

January 1, 2021

Concrete Mix Design

APPROVED:

Division Administrator

By: _____

FEDERAL HIGHWAY ADMINISTRATION

Subsection 701.2.12 of the SCDOT Standard Specifications is amended as follows:

Delete **Subsection 701.2.12.1** and replace with the following:

701.2.12.1 General

- 1 Design the concrete mix and determine the proportions of cementitious material, fine aggregate, coarse aggregate, and admixtures (when used) that produce a workable concrete mix. Meet the criteria for the typical classes of concrete shown in the Structural Concrete Table in **Subsection 701.2.12.2**. Consider the amount of air-entrainment that is incidentally afforded by the use of water-reducing or water-reducing/retarding admixtures. Determine the proportions of ingredients in accordance with requirements for the particular type of work and with consideration of the specific gravities of the materials to provide the desired workability and consistency.
- 2 At its own expense, the Contractor may retain an independent testing laboratory accredited by the AASHTO Accreditation Program to design the mix for the class of concrete specified, or use a mix design previously reviewed and used by the Department.
- 3 Submit all mix designs to the OMR for review a minimum of 12 business days prior to use in SCDOT projects. Submit the mixes on the appropriate OMR form approved by the SME. After successful review by the OMR, provide a copy of the mix design showing OMR's stamp to the RCE before supplying that mix to the project.
- 4 Once a mix has been reviewed by the OMR, that mix is valid for a period of three years provided that the mix ingredients or proportions are not changed. The mix may be supplied to any SCDOT project requiring that class of concrete during that period.
- 5 For the water-cementitious material ratio, use the ratio of water to cementitious materials by weight. When a mix design is reviewed by the OMR using a water-cementitious ratio lower than the maximum allowed in the Structural Concrete Table in **Subsection 701.2.12.2**, the lower water-cementitious ratio as reviewed by the OMR becomes the maximum allowable for that mix.
- 6 Design the concrete mix using Department qualified ingredients intended for use in the project and make any trial batches using such materials. Test trial mixes for complete conformance with the Specifications by the approved laboratory engaged by the Contractor.
- 7 Base mix designs on the air entrainment specifications in **Subsection 701.2.5**.
- 8 Base total water content of the mix on the weight of cement, fly ash, and silica fume multiplied by the water-cementitious ratio. Do not include the absorbed water in the aggregate as mix water.

- 9 Base mix designs on specific gravities and saturated surface dry moisture contents of coarse aggregate obtained from a source on the most recent edition of *SCDOT Qualified Product List 2* and fine aggregate obtained from a source on the most recent edition of *SCDOT Qualified Product List 1*. Include the SCDOT Number as shown on *SCDOT Qualified Product Lists 1 and 2* for all aggregate sources on the mix design form.
- 10 Base the Percent Fine to Coarse Aggregate Ratio on volume. Values of this ratio shown in the Structural Concrete Table in **Subsection 701.2.12.2** are general guidelines for the classes of concrete shown. Vary this ratio to obtain the desired workability.
- 11 No separate payment is made for the cost of the laboratory engaged by the Contractor, the materials furnished and used for trial batches, the preparation and testing of trial batches either by the Contractor or its laboratory, or furnishing the OMR with the mix data, the results of the cylinder tests, and yield to be tested. These costs are considered incidental to the work of the applicable item. Include the cost in the unit prices for the applicable pay items in the Contract.
- 12 After successful review of a mix design by the OMR, do not change the mix proportions or the sources of the individual mix ingredients with the exception of the fly ash source. Fly ash sources can be changed if needed due to supply issues (except for mass concrete mixes), provided that the alternate source is listed in *SCDOT Qualified Product List 3* and meets any other specification requirements. If modifications are necessary (other than the fly ash source), submit a new mix design for review by the OMR.