

MISSISSIPPI DEPARTMENT OF TRANSPORTATION

**MATERIALS DIVISION
INSPECTION, TESTING, AND CERTIFICATION
MANUAL**

Approved and Adopted

By

The Mississippi Transportation Commission

June 28, 2005

Revised April 1, 2010

EXCERPT FROM THE MINUTES OF THE MEETING OF THE
MISSISSIPPI TRANSPORTATION COMMISSION, JUNE 28, 2005

Upon motion duly made with Commissioners Wayne H. Brown and Dick Hall each voting yes, under the authority of the Commission, in conformity with and as spread on its minutes, the Materials Division's Inspection, Testing, and Certification Manual is hereby approved and adopted.

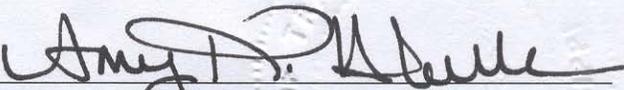
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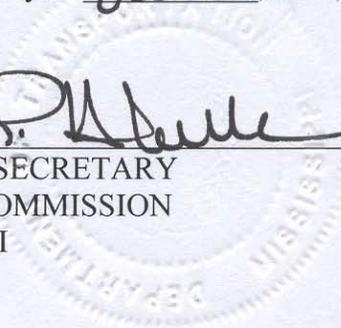
STATE OF MISSISSIPPI

COUNTY OF HINDS

I, Amy K. Hornback, Secretary, Mississippi Transportation Commission, do hereby certify that the above and foregoing is a true and correct copy of an Order of the Mississippi Transportation Commission of record in Minute Book 11, Page 661 of the Official Minutes of said Commission on file in its offices in the City of Jackson, Mississippi, duly adopted on the 28th day of June, A.D., 2005.

Witness my hand and official seal this the 30th day of June, A.D., 2005.


AMY K. HORNBACK, SECRETARY
TRANSPORTATION COMMISSION
STATE OF MISSISSIPPI



Materials Division Mission Statement

The Materials Division is responsible for: the sampling, testing, inspection and reporting of materials produced at plants which are assigned to the Central Laboratory; statewide geotechnical operations; testing and reporting of all samples submitted by the Districts; operation of the independent assurance sampling and testing program; publishing information, directives, test procedures, and sampling and materials inspection procedures in order to accomplish statewide uniformity; advising and assisting the Districts in the sampling and testing of materials; and the evaluation of new products and procedures.

One of the other primary functions of the State Materials Engineer is chairman of the Department's Product Evaluation Committee. The Secretary of this committee is the Division's Quality Assurance Engineer. This individual is the Department's liaison between materials suppliers who want to get approval of a new product (for which the Department may or may not have a standard specification) to be incorporated into road construction work. The Quality Assurance Engineer coordinates and assigns the evaluation of these products to the various divisions and districts which could benefit most from a product innovation.

The Materials Division is subdivided into the Field Operations Branch, the Geotechnical Branch, the Independent Assurance Sampling Branch, and the Laboratory Operations Branch.

Materials Division Inspection, Testing, and Certification Manual

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Section 1 – Certification of Plants, Laboratories, and Testing Personnel

1.1 Plants – Materials Division establishes uniform procedures and guidelines for production plant facilities supplying materials for incorporation into MDOT projects. These procedures and guidelines contained herein are for the purpose of certifying that production plant facilities maintain quality control standards that are acceptable for materials supplied to MDOT.

1.1.1 Asphalt Distribution Facilities Unit Measurement—Asphalt Distribution Facilities are to maintain calibration of their distribution and mulch tanks when bituminous material for MDOT projects is being measured for payment by the gallon. Calibration of the distribution tanks shall be conducted accordance with the guidelines set forth herein.

1.1.1.1 General – When bituminous material is to be paid by the gallon, the distributor tank(s) or storage tank(s), as applicable, to be used for measurement shall be calibrated in a manner approved by MDOT.

A calibration chart showing the dimensions and volume per inch of depth and measuring gauge calibrated in inches shall be furnished to the Engineer. Each tank shall have an identifying serial number on a steel plate welded or riveted to the tank.

In the event the Contractor does not have the above mentioned calibration chart previously made by an approved agency, MDOT will perform the calibration and furnish the required charts upon written request to the Engineer from the Contractor.

1.1.1.2 Location of Calibration Stations – Each District shall establish a calibration station and perform the required calibration of distributors and tanks used to supply MDOT work in the respective District.

1.1.1.3 Equipment Required to Set Up a Calibration Station – Following is a list of the required equipment for a calibration station.

Two (2) – 36" pipe wrenches

One (1) – calibration stick, graduated in inches and equipped with a float

One (1) – hose with 2" connections and cut-off valve

Two (2) – 55 gallon drums calibrated in gallons to 50 gallons

One (1) – or two (2) tanks with a total capacity of approximately 500 gallons (see Note)

One (1) – tank with a capacity of 50 gallons or more calibrated in gallons (see Note)

Note: These tanks are to be elevated to allow gravity loading of the equipment being calibrated.

1.1.1.4 Equipment to be Furnished by the Contractor – The following items are required by the Contractor at the time a distributor tank is calibrated.

- (1) The Contractor shall furnish a calibration stick, graduated in inches, for measuring depth of liquid in the tank.
- (2) The Contractor shall provide an aluminum or sheet metal plate which shall be riveted or welded to the distributor tank. This plate will bear the Serial Number of the distributor, and a place for capacity, in gallons, which will be stamped in the plate by MDOT personnel after calibration has been made.

1.1.1.5 Preparation of Distributor or Tank for Calibration – The equipment to be calibrated must be clean and free of leaks. If the distributor or tank is new, steam cleaning will not be necessary. If the distributor or tank is used, it shall be steam cleaned (inside and out) prior to being delivered for calibration.

1.1.1.6 Calibration Procedure – The following procedure shall be followed when calibrating Asphalt distributors or tanks for distribution of asphalt when being paid for by MDOT by the gallon.

- (1) Fill the distributor or tank to capacity from the elevated tanks and record the capacity on Form TMD-132. (See Appendix A)
- (2) Record the distance from the zero point to the water surface.
- (3) Place the calibration stick into the distributor or tank and record the depth of water in the tank.
- (4) Lower the water level in the distributor tank in increments of one (1) inch on the calibration stick by draining the water into the calibrated drums. Record the calibration stick reading and the number of gallons of water in the drums at each increment.

1.1.1.7 Recalibration – Any change made in the distributor or tank which alters the calibrated

capacity voids the previous calibration and, the distributor or tank shall be recalibrated prior to further use.

1.1.2 Inspection of Hot-Mix Asphalt Plants – Hot-Mix Asphalt Plants must be inspected by MDOT personnel prior to supplying hot-mix asphalt mixes for MDOT projects. Following is the standard procedure for Hot-Mix Asphalt Plant Inspection.

1.1.2.1 General – The District Materials Engineer will be responsible for the initial inspection and approval of each plant in the District before hot-mix production begins for a project, and subsequent inspection and approval not to exceed six months. Upon completion of this formal inspection, copies of Form TMD-322 will be completed and distributed. (See Appendix A)

1.1.2.2 Responsibilities of Plant Management

- (1) Shall make all parts of the plant and material storage accessible to authorized Department personnel.
- (2) Shall provide adequate and acceptable working facilities for Department personnel.
- (3) Shall supply such materials as necessary for testing purposes, in accordance with the specifications.
- (4) Shall purchase all asphalt cement from MDOT approved suppliers of certified bituminous materials.
 - a. Shall obtain a copy of the refinery test report, the temperature-viscosity curve, Certificate "A" or "B" (as applicable) accompanying each shipment of asphalt cement and make available to Department personnel.
 - b. Shall not use different brands or asphalt cement of the same brand from different refineries without a new or transferred approved mix design.
- (5) Shall assume, in conjunction with the Contractor, responsibility for the quality of the hot-mix produced.
- (6) Shall obtain the services of a reputable scales company as required by the specifications.
- (7) Shall notify Project or District personnel as far in advance as possible of the beginning of production for Department work.

