

PART VI

SUPPLEMENTAL SPECIFICATIONS

A. CONCRETE

1. General Requirements

Unless otherwise approved in writing, or as specifically indicated on approved plans, all concrete work shall conform to this section.

2. Materials

(a) Concrete. Concrete for structures shall be

proportioned and mixed in accordance with the Road and Bridge Specifications, Virginia Department of Transportation, dated January 1991, Section 217, or latest revision. The concrete shall be Class A3. Concrete for miscellaneous purposes, such as fill concrete, thrust blocks, concrete encasement, etc., shall have 2500 psi strength at 28 days. The mix proportions and test data for this concrete shall be submitted by the Contractor for approval.

(b) Steel Reinforcement. Reinforcement bars shall be deformed intermediate-grade new billet steel conforming to ASTM A615, 60 ksi yields grade billet steel deformed type, ANSI/ASTM A497. Bars shall be formed to the dimensions indicated by the drawings. The contractor shall submit shop drawings to the engineer for approval.

(c) Wire Reinforcement. Welded wire fabric shall conform to ASTM Specification A185.

(d) Curing Compound. Curing compound shall conform to ASTM Specification C309, latest issue, Type 2.

(e) Joint Filler. Expansion joint material shall be preformed and

shall conform to Federal Specification HH-F-341.

### 3. Slump

Slump tests shall be taken on every load delivered to the site. One test shall be required per load. If water is added to the mix at the site, the amount added shall be noted and the slump test repeated. Slump shall be from two (2) to four (4) inches and will be determined in accordance with ASTM Method C143. Samples for slump determination will be taken from the concrete during placement in the forms.

### 4. Testing

The 28-day compressive strengths will be verified during the progress of the work by testing standard concrete cylinders. The contractor shall furnish the necessary labor and facilities for taking the samples and handling and storing the cylinders at the site of the work. The owner will provide for testing of cylinders. The making, curing, and testing of specimens will be in accordance with ASTM Methods C31 and C39. All concrete cylinders shall be stored at the job site and under the same curing conditions as that of the concrete pour they represent.

### 5. Forms

All concrete shall be formed unless directed otherwise. Forms shall be true to line and grade and shall be mortartight. All exposed joints, edges, and external corners shall have three-quarter (3/4) inch chamfer. Forms shall be of wood, plywood, or steel. Form design shall be subject to approval, but adequacy of ties, supports, etc. shall remain the responsibility of the contractor. Embedded wall ties shall be set one and one-half (1-1/2) inches from exposed concrete surfaces. In conventional thickness walls, the height of form for each vertical lift shall not exceed ten (10) feet. Forms for continuous surfaces shall be fitted over the completed surface to assure accurate alignment and to prevent leakage of mortar. All forms shall be constructed so that they can be removed without damage to the concrete. Before placing concrete, the contact surfaces of forms shall be cleaned and coated with a non-staining

form oil.

Forms of columns, walls, sides of beams and other members not supporting the weight of the concrete may be removed thirty-six (36) hours after placing of concrete. Supporting forms for beams, girders and slabs shall remain in place until the concrete has reached its 28-day strength. Reshoring of such members will only be permitted for just cause and after review and approval by the engineer.

## 6. Placing Reinforcement

Steel reinforcement bars shall be placed in accordance with the approved shop drawings and supported by concrete block or metal chairs. Reinforcement shall be free from loose, flaky rust, mill scale, oil, grease and other coatings that would destroy the bond.

## 7. Placing of Concrete

Concrete placing equipment and methods shall be subject to approval. Poor quality subgrades which would contaminate the concrete shall be covered with building paper or other approved material. All surfaces upon which concrete is to be placed shall be thoroughly dampened. The maximum free fall of concrete during placement shall be six (6) feet. Placement at greater heights than six (6) feet shall be accomplished by chutes, slides or other approved methods. Concrete shall be worked around the reinforcement and embedded fixtures and into corners of the forms with care being taken to avoid segregation. Concrete shall be placed so as to avoid formation of cold joints between successively deposited layers. Concrete shall be placed in the dry and placement will not be permitted during adverse weather conditions as determined by the Authority.

## 8. Vibration

All concrete shall be consolidated with high frequency, internal, mechanical vibrating equipment supplemented by hand spading and tamping. Vibrators shall be designed to operate with vibratory element submerged in the concrete, and shall have a frequency of not less than 6000 impulses per minute when submerged. The vibrating equipment shall be at all times adequate in number of units and

power of each unit to consolidate the concrete properly. Vibration of forms and reinforcement shall not be permitted. Vibrators shall not be used to transport the concrete in the forms. Where concrete is placed in more than one lift, the vibrator shall penetrate into the previous lift to prevent the formation of cold joints.

#### 9. Construction Joints

Construction joints shall be provided where indicated. Construction joint surfaces shall be thoroughly cleaned before placement of concrete. All laitance, coatings, stains, debris and other foreign material shall be removed from the surface and the surface shall be broomed with neat portland cement grout immediately before the new concrete is deposited. Water stops shall be provided at construction joints where indicated. Joints in metal water stops shall be brazed, welded, or soldered. Joints in rubber water stops shall be vulcanized. Water stops shall be installed so as to form a continuous watertight seal in each joint.

#### 10. Placing Concrete in Cold Weather

Except on specific authorization, concrete shall not be placed when the atmospheric temperature is below 40 degrees fahrenheit.

#### 11. Repair of Surface Defects

Surface defects shall be repaired immediately after form removal. Honeycombed and other defective concrete shall be removed down to sound concrete. A 1:1 bonding grout shall be brushed into the surface; then a stiff patching mixture of the same proportions as the concrete, except coarse aggregate, shall be applied to the defective area. The patching mixture shall be thoroughly consolidated and struck off slightly higher to permit shrinkage, then finally finished one hour later. The patch shall be kept damp for seven (7) days.

Tie holes shall be cleaned, thoroughly dampened and filled solid with patching mortar.

#### 12. Surface Finish

Exposed wall surfaces shall be rubbed after completion of all patching. Surfaces shall be wetted and rubbed with carborundum brick or other abrasive until a uniform color and texture are produced. No additional cement grout shall be used other than that past drawn from the green concrete by the rubbing process.

Floor slabs shall receive a steel trowel finish. The surface shall be initially float-finished after the mix has hardened sufficiently to permit proper operation of a power-driven float. Power troweling and hand troweling shall complete the slab finish which shall be free from trowel marks, uniform in texture and appearance and shall be true within one-quarter (1/4) inch in ten (10) feet, determined by a 10-foot straightedge placed anywhere on the slab.

### 13. Protection and Curing

Concrete shall be protected adequately from injurious action by the sun, rain, flowing water, frost, mechanical injury, and shall not be allowed to dry out for seven (7) days after placing. Curing shall be accomplished by water curing or by application of a curing compound, except that compound shall not be used on surfaces to be rubbed, or where its appearance would be objectionable or where coverings are to be bonded to the concrete. Vertical wall forms shall be kept continuously wet while the forms are in place.

### 14. Concrete Walks

Wherever existing concrete walks are cut or disturbed they shall be repaired to their original condition.

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