OFFICE OF STATE AID ROAD CONSTRUCTION STANDARD OPERATING PROCEDURES			S.O.P. NO. SA II-3-6 Page 1 of 8
Subject: S.O.P. FREQUENCIES FOR INDEPENDENT ASSURANCE SAMPLING AND TESTING			Distribution A, B, C, D, E
EFFECTIVE July 1, 2005	ISSUED July 1, 2005	SUPERSEDES Page 1 of 8 S.O.P. NO. SAD II-3-6 EFFECTIVE: January 1, 1981	APPROVED J. Brooks Miller, Sr. STATE AID ENGINEER

PURPOSE: To Establish A Schedule Of The Approximate Number Of Independent Assurance Samples To Be Obtained On "Non-Exempt" Federal Aid Projects, in accordance with Federal-Aid Policy Guide 23 CFR 637B. Independent Assurance Sampling and Testing are required on all “Non-Exempt” projects. In addition the Independent Assurance Sample Section of the MDOT Materials Division may select any federally funded project for Independent Assurance Sampling.

At the beginning of each contract, the Central Laboratory will determine the number of samples and/or tests for each class of construction. The Independent Assurance Sampler shall make every endeavor to obtain samples, perform tests and/or make observations as assigned. Under certain conditions the State Materials Engineer may waive the frequency of any or all independent assurance samples. The two most common conditions are: (1) when the Independent Assurance Sampler was not notified by the County Engineer when the various classes of construction are to be performed (2) when the Independent Assurance Sampler has made reasonable efforts to perform his duties but was unable to sample, test or make observations due to circumstances beyond his control.

Responsibility for compliance with this schedule rests with the County/LSBP Engineer in that the Engineer will keep the District Independent Assurance Sampler or the State Materials Engineer advised as to contemplated future operations.

Whenever, in this schedule, a unit of frequency is shown, such as "per ton", "per cubic yard", etc., this is intended to mean "or fraction thereof."

For the field tests required in this schedule, the Independent Assurance Sampler can simply observe another technician at his discretion, but will personally perform at least 10% of them (and at least one test of each type test per project). Tests by the Independent Assurance Sampler shall be performed using equipment furnished by him, as listed below, or other job control equipment which has been checked by him and found to be in satisfactory condition. These tests will be performed as nearly as practicable at the same times and at the same locations as the parallel job control tests. The Independent Assurance Sampler will indicate these parallel independent assurance tests on the Information Cards, cross-referencing them to the appropriate job control acceptance tests.

When practical, the Independent Assurance Sampler and the Field Technician will jointly obtain a sample of a material; the sample will be "split" with one part tested as an independent assurance sample, the other as a job control acceptance sample. In some cases, the Independent Assurance Sampler may test the Independent Assurance sample; when this is not feasible, he will submit the independent assurance sample to the Central Laboratory. In any case, the two samples will be cross-referenced.

The independent assurance samples obtained and/or tested as described in the preceding two paragraphs will be compared with the parallel job control acceptance test results. This is the responsibility of the County/LSBP Engineer. The Engineer's copy of the independent assurance sample test report will indicate that such comparison has been made, whether the comparison is favorable or unfavorable, and in case of the latter, what corrective action has been taken.

The following equipment will be furnished by the Independent Assurance Sampler:

1. Material splitter and sample mat
2. Electronic thermometer
3. Slump cone and rod
4. Pan and bucket
5. A set of standard weights
6. Nuclear Density Gauge

Independent Assurance Samples will be taken in accordance with the schedule set out below. No independent assurance density samples will be required for chemically treated courses prior to chemical treatment. No independent assurance samples will be required for granular material used for shoulder leveling on overlay projects. When a job control acceptance sample is not required as set out in S.O.P. NO. SA II-3-7, Sampling and Testing of Small Quantities of Miscellaneous Materials, then no independence assurance sample will be taken.