- (8) Shall obtain all aggregates for Department work from sources approved by the Department and shall not change sources without a new or transferred mix design.
- (9) Shall employ knowledgeable and competent personnel to operate the plant. A Level I Certified Asphalt Technician (CAT-I) shall be on location at the plant laboratory to conduct all quality control testing. A Level II Certified Asphalt Technician (CAT-II) shall be on location to make appropriate adjustments to the mix for proper quality control.

1.1.2.3 Department Responsibilities

- (1) Shall perform initial inspection upon request from hot-mix plant (Section 1.1.2). The plant will be approved if it meets all applicable requirements of the specifications. The Department will then perform informal inspections at least every two to four weeks during production, in accordance with the Asphalt Plant Inspection Checklist from the HMA Field Manual.
- (2) Advise plant personnel of specification requirements regarding materials, material storage, and plant and laboratory facilities.
- (3) A qualified inspector will perform an inspection, in accordance with the QMP Inspector's Checklist found in the HMA Field Manual, of the plant's quality control laboratory and their sampling and testing procedures. The plant's designated personnel shall be informed of the results of all inspections.

1.1.3 Volume Correction for Bituminous Materials

1.1.3.1 General – When bituminous materials are to be paid for by the gallon, the pay quantity will be based on the volume of the material at 60°F. At the time of use, the temperature of the material will be determined by the use of a thermometer. This will be the observed temperature.

1.1.3.2 Use of Tables

- (1) From the observed temperature, the conversion factor can be chosen for emulsions, cutback asphalts, and asphalt cements.
- (2) The correct volume of the material can be calculated by multiplying the conversion factor times the volume of material at the observed temperature.
- (3) **EXAMPLE:** What is the volume of 5,000 gallons of AC-5 at 60°F with an observed temperature of 300°F?

From the table, the conversion factor at 300° F for AC is 0.9187.

5,000 gallons x 0.9187 = 4593.5 gallons

Factor for Reducing Volume to 60°F							
Observed Temp. °F	Emulsions	Cut Back, RC, MC,SC	A.C.	Observed Temp. °F	Emulsions	Cut Back, RC, MC,SC	A.C.
50	1.0025			90	0.9925	0.9881	
51	1.0023			91	0.9923	0.9877	
52	1.0020			92	0.9920	0.9873	
53	1.0018			93	0.9918	0.9869	
54	1.0015			94	0.9915	0.9865	
55	1.0013			95	0.9913	0.9861	
56	1.0010			96	0.9910	0.9857	
57	1.0008			97	0.9908	0.9854	
58	1.0005			98	0.9905	0.9850	
59	1.0003			99	0.9903	0.9846	
60	1.0000	1.000		100	0.9900	0.9842	
61	0.9998	0.9996		101	0.9898	0.9838	
62	0.9995	0.9992		102	0.9895	0.9834	
63	0.9993	0.9988		103	0.9993	0.9830	
64	0.9990	0.9984		104	0.9890	0.9826	
65	0.9988	0.9980		105	0.9888	0.9822	
66	0.9985	0.9976		106	0.9885	0.9818	
67	0.9983	0.9972		107	0.9883	0.9814	
68	0.9980	0.9968		108	0.9880	0.9810	
69	0.9978	0.9964		109	0.9878	0.9806	
70	0.9975	0.9960		110	0.9875	0.9803	
71	0.9973	0.9956		111	0.9873	0.9799	
72	0.9970	0.9952		112	0.9870	0.9795	
73	0.9968	0.9948		113	0.9868	0.9791	
74	0.9965	0.9944		114	0.9865	0.9787	
75	0.9963	0.9940		115	0.9863	0.9783	
76	0.9960	0.9936		116	0.9860	0.9779	
77	0.9958	0.9932		117	0.9858	0.9775	
78	0.9955	0.9929		118	0.9855	0.9771	
79	0.9953	0.9925		119	0.9853	0.9767	
80	0.9950	0.9921		120	0.9850	0.9763	
81	0.9948	0.9917		121	0.9848	0.9760	
82	0.9945	0.9913		122	0.9845	0.9756	
83	0.9943	0.9909		123	0.9843	0.9752	
84	0.9940	0.9905		124	0.9840	0.9748	
85	0.9938	0.9901		125	0.9838	0.9744	
86	0.9935	0.9897		126	0.9835	0.9740	
87	0.9933	0.9893		127	0.9833	0.9736	
88	0.9930	0.9889		128	0.9830	0.9732	

Factor for Reducing Volume to 60°F							
Observed Temp. °F	Emulsions	Cut Back, RC, MC,SC	A.C.	Observed Temp. °F	Emulsions	Cut Back, RC, MC,SC	A.C.
89	0.9928	0.9885		129	0.9828	0.9728	
130	0.9825	0.9725		170	0.9725	0.9570	0.9621
131	0.9823	0.9721		171	0.9723	0.9566	0.9618
132	0.9820	0.9717		172	0.9720	0.9562	0.9614
133	0.9818	0.9713		173	0.9718	0.9559	0.9611
134	0.9815	0.9709		174	0.9715	0.9555	0.9607
135	0.9813	0.9705		175	0.9713	0.9551	0.9604
136	0.9810	0.9701		176	0.9710	0.9547	0.9601
137	0.9808	0.9697		177	0.9708	0.9543	0.9597
138	0.9805	0.9693		178	0.9705	0.9539	0.9594
139	0.9803	0.9690		179	0.9703	0.9536	0.9590
140	0.9800	0.9686	0.9723	180	0.9700	0.9532	0.9587
141	0.9798	0.9682	0.9720	181	0.9698	0.9528	0.9584
142	0.9795	0.9678	0.9716	182	0.9695	0.9524	0.9580
143	0.9793	0.9674	0.9713	183	0.9693	0.9520	0.9577
144	0.9790	0.9670	0.9710	184	0.9690	0.9517	0.9574
145	0.9788	0.9666	0.9706	185	0.9688	0.9513	0.9570
146	0.9785	0.9662	0.9703	186	0.9685	0.9509	0.9567
147	0.9783	0.9659	0.9699	187	0.9683	0.9505	0.9563
148	0.9780	0.9655	0.9696	188	0.9680	0.9501	0.9560
149	0.9778	0.9651	0.9693	189	0.9678	0.9498	0.9557
150	0.9775	0.9647	0.9689	190	0.9675	0.9494	0.9553
151	0.9773	0.9643	0.9686	191	0.9673	0.9490	0.9550
152	0.9770	0.9639	0.9682	192	0.9670	0.9486	0.9547
153	0.9768	0.9635	0.9679	193	0.9668	0.9482	0.9543
154	0.9765	0.9632	0.9675	194	0.9665	0.9478	0.9540
155	0.9763	0.9628	0.9672	195	0.9663	0.9475	0.9536
156	0.9760	0.9624	0.9669	196	0.9660	0.9471	0.9533
157	0.9758	0.9620	0.9665	197	0.9658	0.9467	0.9530
158	0.9755	0.9616	0.9662	198	0.9655	0.9463	0.9526
159	0.9753	0.9612	0.9658	199	0.9653	0.9460	0.9523
160	0.9750	0.9609	0.9655	200	0.9650	0.9456	0.9520
161	0.9748	0.9605	0.9652	201		0.9452	0.9516
162	0.9745	0.9601	0.9648	202		0.9448	0.9513
163	0.9743	0.9597	0.9645	203		0.9444	0.9509
164	0.9740	0.9593	0.9641	204		0.9441	0.9506
165	0.9738	0.9589	0.9638	205		0.9437	0.9503
166	0.9735	0.9585	0.9635	206		0.9433	0.9499

