specification Subarticle 346-3.3 into contracts let prior to January 2016. Attach a copy of this memorandum with the attached Specification Subarticle 346-3.3 to the Work Order or Supplemental Agreement. Implementation of this memo will result in a credit to the Department.

If you have any questions, please call Dan Hurtado at (850) 414-4155.

DAS/dh

DRAFT

346 PORTLAND CEMENT CONCRETE.
(REV 3-26-15) (FA 4-8-15) (1-16)

SUBARTICLE 346-3.3 is deleted and the following substituted:

346-3.3 Mass Concrete: When mass concrete is designated in the Contract Documents, use a Specialty Engineer to develop and administer a Mass Concrete Control Plan (MCCP). Develop the MCCP in accordance with Section 207 of the ACI Manual of Concrete Practice to ensure concrete core temperatures for any mass concrete element do not exceed the maximum allowable core temperature of 180°F and that the temperature differential between the element core and surface do not exceed the maximum allowable temperature differential of 35°F. Submit the MCCP to the Engineer for approval at least 14 days prior to the first anticipated mass concrete placement. Ensure the MCCP includes and fully describes the following:

1. Concrete mix design proportions,
2. Casting procedures,
3. Insulating systems,
4. Type and placement of temperature measuring and recording devices,
5. Analysis of anticipated thermal developments for the various mass concrete elements for all anticipated ambient temperature ranges,
6. Names and qualifications of all designees who will inspect the installation of and record the output of temperature measuring devices, and who will implement temperature control measures directed by the Specialty Engineer,
7. Measures to prevent thermal shock, and
8. Active cooling measures (if used).

Fully comply with the approved MCCP. The Specialty Engineer or approved designee shall personally inspect and approve the installation of temperature measuring devices and verify that the process for recording temperature readings is effective for the first placement of each size and type mass component. The Specialty Engineer shall be available for immediate consultation during the monitoring period of any mass concrete element. Record temperature measuring device readings at intervals no greater than six hours, beginning at the completion of concrete placement and continuing until decreasing core temperatures and temperature differentials are confirmed in accordance with the approved MCCP. Leave temperature control mechanisms in place until the concrete core temperature is within 50°F of the ambient temperature. Within three days of the completion of temperature monitoring, provide a report to the Engineer which includes all temperature readings, temperature differentials, data logger summary sheets and the maximum core temperature and temperature differentials for each mass concrete element.

Upon successful performance of the MCCP, reduced monitoring of similar elements may be requested. Submit any such requests to the Engineer for approval at least 14 days prior to the requested date of reduced monitoring. If approved, the Specialty Engineer may monitor only the initial element of concrete elements meeting all of the following requirements:

1. All elements have the same least cross sectional dimension,
2. All elements have the same concrete mix design,
3. All elements have the same insulation R value and active cooling measures (if used), and

4. Ambient temperatures during concrete placement for all elements is within minus 10°F or plus 5°F of the ambient temperature during placement of the initial element.

Install temperature measuring devices for all mass concrete elements. Resume the recording of temperature monitoring device output for all elements if directed by the Engineer. The Department will make no compensation, either monetary or time, for any impacts associated with reduced monitoring of mass concrete elements.

Mass concrete control provisions are not required for drilled shafts supporting sign, signal, lighting or intelligent transportation (ITS) structures. At the Contractor's option, instrumentation and temperature measuring may be omitted for any mass concrete substructure element meeting all of the following requirements:

1. Least cross sectional dimension of six feet or less,
2. Insulation R value of at least 2.5 provided for at least 72 hours following the completion of concrete placement,
3. The environmental classification of the concrete element is Slightly Aggressive or Moderately Aggressive,
4. The concrete mix design meets the mass concrete proportioning requirements of 346-2.3, and
5. The total cementitious content of the concrete mix design is 750 lb/yd^3 or less.

If either the maximum allowable core temperature or temperature differential of any mass concrete element is exceeded, implement immediate corrective action as directed by the Specialty Engineer to remediate. The approval of the MCCP shall be revoked. Do not place any mass concrete elements until a revised MCCP has been approved by the Engineer. Submit an analysis prepared by a Specialty Engineer to the Engineer for approval which addresses the structural integrity and durability of any mass concrete element which is not cast in compliance with the approved MCCP or which exceeds the allowable core temperature or temperature differential. Provide all analyses and test results requested by the Engineer for any noncompliant mass concrete element to the satisfaction of the Engineer. The Department will make no compensation, either monetary or time, for the analyses and tests or any impacts upon the project.