MATERIAL OR OPERATION	TESTS REQUIRED	FREQUENCY	WHEN OR WHERE
Embankments and Design Soil			
	Density Note (1)	1 per 100,000 cy min. 2 per project	In place
	Proctor	1 per class of borrow	In place
	L.L. & P.I.	3 per class of borrow	In place
Subgrades: Chemically Treated Soils			
	Density Note (1)	1 per 50,000 sy min. 2 per project	In place
Base: Untreated Granular Materials	Density, Gradation, PI Note (1)	1 each 10,000 cy or 14,000 tons min. 2 per project	In place

MATERIAL OR OPERATION	TESTS REQUIRED	FREQUENCY	W H E N O R W H E R E
Mechanically-stabilized Base	Density Note (1)	1 per 50,000 sy min. 2 per project	In place After mixing
	Composite Gradation, PI	1 each 10,000cy or14,000 tons min. 2 per project	In place After mixing
Chemically Treated Bases	Density Note (1)	1 per 50,000 sy min. 2 per project	In place After mixing
Concrete Structural:			
Aggregates	Gradation and Cleanness	1 each aggregate per 1000 cy concrete min. 1 per project	At Concrete Plant
Field Tests	Comp. Strength Slump, % Air (If used)	1 cylinder each 1000 cy conc. min. 1 per project, per Class Note (2)	Before placing
Reinforcing Steel:	Physical Tests (structures)	1 each 50 tons min. 1 per bar size	Project site
Surface Treatments:			
Aggregates	Quality Tests	1 each 3,000 cy or 4,200 tons; min. 1 each per project	Stockpile at Project Site

MATERIAL OR OPERATION	TESTS REQUIRED	FREQUENCY	WHEN OR WHERE
Bituminous Hot Mixes:			
Mixture	AC, VMA, Total Voids, Extraction, Gradation Note (1)	1 per 10,000 tons min. 1 per mixture per project for projects greater than 3,000 tons	Asphalt Plant
Roadway	Density Note (1)	1 per 10,000 tons min. 1 per mixture per project for projects greater than 3,000 tons	In place
Prestressed Concrete (Excluding Piles) (Note 3):			
Aggregates	Gradation and Cleanness	1 every 3 months	At concrete batch plant
Field Tests	Compressive strength and slump Note (2)	1 every 3 months	At prestress plant
Reinforcement	Prestress strand Spiral wire Reinforcing steel	1 every 3 months	At prestress plant

SPECIFIC NOTES REFERENCED IN SCHEDULE FOR INDEPENDENT ASSURANCE SAMPLING AND TESTING

1. Density, total voids, and VMA tests may be performed by County Engineer or personnel from an approved laboratory, but the test will be observed or performed by the Independent Assurance Sampler when reported as an Independent Assurance sample.

2. The independent assurance sample cylinder may be cast by County Engineer personnel, but the casting is to be observed by the Independent Assurance Sampler; likewise, the slump and air content tests may be performed by County Engineer personnel, but observed by the Independent Assurance Sampler. County Engineer personnel will be furnished Form FIA704, completed by the Independent Assurance Sampler as pertains to the cylinder; the card is to be forwarded to the Central Laboratory at the time of delivery of the cylinder. The Independent Assurance Sampler will mark the cylinder in such a way that it may be later identified as a independent assurance sample. The slump and air content results will be reported by the Independent Assurance Sampler on Form FIA703.

3. Independent assurance samples taken at prestress concrete plants shall show the project number for which the units are being cast. All concrete cylinder Independent Assurance samples shall be cross referenced to job control cylinders. When practicable, the Independent Assurance Sampler and Prestress Inspector will jointly obtain a sample of material; the sample will be "split" with one part tested as an independent assurance sample, the other as a job control acceptance sample. Independent assurance samples shall be obtained only when production is for State Aid or MDOT projects.

Comparison of job control acceptance test results with independent assurance sample test results is the responsibility o the County Engineer. The County Engineer shall furnish completed copies of Form TMD-890 for each comparison of job control acceptance test results with independent assurance test results to the State Aid Materials Engineer and the MDOT Materials Engineer immediately upon completion of all tests. Form TMD-890 shall show the results of the comparison, the cause of any unfavorable comparison, and, when unfavorable, the corrective action taken. Upon completion of the project, the County Engineer shall submit Form TMD-891 to the State Aid Materials Engineer and the MDOT Materials Engineer listing and certifying that a comparison of independent assurance sample test results with job control acceptance sample test results was performed. The County Engineer shall maintain a file of all documentation of comparisons for each project. This file shall contain each completed Form TMD-890 along with a copy of the test reports represented attached thereto, and a completed Form TMD-891.