Factor for Reducing Volume to 60°F							
Observed Temp. °F	Emulsions	Cut Back, RC, MC,SC	A.C.	Observed Temp. °F	Emulsions	Cut Back, RC, MC,SC	A.C.
167	0.9733	0.9582	0.9631	207		0.9429	0.9496
168	0.9730	0.9578	0.9628	208		0.9425	0.9493
169	0.9728	0.9574	0.9624	209		0.9422	0.9489
210		0.9418	0.9486	250		0.9268	0.9352
211		0.9414	0.9483	251			0.9349
212		0.9410	0.9479	252			0.9346
213		0.9407	0.9476	253			0.9342
214		0.9403	0.9472	254			0.9339
215		0.9399	0.9469	255			0.9336
216		0.9395	0.9466	256			0.9332
217		0.9391	0.9462	257			0.9329
218		0.9388	0.9459	258			0.9326
219		0.9384	0.9456	259			0.9322
220		0.9380	0.9452	260			0.9319
221		0.9376	0.9449	261			0.9316
222		0.9373	0.9446	262			0.9312
223		0.9369	0.9442	263			0.9309
224		0.9365	0.9439	264			0.9306
225		0.9361	0.9436	265			0.9302
226		0.9358	0.9432	266			0.9299
227		0.9354	0.9429	267			0.9296
228		0.9350	0.9426	268			0.9293
229		0.9346	0.9422	269			0.9289
230		0.9343	0.9419	270			0.9286
231		0.9339	0.9416	271			0.9283
232		0.9335	0.9412	272			0.9279
233		0.9331	0.9409	273			0.9276
234		0.9328	0.9405	274			0.9273
235		0.9324	0.9402	275			0.9269
236		0.9320	0.9399	276			0.9266
237		0.9316	0.9395	277			0.9363
238		0.9313	0.9392	278			0.9259
239		0.9309	0.9389	279			0.9256
240		0.9305	0.9385	280			0.9253
241		0.9301	0.9382	281			0.9250
242		0.9298	0.9379	282			0.9246
243		0.9294	0.9375	283			0.9243
244		0.9290	0.9372	284			0.9240
245		0.9286	0.9369	285			0.9236

Factor for Reducing Volume to 60°F							
Observed Temp. °F	Emulsions	Cut Back, RC, MC,SC	A.C.	Observed Temp. °F	Emulsions	Cut Back, RC, MC,SC	A.C.
246		0.9283	0.9365	286			0.9233
247		0.9279	0.9362	287			0.9230
248		0.9275	0.9359	288			0.9227
249		0.9272	0.9356	289			0.9223
290			0.9220	330			0.9089
291			0.9217	331			0.9086
292			0.9213	332			0.9083
293			0.9210	333			0.9079
294			0.9207	334			0.9076
295			0.9204	335			0.9073
296			0.9200	336			0.9070
297			0.9197	337			0.9066
298			0.9194	338			0.9063
299			0.9190	339			0.9060
300			0.9187	340			0.9057
301			0.9184	341			0.9053
302			0.9181	342			0.9050
303			0.9177	343			0.9047
304			0.9174	344			0.9044
305			0.9171	345			0.9040
306			0.9167	346			0.9037
307			0.9164	347			0.9034
308			0.9161	348			0.9031
309			0.9158	349			0.9028
310			0.9154	350			0.9024
311			0.9151	351			0.9021
312			0.9148	352			0.9018
313			0.9145	353			0.9015
314			0.9141	354			0.9011
315			0.9138	355			0.9008
316			0.9135	356			0.9005
317			0.9132	357			0.9002
318			0.9128	358			0.8998
319			0.9125	359			0.8995
320			0.9122	360			0.8992
321			0.9118	361			0.8989
322			0.9115	362			0.8986
323			0.9112	363			0.8982
324			0.9109	364			0.8979

Factor for Reducing Volume to 60°F							
Observed Temp. °F	Emulsions	Cut Back, RC, MC,SC	A.C.	Observed Temp. °F	Emulsions	Cut Back, RC, MC,SC	A.C.
325			0.9105	365			0.8976
326			0.9102	366			0.8973
327			0.9099	367			0.8969
328			0.6096	368			0.8966
329			0.6092	369			0.8963

Observed Temp. °F	A.C.	Observed Temp. °C	A.C.	Observed Temp. °F	A.C.		
370			0.8960	410			0.8832
371			0.8957	411			0.8829
372			0.8953	412			0.8826
373			0.8950	413			0.8822
374			0.8947	414			0.8819
375			0.8944	415			0.8816
376			0.8941	416			0.8813
377			0.8937	417			0.8810
378			0.8934	418			0.8806
379			0.8931	419			0.8803
380			0.8928	420			0.8800
381			0.8924	421			0.8797
382			0.8921	422			0.8794
383			0.8918	423			0.8791
384			0.8915	424			0.8787
385			0.8912	425			0.8784
386			0.8908	426			0.8781
387			0.8905	427			0.8778
388			0.8902	428			0.8775
389			0.8899	429			0.8772
390			0.8896	430			0.8768
391			0.8892	431			0.8765
392			0.8889	432			0.8762
393			0.8886	433			0.8759
394			0.8883	434			0.8756
395			0.8880	435			0.8753
396			0.8876	436			0.8749
397			0.8873	437			0.8746
398			0.8870	438			0.8743
399			0.8867	439			0.8740
400			0.8864	440			0.8737
401			0.8861	441			0.8734
402			0.8857	442			0.8731
403			0.8854	443			0.8727
404			0.8851	444			0.8724
405			0.8848	445			0.8721
406			0.8845	446			0.8718
407			0.8841	447			0.8715
408			0.8838	448			0.8712

Observed Temp. °F	A.C.	Observed Temp. °C	A.C.	Observed Temp. °F	A.C.		
409			0.8835	449			0.8709
450			0.8705	490			0.8580
451			0.8702	491			0.8577
452			0.8699	492			0.8574
453			0.9696	493			0.8571
454			0.8693	494			0.8568
455			0.8690	495			0.8565
456			0.8687	496			0.8562
457			0.8683	497			0.9559
458			0.8680	498			0.8556
459			0.8677	499			0.8552
460			0.8674	500			0.8549
461			0.8671				
462			0.8668				
463			0.8665				
464			0.8661				
465			0.8658				
466			0.8655				
467			0.8652				
468			0.8649				
469			0.8646				
470			0.8643				
471			0.8640				
472			0.8636				
473			0.8633				
474			0.8630				
475			0.8627				
476			0.8624				
477			0.8621				
478			0.8618				
479			0.8615				
480			0.8611				
481			0.8608				
482			0.8605				
483			0.8602				
484			0.8599				
485			0.8596				
486			0.8593				
487			0.8590				

Observed Temp. °F	A.C.	Observed Temp. °C	A.C.	Observed Temp. °F	A.C.		
488			0.8587				
489			0.8583				

1.1.4 Certification of Concrete Batch Plants and Scale Calibration – Certification of Concrete Batch Plants will be in accordance with the requirements in the Department's *Concrete Field Manual*. Concrete Batch Plants must be inspected utilizing the National Ready Mix Concrete Association (NRMCA) QC-3 Checklist prior to supplying concrete to Department projects. The inspection must be performed by an inspector approved by NRMCA and observed by the District Materials Engineer. Calibration of scales at Concrete Plants shall be conducted by a licensed scale repairman in the presence of the District Materials Engineer.

Specific information regarding Concrete Batch Plant Certification and scale calibration can be found in the Department's *Concrete Field Manual*. A copy can be obtained at www.GoMDOT.com

1.2 Laboratories – Materials Division establishes methods and procedures for certification of laboratories that test materials to be incorporated into MDOT projects.

1.2.1 Inspection of Laboratories Used for Testing Concrete – Laboratories conducting quality control (QC) and quality assurance (QA) testing of concrete for MDOT projects must meet the requirements of Section 804.02-8 and the requirements of the Department's *Concrete Field Manual*.

