PURPOSE: To establish uniform procedures and practice for quality assurance sampling and testing of materials for structural concrete after field verification of the JMF (See S.O.P. SA II-3-21).

1. GENERAL

1.1. This S.O.P. provides instructions and procedures to County/LSBP Engineer personnel for acceptance of concrete used in bridges and structures as required by the specifications. Sampling procedures and frequencies, tests, frequencies for documentation review to be performed by the Engineer for the quality assurance and acceptability of concrete are detailed.

1.2. Laboratories used to perform concrete testing shall be certified in accordance with Subsection S-804.02.8 of the Standard Specifications.

1.3. It is the responsibility of the Engineer to make certain that all tests are assigned to and performed by qualified technicians. Technicians shall be certified in accordance with Subsection S-804.02.9 of the Standard Specifications.

2. CERTIFIED TECHNICIANS

2.1. The following plastic concrete tests will be performed by an ACI Grade I or Mississippi Department of Transportation (MDOT) Class I Concrete Field Testing Technician:

2.1.1.	AASHTO T 23	Making and Curing Concrete Test Specimens in the Field
2.1.2.	AASHTO T 119	Slump of Hydraulic Cement Concrete
2.1.3.	AASHTO T 121	Unit Weight, Yield, and Air Content (Gravimetric) of Concrete
2.1.4.	AASHTO T 141	Sampling Freshly Mixed Concrete
2.1.5.	AASHTO T 152	Air Content of Freshly Mixed Concrete by Pressure Method
2.1.6.	AASHTO T 196	Air Content of Freshly Mixed Concrete by Volumetric Method
2.1.7.	ASTM C 1064	Temperature of Freshly Mixed Portland Cement Concrete

2.2. The following aggregate tests will be performed by a MDOT Class II Concrete QC/QA Technician:

2.2.1.	AASHTO T 2	Sampling Aggregates
2.2.2.	AASHTO T 27	Sieve Analysis of Fine and Coarse Aggregates
2.2.3.	AASHTO T 248	Reducing Field Samples of Aggregate to Testing Size
2.2.4.	AASHTO T 255	Total Moisture Content of Aggregate by Drying

2.3. The following tests will be performed by a MDOT Class III Concrete QC/QA Technician or a technician under the direct supervision of a MDOT Class III Concrete QC/QA Technician:

2.3.1	AASHTO T 19	Unit Weight and Voids in Aggregate
2.3.2.	AASHTO T 22	Compressive Strength of Cylindrical Concrete Specimens
2.3.3.	AASHTO T 84	Specific Gravity and Absorption of Fine Aggregate
2.3.4.	AASHTO T 85	Specific Gravity and Absorption of Coarse Aggregate
2.3.5.	AASHTO T 126	Making and Curing Concrete Test Specimens in the Laboratory
2.3.6.	AASHTO T 231	Capping Cylindrical Concrete Specimens

3. QUALITY ASSURANCE OF CONCRETE AND AGGREGATES

3.1. The minimum frequency for acceptance testing of aggregate and plastic concrete by the Engineer will follow the frequencies set forth in S.O.P. No. SA-II-3-5.

3.2. Concrete compressive strength tests are considered acceptable, if the compressive strength is equal to or more than the specified strength.

Comparison of QC and QA strength test cylinders are to be made on the first concrete placement of each mix. A favorable comparison is obtained, if the Contractor's QC 28-day compressive strength test results are within 990 psi of the Engineer's QA results. If a concrete compressive strength test does not compare, then the Engineer will continue testing until a favorable comparison can be obtained.

3.3. Aggregate gradation test results are considered to have a favorable comparison, if both Engineer and Contractor's test results meet the gradation requirements of the specifications. Once a favorable comparison is attained, QA testing of aggregate can be reduced in accordance with Subsection 2.4 of S.O.P. No. SA II-3-10.

3.4. After comparison, the Engineer will continue to inspect the Contractor's testing procedures and construction practices. Any material that does not comply with the specifications will be brought to the attention of the Contractor. At all times, the Engineer's inspector has the authority and responsibility to reject out of compliance material.

4. CONCRETE FIELD TESTING AND INSPECTION

4.1. The QC and QA test cylinders are to be made from the same sample of concrete. Concrete field testing will begin within fifteen (15) minutes after the concrete arrives on the job site, and always after the addition of water. The sample for slump, air, and temperature may be taken from the first concrete discharged. If there is any question as to whether the concrete is acceptable, delay placing the concrete until test results are known. Take the sample from the middle portion of the load, if compressive test cylinders are to be made. Always test for slump, air, and temperature when compressive test cylinders are made.

4.2. Place a lid or moisture proof bag over the compressive test cylinders. If the ambient temperature is expected to be below 60˚ F, transfer to a curing box. Place wet burlap around the test cylinders and place in an outside area, if the ambient temperature is expected to be above 80˚ F. Transfer the cylinders to a standard cure condition within 24 ± 8 hours of casting the sample. The cylinders must be transferred in a way to prevent jarring and be protected from the elements.

4.3. If the temperature is outside the specified limits, reject the concrete. If the slump or air is outside the specified limits, a check test shall be made on another portion of the sample before rejection of any load.

4.4. If more than one and one half gallons of water per cubic yard are added to the load of concrete, reject the concrete regardless of the slump. Water can only be added once before discharging the load. If water is added after partial discharge of the load, reject the remaining concrete.

4.5. Compressive strength cylinders will be standard cured in a water storage tank or moist room, at a temperature of 73 ± 3˚F. The test cylinders will be broken to failure and the strength reported to the nearest ten (10) psi.

5. NON-COMPLIANCE

5.1. If a concrete compressive strength fails to meet the requirements detailed in Subsection 3.2 above, State Aid is to be contacted. A decision will be made to determine if the concrete represented by the compressive strength tests is to be removed or will be allowed to remain in place.

5.2. The Engineer will provide for an adjustment in pay, in accordance with Subsection S-804.02.13.1.5 of the Standard Specifications, for concrete that does not meet the requirements as stated in the specifications but was allowed to remain in place. The reduction in pay will be based on the bid price as stated in the contract for the volume of concrete represented by the strength test results.