Set out below is a guideline for use in determining favorable or unfavorable comparison of job control acceptance sample test results with independent assurance sample test results. The values listed below are valid only on single test results performed by two technicians on a split sample.

	Material & Characteristic	Maximum Variation for Favorable Comparison
I.	Soils and Granular Materials	
A.	Gradation Plus No. 10 Materials	
1.	Passing No. 10 & larger sieves	5%
B.	Material finer than No. 10 sieve (100% basis)	
1.	Passing No. 10 and retained on No. 40 sieve	4%
2.	Passing No. 40 and retained on No. 60 sieve	4%
3.	Passing No. 60 and retained on No. 200 sieve	4%
4.	Passing No. 200 sieve	5%
C.	Liquid limit	8%
D.	Plastic limit	5%
E.	Optimum moisture	3%
F.	Standard density (lb/cf)	5%

II. Gradation of Fine Aggregate

A.	Passing ⅜ in. and retained on No. 4	2%
B.	Passing No. 4 and retained on No. 8	3%
C.	Passing No. 8 and retained on No. 16	3%
D.	Passing No. 16 and retained on No. 30	3%
E.	Passing No. 30 and retained on No. 50	6%
F.	Passing No. 50 and retained on No. 100	5%
G.	Passing No. 100 and retained on No. 200	2%
H.	Passing No. 200	2%

III. Gradation of Coarse Aggregate

A.	Retained on 1 in.	4%
B.	Passing 1 in. and retained on ¾ in.	6%
C.	Passing ¾ in. and retained on ½ in.	7%
D.	Passing ½ in. and retained on ⅜ in.	6%
E.	Passing ⅜ in. and retained on No. 4	5%
F.	Passing No. 4 & smaller sieves	2%

IV Crushed Stone Bases

A. Size 610

Passing 1½ in. and retained on 1 in.	4%
Passing 1 in. and retained on ¾ in.	6%
Passing ¾ in. and retained on ½ in.	7%
Passing ½ in. and retained on ⅜ in.	6%
Passing ⅜ in. and retained on No. 4	5%
Passing No. 4 and retained on No. 40	3%
Passing No. 40 and retained on No. 200	4%

B. Size 825

Passing 2 in. and retained on 1½ in	4%.
Passing 1½ in. and retained on 1 in.	4%
Passing 1 in. and retained on ½ in.	6%
Passing ½ in. and retained on No. 4	5%
Passing No. 4 and retained on No. 8	3%
Passing No. 8 and retained on No. 16	3%
Passing No. 16 and retained on No. 50	6%
Passing No. 50 and retained on No. 200	4%

V. Hot Asphalt Paving Mixtures

A.	Asphalt cement content by Extraction	0.60%
B.	Asphalt cement content by Nuclear Method	0.30%
C.	Maximum Specific Gravity	0.055
D.	Gradation of Extracted Mineral Aggregates	
	Size Fraction (Note 1)	
	Retained on ½ in. & Larger sieves	5%
	Passing ½ in. and retained on ⅜ in. sieves	4%
	Passing ½ in. and retained on No. 4 sieves	5%
	Passing ⅜ in. and retained on No. 4 sieves	4%
	Passing ⅜ in. and retained on No. 8 sieves	5%
	Passing No. 4 and retained on No. 8 sieves	3%
	Passing No. 8 and retained on No. 16 sieves	4%
	Passing No. 16 and retained on No. 30 sieves	3%
	Passing No. 30 and retained on No. 50 sieves	4%
	Passing No. 50 and retained on No. 200 sieves	3%
	Passing No. 200 sieve	2%

Note 1: Use size fractions for sieves designated in the specifications for various mixtures. Only a one (1) percent variation will be given for maximum sieve size with 100% passing in job mix formula.

Note 2: For aggregate gradations prior to the addition of asphalt (Stockpile samples, belt samples, dry batch samples, etc.) refer to paragraphs II and III for variations.

VI. Concrete

A.	Concrete Cylinder Breaks	990 psi
B.	Slump	1 inch
C.	Air Content	1%