All laboratories testing structural concrete produced for Department projects must be fully equipped to perform the required tests. Laboratory certification by MDOT shall consist of proof of technician certification and inspection of equipment. All such equipment must meet the requirements of the Department's specified test methods.

MDOT Certification of concrete laboratories shall extend to Contractor, Private, State Aid, City, and any other laboratories doing concrete testing utilizing MDOT Standard Specifications.

Laboratories that are Certified or have been Recertified by MDOT to conduct concrete testing shall be certified for a period of three years. It is the Laboratories responsibility to maintain current certification. The State Materials Engineer should be notified to schedule a laboratory

inspection prior to expiration of the certification.

Specific information regarding Concrete Laboratory Certification can be found in the Department's *Concrete Field Manual*. A copy can be obtained at www.GoMDOT.com

1.2.2 Inspection of Laboratories Used For Testing Soils and Aggregates – These provisions establish a procedure for certification of laboratories for testing of soils and aggregates.

1.2.2.1 Laboratory Certification Requirements

- (1) All laboratories testing soils and aggregates produced for Department projects must be fully equipped to perform tests for which they are certified. Laboratory certification shall consist of proof of technician certification and inspection of equipment. All such equipment must meet the requirements of the Department's specified test methods.
- (2) This procedure for certification of laboratories is for Contractor, Private, State Aid, City, Department of Transportation, and any other entity's Laboratories(as applicable).
- (3) Certification is good for three years.

1.2.2.2 Equipment Inspection

- (1) The laboratory shall be equipped, calibrated, and inspected prior to the testing of soils and aggregates. A request shall be made to the Engineer for inspection of Contractor's laboratory equipment.
- (2) Laboratory inspection will be performed by personnel from the Central Laboratory's Soils and Physical Sections.
- (3) Equipment is to be checked for compliance to AASHTO and MT specifications, as applicable. Inspection of the laboratory is as follows:

- a.** MT 8/AASHTO T 99, Moisture Density Relations of Soils Using a 5.5lb Hammer (12 in.) Drop

Rammer
Rammer Face
Sample Extruder or Split Molds
Balances and Scales
Drying Oven
Straightedge
Sieves
Mixing Tools
Moisture Containers

- b.** MT 9, Moisture Density Relations of Treated Soils

Rammer
Rammer Face
Sample Extruder or Split Molds
Balances and Scales
Drying Oven
Straightedge
Sieves
Mixing Tools
Moisture Containers

- c.** MT 16, Nuclear Method for Field In-Place Density Determination

Probe
Scrape Plate
Guide
Drill Rod

- d.** MT 22, Sieve Analysis of Granular Material

Oven
Balance
Stirring Apparatus

Hydrometer
Sedimentation Cylinders
Thermometer
Sieves
Water Bath
Beaker
Timing Device
Containers
Glass Stirring Rod

- e.** AASHTO T 11, Material Finer than No. 200 Sieve in Mineral Aggregate by Washing
Washing
Balance
Sieves
Containers
Oven
Wetting Agent
- f.** AASHTO T 87, Determining Dry Preparation of Disturbed Soil & Soil Aggregate Samples
Drying Apparatus
Sieves
Pulverizing Apparatus
Sample Splitter
- g.** AASHTO T 88, Particle Size Analysis of Soils
Oven
Balance
Stirring Apparatus
Hydrometer
Sedimentation Cylinders
Thermometer
Sieves
Water Bath
Beaker

Timing Device
Containers
Glass Stirring Rod

h. AASHTO T 89, Determining Liquid Limit of Soils

Dish
Spatula
Liquid Limit Device
Grooving Tool
Gage
Containers
Balance
Oven

i. AASHTO T 90, Determining the Plastic Limit and Plasticity of Soils

Dish
Spatula
Surface for Rolling
Containers
Balance
Oven

j. AASHTO T 92, Determining the Shrinkage Factors of Soils

Dishes
Spatula
Milk Dish
Straightedge
Glass Cup
Glass Graduate
Balance
Mercury
Oven

k. AASHTO T 99, Moisture Density Relations of Soils Using a 5.5lb Hammer

(12 in.) Drop
Molds

Rammer
Rammer Face
Sample Extruder or Split Molds
Balances and Scales
Drying Oven
Straightedge
Sieves
Mixing Tools
Containers

I. AASHTO T 100, Specific Gravity of Soils

Pycnometer
Balance
Oven
Thermometer

m. AASHTO T 180, Moisture Density Relations of Soils Using a 10lb Hammer

(18 in.) Drop
Molds
Rammer
Rammer Face
Sample Extruder or Split Molds
Balances and Scales
Drying Oven
Straightedge
Sieves
Mixing Tools
Containers

1.3 Testing Personnel

1.3.1 Certification of Laboratory Technicians for the Office of State Aid Road Construction

– The following provisions are to establish a procedure for certification of laboratory technicians for the Office of State Aid Road Construction.

1.3.1.1 General – It is not the purpose of this manual to set up a training program for laboratory technicians in the Central Laboratory. The applicant for certification must be familiar with all test methods (MT or AASHTO) for which certification is sought, including sample preparation.

1.3.1.2 – Certification Procedure

- (1) The County Engineer shall make a written request to the State Aid Engineer to set a date with the State Materials Engineer for examination of an applicant for certification. This written request shall include the following information with copies to the State Materials Engineer and District Materials Engineer.
 - a. List all tests for which applicant seek certification.
 - b. Certify that applicant can perform all tests in accordance with the appropriate test method (MT or AASHTO).
 - c. Certify that he has copies of current test methods.
 - d. County Engineer shall state that he will pay charges for examination of applicant or attach copy of letter from Board of Supervisors stating same.
- (2) Upon receipt of the request as set out in (1), the State Aid Engineer shall make a written request to the State Materials Engineer to set a date for examination of the applicant.
- (3) Upon receipt of the request from the State Aid Engineer, the State Materials Engineer shall set a date for examination of the applicant and shall give a written notice to all parties concerned.

1.3.1.3 – Equipment

- (1) All equipment for use in testing for Office of State Aid Road Construction work must

be approved by the State Materials Engineer in accordance with Section 1.2 of this manual

- (2) The applicant's laboratory cylinder breaking machine must have a current calibration. This calibration must be renewed annually.

1.3.1.4 – Cost of Examination – Cost of examination will be based on a per man-hour actual time spent with the applicant. For equipment that cannot be transported to the Central Laboratory, a charge for this inspection will be made based on travel expense plus man-hour time from Central Laboratory to the County Engineer's Laboratory and return to Central Laboratory.

1.3.2 Certification of Laboratory Technicians for Local Public Agency (LPA) Projects and other applicable entities – The following provisions are to establish a procedure for certification of laboratory technicians for Urban Projects.

1.3.2.1 – General

- (1) It is not the purpose of this manual to set up a training program for laboratory technicians in the Central Laboratory. The applicant for certification must be familiar with all test methods (MT or AASHTO) for which certification is sought, including sample preparation.
- (2) The LPA Engineer may be a full-time employee or a consultant engaged for a specific project.

1.3.2.2 Certification Procedure

- (1) The approved Project Engineer shall make a written request to the District Engineer to set a date with the State Materials Engineer for examination of an applicant for certification. This written request shall include the following information:
 - a. List all tests for which applicant seek certification.
 - b. Certify that applicant can perform all tests in accordance with the appropriate test method (MT or AASHTO).
 - c. Certify that he has copies of current test methods.
 - d. The Project Engineer shall state that he will pay charges for examination of applicant or attach copy of letter from Mayor stating same.
- (2) Upon receipt of the request for technician certification, the District Engineer shall make a written request to the State Materials Engineer to set a date for examination of the applicant.
- (3) Upon receipt of the request from the District Engineer, the State Materials Engineer

shall set a date for examination of the applicant and shall give a written notice to all parties concerned.

1.3.2.3 Equipment

- (1) All equipment for use in testing for Urban work must be approved by the State Materials Engineer in accordance with Section 1.2 of this manual

- (2) The applicant's laboratory cylinder breaking machine must have a current calibration. This calibration must be renewed annually.

1.3.2.4 Cost of Examination – Cost of examination will be based on a per man-hour actual time spent with the applicant. For equipment that cannot be transported to the Central Laboratory, a charge for this inspection will be made based on travel expense plus man-hour time from Central Laboratory to the LPA Engineer's Laboratory and return to Central Laboratory.

1.3.3 MDOT Hot Mix Asphalt Technician Certification Program

1.3.3.1 Scope

The goals of this program are to provide a group of experienced technicians to design, test and monitor hot mix asphalt (HMA) mixtures used as part of the Mississippi Quality Management Program (QMP). The intent of this program is to improve the quality and performance of hot mix asphalt pavements through knowledge and understanding of the product. The program will provide for the certification for three levels of technicians. These levels include CAT-I Testing Technician, CAT-II Quality Management Technician and CMDT Mixture Design Technician.

1.3.3.2 Program Administration

(1) Board of Directors

The Certification Program will be administered by a board of directors appointed by the Joint MDOT/MAPA Specification Committee. The Board shall consist of four members. At least one member shall be a contractor representative of MAPA and at least one member shall be from the MDOT staff.

(2) Meetings

The Board shall schedule meetings as required to manage the program. Advanced notice of the meetings, agenda and minutes of previous meetings shall be distributed to the Board members as appropriate. Copies of all meeting minutes shall be provided to the Specification Committee.

(3) Responsibilities

The Board will be responsible for all operations with regards to the HMA technician certification program to include, but not be limited to, such items as: the establishment and modification of all class, laboratory training and examination programs; selection of the trainers; review of candidates' background; recertification; and to hear and decide on all complaints about the certification program.

1.3.3.3 Certification Standards

(1) Certified Asphalt Technician - I (CAT-I)

The CAT-I will be responsible for the daily sampling, testing, data calculations, charting and process monitoring at the HMA plant. Prospective candidates will be required to have basic math skills, the ability to use a calculator and meet one of the following experience requirements:

- a. A minimum of six months of hands on experience under the supervision of a current CAT-I.
- b. A minimum of two years of current experience in the HMA industry doing Quality Control testing.

Certification will be based on the successful completion of a written examination and demonstrated competence in the required field sampling and testing program before an approved CMDT proctor. The hands-on demonstration shall be with a proctor who usually works in a district outside the employee's normal working area.

(2) Certified Asphalt Technician - II (CAT-II)

The CAT-II will be responsible for the successful operations of the quality control program at the HMA plant and the necessary adjustments to the process to maintain the mixture within the required control limits. Prospective candidates shall have successfully completed the CAT-I program. The training will consist of a 2-4 day program of class sessions. Certification will be based on the successful completion of a written examination taken under the supervision of MDOT and/or MAPA.

(3) Certified Mixture Design Technician (CMDT)

The CMDT will be responsible for testing according to MDOT design procedures for the development of a job mix formula for HMA mixtures. Prospective candidates will be required to have basic math skills, the ability to use a calculator and meet one of the

following experience requirements:

- a. A minimum of three months experience as a CAT-I.
- b. A minimum of three months experience under the supervision of a current CMDT.
- c. A minimum of two years of current experience in the HMA industry doing Quality Control or Mixture Design testing

The training will consist of a 4 day program of class and laboratory sessions conducted under directive of MDOT or MAPA. Certification will be based on the successful completion of a written examination and the submittal of a mixture design conducted according to MDOT design procedures. Completion of the CMDT certification process will also satisfy the requirements for CAT-I certification.

1.3.3.4 Certification Process

Prospective candidates shall submit a request for certification to the HMA Technician Certification Board of Directors in care of the Mississippi Asphalt Pavement Association. The request must contain the certification level sought and information about the successful completion of the required prerequisites for the requested level. Students will be allowed one retest if they do not pass the written examination portion of the certification process. If they do not pass the second examination, they must retake the entire training program. Students not meeting the demonstration requirements for certification will be allowed to retest after further documented experience under the supervision of a certified technician.

1.3.3.5 Recertification

Certification shall be valid at all levels for a period of five years. Recertification for technicians shall consist of attendance at a one-half day review class and passing a written examination. Mix design submittal will also be required for recertification as a CMDT. Recertification will only be required for the highest level of certification obtained.

1.3.3.6 Certified Technician Responsibilities

Certified Technicians will be required to sign an acknowledgement form before their certificate will be issued. When the technicians sign the form, they acknowledge that they will conduct themselves, in regards to HMA responsibilities, in a professional and honest manner at all times. This means that they will conduct all sampling and testing according to the procedures required for the materials being tested and the specifications for the specific project being constructed. All test results will be calculated and reported accurately according to the required procedures. Failure to comply with these responsibilities may result in the suspension or revocation of certification.

1.3.4 MDOT Concrete Technician Certification Program

1.3.4.1 Scope

The MDOT Concrete Technician Certification Program is intended to help assure appropriate minimum training and proficiency qualifications for all personnel, both agency and industry, who are involved with quality control (QC), quality assurance (QA), mixture design, and testing concrete and aggregates for acceptance purposes on MDOT projects. There are four (4) classes of certification, as detailed below, and the appropriate class is required of each individual performing these duties on MDOT projects. Certifications are valid for five (5) years. Retesting is required for certification renewal. Additionally, technicians interpreting and applying maturity information to estimate the in-place strength of concrete require a two hour training class, as detailed below.

1.3.4.2 Program Administration

The MDOT Concrete Technician Certification Program shall be administered by the Mississippi Concrete Industries Association (MCIA). An Oversight Committee is established, consisting of the MCIA Technical Education Committee members, and MDOT's Assistant Chief Engineer of Operations, State Materials Engineer, and Assistant State Materials Engineer. The MDOT/MCIA Oversight Committee will meet once a year to approve any changes in the certification procedures.

1.3.4.3 Certification Standards

(1) MDOT CLASS I certification covers field testing plastic concrete. The MDOT Class I certification program consists of the nationally recognized ACI Concrete Field Testing Technician Grade I program, and maintaining good standing with MDOT. No substitutions are accepted. The MDOT Class I program includes the following test procedures:

- a. ASTM Designation: C 1064 - Temperature of Freshly Mixed Portland-Cement Concrete
- b. ASTM Designation: C 172 - Sampling Freshly Mixed Concrete
- c. ASTM Designation: C 143 - Slump of Hydraulic Cement Concrete
- d. ASTM Designation: C 138 - Unit Weight, Yield, and Air Content (Gravimetric) of Concrete
- e. ASTM Designation: C 231 - Air Content of Freshly Mixed Concrete by the Pressure Method

- f. ASTM Designation: C 173 - Air Content of Freshly Mixed Concrete by the Volumetric Method
- g. ASTM Designation: C 31 - Making and Curing Concrete Test Specimens in the Field

(2) MDOT CLASS II certification is intended for technicians who perform tests on aggregates. The MDOT Class II certification program consists of the nationally recognized ACI Aggregate Testing Technician - Level 1 program, and maintaining good standing with MDOT. The MDOT Class II program requires competency in the following test procedures:

- a. ASTM Designation: D 75 - Sampling Aggregates
- b. ASTM Designation: C 702 - Reducing Field Samples of Aggregate to Testing Size
- c. ASTM Designation: C 117 - Materials finer than 75- μ m (No. 200) Sieve for Mineral Aggregates by Washing
- d. ASTM Designation: C 136 - Sieve Analysis of Fine and Coarse Aggregate
- e. ASTM Designation: C 127 - Specific Gravity and Absorption of Coarse Aggregate
- f. ASTM Designation: C 128 - Specific Gravity and Absorption of Fine Aggregate
- g. ASTM Designation: C 566 - Total Moisture Content of Aggregate by Drying
- h. ASTM Designation: C 40 - Organic Impurities in Fine Aggregates for Concrete

(3) MDOT CLASS III certification is intended for technicians who design and make field adjustments to concrete mixtures. The MDOT Class III certification program requires that the candidate have valid MDOT Class I, MDOT Class II, and MDOT Strength Testing Technician certifications, and knowledge of the following procedures and specifications:

- a. AASHTO Designation: R 39 - Making and Curing Concrete Test Specimens in the Lab
- b. AASHTO Designation: M 157 - Standard Specifications for Ready Mix Concrete
- c. AASHTO Designation: T 325 – Estimating the Strength of Concrete in Transportation Construction by Maturity Tests.
- d. ASTM Designation: C 1074 – Estimating Concrete Strength by the Maturity Method
- e. Adjustment of Batch Weights for Aggregate Moisture
- f. Concrete Fundamentals (PCA's *Design and Control of Concrete Mixtures*)
- g. Principles of mixture design
 - 1. ACI 211.1 - Standard Practice for Selecting Proportions for Normal, Heavyweight, and Mass Concrete
 - 2. PCA methods
 - 3. MDOT special requirements
- h. Use of Admixtures

- i. Cementitious Materials
- j. MDOT Specifications, 2004 Edition:
 - 1. Section 501 – Portland Cement Concrete Pavement
 - 2. Section 503 – Replacement of Concrete Pavement
 - 3. Section 504 – Ultra-Thin and Thin Portland Cement Concrete Pavement
 - 4. Section 631 – Flowable Fill
 - 5. Section 803 – Deep Foundations (Drilled Shafts)
 - 6. Section 804 – Concrete for Bridges and Structures
- k. Using Maturity to Estimate In-Place Concrete Strength
- l. Data Management procedures of MDOT's QC/QA Concrete Program

(4) MDOT Concrete Strength Testing Technician certification is intended for technicians who performed tests on concrete strength specimens. The MDOT Concrete Strength Testing certification program consists of the nationally recognized ACI Concrete Strength Testing certification program, and maintaining good standing with MDOT. The MDOT Concrete Strength Testing program requires competency in the following test procedures:

- 1. ASTM Designation: C 617 - Capping Cylindrical Concrete Specimens
- 2. ASTM Designation: C 1231 - Unbonded Caps for Concrete Cylinders
- 3. ASTM Designation: C 39 - Compressive Strength of Cylindrical Concrete Specimens
- 4. ASTM Designation: C 78 - Flexural Strength of Concrete

(5) Maturity Training is intended for technicians who interpret and apply concrete maturity data in order to estimate the in-place strength of concrete. The two hour training program is facilitated by MCIA. Retraining is not required. The training course reviews the following test procedures:

- 1. AASHTO Designation: T 325 – Estimating the Strength of Concrete in Transportation Construction by Maturity Tests
- 2. ASTM Designation: C1074 – Estimating Concrete Strength by Maturity Method

1.3.4.4 Certification Process

Each class of certification requires, and is contingent upon, current certification at the preceding class level. Except for MDOT Concrete Strength Testing Technician certification, each certification is valid for five (5) years. MDOT Concrete Strength Testing Technician certification is

valid for six (6) years. Renewal requires reexamination. MDOT Grades I, II, and Concrete Strength Testing certifications require passing a closed-book written examination covering each of the referenced standards, and passing the performance examination by properly demonstrating each ASTM test method. MDOT Class III certifications require passing an open-book written examination covering referenced AASHTO standards and concrete technology material presented in the course.

1.3.4.5 Recertification

Concrete technician recertification will be the same as the certification process, except that attending the classroom sessions will not be mandatory. When a technician's certification has expired and the technician is enrolled in a recertification class, their certification is automatically extended for an additional 45 days until the results of their recertification test are known.

**Section 2 – Inspection, Sampling, Testing, and Reporting of
Pre-Tested Materials**

2.1 Bituminous Materials: Emulsified Asphalt and Performance Graded Asphalt Binders

2.1.1 Bituminous Materials - The following section establishes uniform policies and procedures for the sampling, testing, inspection, and acceptance of certified bituminous materials including emulsified asphalt and performance graded binders for use in pavement work under the supervision of the Mississippi Department of Transportation.

All bituminous materials furnished for use in MDOT construction or maintenance work shall be shipped under the Mississippi Department of Transportation certification program as established in these provisions. The requirements and procedures shall apply to materials that meet the requirements of AASHTO M 140, M 208, and M 320, Section 5, Materials and Manufacture, and which are manufactured at refineries or mixed at terminals.

2.1.2 Referenced Documents – The following is a list of documents referenced in this section:

AASHTO STANDARDS:

M 140—Emulsified Asphalt

M 208—Cationic Emulsified Asphalt

M 320—Specification for performance Graded Asphalt Binders

R 29—Practice for Grading or Verifying the Performance Grade of an Asphalt Binder

T 40—Sampling of Bituminous Materials

ASTM STANDARDS:

D 8—Definitions of Terms Relating to Materials for Road and Pavements

D 3665—Random Sampling of Construction Materials

MISSISSIPPI SPECIFICATIONS:

Mississippi Standard Specifications for Road and Bridge Construction, 2004 Edition

Mississippi Standard Specifications for Road and Bridge Construction, 1990 Edition

Mississippi Standard Specifications for Road and Bridge Construction, 1996 Metric Edition

Applicable Notice to Bidders, Special Provisions and Supplemental Specifications

2.1.3 Terminology – The following is a list of terms referenced in this section (2.1):

AAP—AASHTO Accreditation Program

AMRL—AASHTO Materials Reference Laboratory

Asphalt Binder—an asphalt-based cement that is produced from petroleum residue either with or without the addition of non-particulate organic modifiers.

ASC—Approved Supplier Certification

EA—Emulsified Asphalt

HMA—Hot Mix Asphalt

PGAB—Performance Graded Asphalt Binder

MDOT—Mississippi Department of Transportation

Supplier—A Supplier shall be defined as one who produces the final product or who makes the blend or modification that alters the properties of the binder to produce the PGAB as specified in by AASHTO specifications. A Supplier shall be a refinery or a terminal. If no modification is made to either the EA or the PGAB after its initial production at the refinery, the refinery shall be the Supplier and must provide the certification. If any modification is made to the bituminous material at the terminal, the terminal shall be the Supplier and must provide the certification. No modification of the PGAB will be allowed after delivery to the HMA plant.

Note 1: Various refining techniques can produce equivalent PGAB; however, these asphalts may be incompatible with each other. Suppliers shall confirm compatibility through testing before combining asphalts from different sources.

Specification Compliance Testing—Complete testing in accordance with the applicable AASHTO specification requirements. The procedure for verification of PGAB shall be as described in AASHTO R 29 shall be followed.

Quality Control Testing—The quality control testing shall be described in the Supplier's quality control plan. The Supplier's quality control plan shall be approved by MDOT.

Note 2: Definitions for many terms common to asphalt binder are found in ASTM D 8.

2.1.4 Significance and Use – This standard specifies procedures for determining specification compliance of EA or PGAB by a certification system that evaluates quality control and specification compliance tests performed by the Supplier on samples

obtained prior to shipment, and verification testing performed by MDOT. Following are activities covered within this provision:

- General requirements that the Supplier shall satisfy to be given approved-supplier status.
- Minimum requirements that shall be included in a Supplier's quality control plan.
- General requirements that MDOT shall satisfy before certification.
- Procedure for shipping bituminous materials under an ASC system.
- Procedure for MDOT monitoring of an ASC system at the shipping facility and HMA facility.
- Procedure for field sampling and testing of bituminous materials shipped under an ASC system.

2.1.5 Supplier Requirements—Each asphalt refinery or terminal proposing to furnish bituminous materials for MDOT work shall submit a written request to the Materials Division of MDOT for authorization to ship PGAB or EA under the ASC system and shall list the material(s) to which the request applies. The request should certify by letter to the State Materials Engineer agreement with and acceptance of the provisions of Section 2.1 of the Materials Division Inspection, Testing, and Certification Manual and that sampling and testing will be in accordance with the applicable AASHTO or MT Test Methods. This letter shall remain in effect until rescinded in writing. At a mutually convenient time, representatives of the Central Laboratory will visit the production and/or shipping site to observe the Supplier's quality control activities, to inspect the facilities and to obtain samples for test of any applicable material(s) prior to beginning shipments.

2.1.5.2 Initial Approval Requirements—The Supplier shall meet the following criteria when applying for approval to supply bituminous materials

- (1) The Supplier shall submit to MDOT for approval a complete quality control plan that complies with the requirements of Section 2.1.5.4. The Supplier shall follow the procedures described in the approved quality control plan.
- (2) The Supplier shall establish a continuing test record for each test required for every EA or PGAB included in the approval request to satisfy the requirements of the quality control plan outlined in Section 2.1.5.4.
- (3) The Supplier shall submit to MDOT all reports required by Section 2.1 in a form

approved by MDOT. A copy of each required report shall be submitted with the Supplier quality control plan for approval.

- (4) For each PGAB included in the written request the Supplier shall forward to MDOT the initial series of test data prepared to satisfy the quality control plan. For all PGAB, the Supplier shall also obtain and provide a split sample for MDOT. For polymer modified PGAB, a written procedure for reheating the sample for testing shall be supplied with the sample.
- (5) The Supplier shall have a satisfactory record of compliance with governing specifications. Judgments by MDOT concerning this requirement shall be based on the test results furnished by the Supplier and satisfactory results when the monitoring and field tests are compared with supplier tests. Following the initial refinery tests on a tank of new material, a check test shall be performed at least each week by the refinery to assure compliance of the material with the specifications.

2.1.5.2 Sampling – All test samples shall be obtained in accordance with the applicable AASHTO or ASTM test method for the material to be supplied. The use of a random sampling procedure is mandatory to the establishment of a valid certification program.

2.1.5.3 Testing Requirements – All required testing shall be performed by a laboratory currently approved by the Materials Division of MDOT. Inspection by AMRL and participation in an AMRL proficiency samples program shall be used as the basis for approval. AMRL inspection reports along with documentation of resolution of discrepancies in the AMRL report must be provided upon request. In addition, MDOT shall require that the certifying technician participate in a bituminous technician certification program.

2.1.5.4 Supplier Quality Control Plan (Minimum Requirements)

- (1) Identify the following:
 - Facility type (refinery or terminal);
 - Facility location;
 - Name and telephone number of the person responsible for quality control at the facility;

The quality control tests to be performed on each EA or PGAB;
Name, address and location of the laboratory performing quality control tests on the EA or PGAB that is shipped.

- (2) The plan must include a declaration stating that if a test result indicates that a shipment of EA or PGAB is not in compliance with the specifications, the Supplier shall:
Immediately notify MDOT of the shipment in question;
Identify the material;
Cease shipment until the material complies with the specifications;
Notify MDOT when shipment resumes;
Implement any mutually agreed upon procedures for the disposition of the material.
- (3) List procedures that will be taken in the disposition of any shipment(s) of any EA or PGAB not in compliance with the specifications.
- (4) Describe method and frequency for quality control testing and specification compliance testing.
- (5) The plan shall outline the content of the required quarterly summary reports for all quality control and specification compliance tests performed during that period for submittal to MDOT.
- (6) The plan shall provide an outline of the procedure to be followed for checking transport vehicles before loading to prevent contamination of shipments. The outline shall include a statement that the transport vehicle inspection report, signed by the responsible inspector, shall be maintained in the Supplier's records and shall be made available to MDOT on request.

2.1.5.5 Specification Compliance Testing by the Supplier:

- 2.1.5.5.1 INITIAL TESTING:** For each PGAB or EA to be supplied, specification compliance testing (*complete AASHTO M 320 or M 140 testing*) shall be performed for at least three consecutive lots. A lot may be a fixed batch of material or a specified

quantity in a continuous operation (see Note 3). The Supplier and MDOT shall agree on a lot size. MDOT must approve any change to a lot size.

NOTE: If a batch operation is used to manufacture the PGAB or EA, a tank will be defined as a lot and the lot size will be the amount of material batched into the tank. If a continuous process (in-line blending or shipment from “live” tanks) is used to manufacture the PGAB or EA, the lot size will be obtained at random during the production for continuous operations. Lot size shall depend on the production method used and the quantity produced. High production quantity will generally have larger lot sizes than low production quantity.

2.1.5.5.2 Reduced Frequency of Testing for Specification Compliance: If test results show that material consistently meets the minimum AASHTO requirements, the manufacturer may elect to reduce the testing frequency as outlined in their Quality Control Plan. If at any time the manufacturer’s test results show marginal or failing material, testing should be conducted for each lot of material until at least three consecutive lots produce satisfactory material. Any material found by test results not to meet the minimum AASHTO requirements, should be handled in accordance with the manufacturer’s Quality Control Plan. In no instance should material be shipped by the Supplier that has been shown by testing not to meet the minimum AASHTO requirements.

Note, For each lot of PGAB, the Supplier shall develop a temperature-viscosity curve. A copy of the curve shall be distributed with each copy of the bill of lading.

2.1.6 Shipping and Certification— Requirements for Shipping and Certification of EA or PGAB by an ASC Supplier

2.1.6.1 General Shipping Requirements

- (1) The Supplier’s quality control plan as approved by MDOT (see Section 2.1.5.4) shall be implemented.
- (2) The Supplier shall make material shipments covered by the certification as dictated by shipping schedules. A certificate “A” or “B” as detailed herein shall be furnished with each shipment.

- (3) If the specification compliance test results do not conform to PGAB specifications, the Supplier shall remove the noncompliant material from the shipping queue as outlined in Section 2.1.5.4
- (4) Based on MDOT assurance testing or the referee sample testing compromise (see NOTE 4), penalties shall be assessed for material that does not comply with the specified requirements. The penalty shall be determined by MDOT. If problems with the material recur at the HMA plant, MDOT may suspend use of the EA or PGAB until the cause for noncompliance with specifications can be identified and corrected.

2.1.6.2

Certifications and Shipping Reports--All bituminous materials accepted by certification will be delivered as set forth in one of the following conditions:

CASE 1: Bituminous Material Delivered Directly From a Pretested Storage Tank to a Project Site or Maintenance Work Order

- a. Certified refinery test reports shall be furnished to the State Materials Engineer, including all specified tests made on stored bituminous material. The test reports shall also include the following data:

- Refinery Location
- Test Results
- Storage Tank Number
- Type Bituminous Material
- Refinery Laboratory Number
- Date Sampled
- Number Gallons Represented

- b. The certificate of compliance shall contain the following or similar wording:

"The undersigned certifies that the sample(s) represented by this report was obtained from bituminous material loaded into the storage tank number indicated above; that no additional material has been added since these tests were made; that the tests were made in accordance with the latest AASHTO or MT standard methods; and that the bituminous material complies with the Mississippi Department of Transportation specification for the type shown above."

- c. The format of the test report may be the same as that normally used by the refinery. The above certificate may be printed or stamped on the test report.

- d. For each shipment of bituminous material, a certificate (hereinafter called **Certificate "A"**) shall be furnished with the following data:

Certificate "A" Number
Refinery Laboratory Number
Refinery Location
Date Shipped
Type of Bituminous Material
Project or Work Order Number
Storage Tank Number
Name of Purchaser
Destination
Number of Gallons Shipped

- e. The Certificates "A" shall be numbered consecutively and contain the following or similar wording:

"The undersigned certifies that the transport or railroad car was inspected prior to loading and found to contain no contaminating material. The bituminous material in this shipment was loaded from the pre-tested tank indicated above, and it complies with Mississippi Department of Transportation specifications. No bituminous material not covered by a certified test report has been added to the storage tank."

- f. The Certificates "A" shall be signed by an authorized company representative.
- g. When bituminous material is delivered by truck transport, the certificate shall accompany each transport. It shall be delivered to the appropriate Department representative, and copies shall be mailed to the State Materials Engineer and the District Materials Engineer.

CASE 2: Bituminous Material Delivered Directly From a Pretested Storage Tank To a Commercial Asphalt Plant Which Produces For Department Work.

Certified refinery test reports with an attached copy of the temperature-viscosity curve shall be furnished the State Materials Engineer, the asphalt plant and the appropriate Department representative at the asphalt plant. (The test reports are

described under Case 1 above.) A copy of the Certificate "A" will be furnished the State Materials Engineer and two (2) copies will be furnished to the asphalt plant. A copy of the Certificate "A" shall be furnished the appropriate Department representative by the asphalt plant.

CASE 3: Bituminous Material Delivered From a Pre-tested Storage Tank to an Intermediate Terminal for Trans-shipment to Projects, Work Orders, or Asphalt Plants

Certified test reports, temperature viscosity curves, and Certificate A's, shall be furnished the State Materials Engineer. (These reports are described under Case 1.) A Certificate "A" as described in Case 1 above, shall be furnished to the State Materials Engineer and to the management of the terminal for each shipment to the terminal.

CASE 4: Bituminous Material Delivered From an Intermediate Terminal to a Project or Work Order

- a. For each shipment of bituminous material from an intermediate terminal to a project or work order, a certificate (hereinafter called **Certificate "B"**) shall be furnished with the following data:

Certificate "B" Number
Type Bituminous Material
Terminal Location
Number Gallons Shipped
Terminal Storage Tank Number
Project or Work Order Number
Name of Purchaser
Date Shipped
Destination
Asphalt Refinery Location*
*Location from which bituminous material was obtained

- b. The Certificates "B" shall be numbered consecutively and contain the following or similar wording:

"The undersigned certifies that the transport vehicle was inspected prior to loading and found to contain no contaminating material. The bituminous material in this shipment was loaded from the terminal storage tank indicated above; that it is the same bituminous material covered by Certificate "A" No. (Certificate No.) issued by (asphalt refinery name); that no bituminous material not covered by certified test reports has been

added to the storage tank; and that the bituminous material complies with Mississippi Department of Transportation specification for the type indicated."

- c. The certificate shall be signed by an authorized representative of the terminal. When bituminous material is delivered by truck transport, the certificate shall accompany each transport. It shall be delivered to the appropriate Department representative, and copies shall be mailed to the State Materials Engineer and the District Materials Engineer.

CASE 5: Bituminous Material Delivered From an Intermediate Terminal to a Commercial Asphalt Plant Which Produces For the Department Work

A copy of the Certificate "B" as described in Case 4 above will be furnished the State Materials Engineer and two (2) copies to the asphalt plant. A copy of the Certificate "B" shall be furnished the appropriate Department representative by the asphalt plant. A copy of the temperature-viscosity curve shall be attached to each Certificate "B" and copies sent to the asphalt plant.

- 2.1.7 Sampling Bituminous Material at the Refinery or Terminal by MDOT** – All bituminous materials shall be sampled according to the procedure in the following Table.

Sampling Frequency for Bituminous Materials

MATERIAL TYPE	TANK CAPACITY (GALLONS)	NUMBER OF SAMPLES	SAMPLING LOCATION
ASPHALT EMULSION	LESS THAN 10,000	ONE (1)	MIDDLE
ASPHALT EMULSION	10,000 TO 50,000	TWO (2)	TOP & MIDDLE
OTHER THAN EMULSION	LESS THAN 50,000	ONE (1)	MIDDLE
ALL TYPES	50,000 TO 150,000	TWO (2)	TOP & BOTTOM
ALL TYPES	MORE THAN 150,000	THREE (3)	TOP, MIDDLE & BOTTOM

NOTE: When storage tanks are equipped to properly circulate the material, the samples may be obtained from any one location of the tank.

- 2.1.7.1** Following approval of a storage tank of bituminous material, stock samples will be obtained at a frequency of one (1) each two weeks from each approved tank when

more than 50,000 gallons are shipped each two weeks. When less than 50,000 gallons are shipped each two weeks, a stock sample will be obtained for each 50,000 gallons shipped. During winter months, asphalt emulsions will be sampled prior to shipment or one (1) sample every two weeks from each approved tank.

2.1.7.2 In the event a stock sample fails to meet the requirements of the specifications, the Central Laboratory will advise the refinery (or terminal) of the failure and advise that shipments to Department projects be ceased. A stock check sample will be obtained if requested by the refinery.

2.1.7.3 In the event of noncompliance of a stock check sample, the Central Laboratory will notify the refinery (or terminal) that the material is rejected, and no further testing will be performed until the tank has been reworked and a certified test report has been submitted showing the deficiency has been corrected. The tank may then be resampled and tested.

2.1.7.4 After the failure of the stock sample and the stock check sample, no further shipments of material, of the same type and grade, will be made until the new material has been sampled, tested and accepted by the Central Laboratory.

2.1.8 Field Acceptance Sampling Requirements— Bituminous material used for Department work shall be sampled by a representative of the Department at the frequencies outlined hereinafter. The frequencies shown apply to each source and are the minimum; additional samples shall be obtained if there is a question concerning the quality of the asphalt.

2.1.8.1 Each sample of asphalt binder will consist of 1 quart; each sample of emulsified asphalt will consist of one (1) gallons. The asphalt binder will be placed in one-quart metal cans, and emulsified asphalt will be placed in one-gallon plastic containers. Extreme care must be taken in sealing the sample containers to prevent contamination and loss of volatiles.

2.1.8.2 The Department Inspector must pay special attention to the following:

- Use proper sampling procedures;
- Use only clean, dry sample containers;
- Complete the sample information card (TMD-320) or enter the SiteManager Sample Information;

Ship samples to Central Laboratory as soon as possible.

2.1.8.3 The Central Laboratory will notify the Engineer of failing test results by telephone or e-mail. The Engineer will notify the Contractor of the failure as soon as possible so that corrective actions may take place.

2.1.8.4 Bituminous material delivered to a project for surface treatment will be sampled at the rate of one (1) sample for each 50,000 gallons or fraction thereof. At least one (1) sample will be obtained for each project.

2.1.8.5 Emulsified asphalt delivered to a project for prime, curing or erosion control will be sampled at the rate of one (1) sample for each 30,000 gallons or fraction thereof. At least one (1) sample shall be obtained for each project.. Emulsified asphalt stored on the project during periods when the temperature is below freezing shall be re-sampled and submitted to the Central Laboratory. Test results will indicate whether or not this material is acceptable for use in the work.

2.1.8.6 Performance Graded Asphalt Binder Field Sampling Requirements

- (1)** PGAB delivered to a field facility (HMA Plant) shall be sampled on a random basis for quality assurance at a minimum frequency of one sample per 200,000 gallons of PGAB. Additional samples may be obtained by either MDOT or the HMA producer as deemed necessary.
- (2)** Field samples are taken for several purposes including but not limited to the following: To determine the type and magnitude of any changes in the properties of the PGAB during transportation and storage; to determine that the material received in the field is the material ordered; or to verify that the quality control/quality assurance system is performing as intended.
- (3)** If test results indicate that the PGAB does not meet specifications, MDOT shall immediately notify the HMA producer. An investigation shall be conducted that shall include a review of quality control and sampling and testing procedures for field sampling and split sampling. The purpose of the investigation is to rule out contamination of the PGAB due to sampling technique and sampling location.

- (4) After completion of the investigation, if the PGAB is found to not meet the specifications, the District Materials Engineer and Project Engineer shall be notified immediately. The Project Engineer shall notify the HMA producer to suspend operations immediately. The HMA producer and Supplier shall immediately investigate the possibility of contamination in transport vehicles, field storage tanks, pumps, lines and at handling facilities or other causes, and take appropriate action to correct the problem. When it is determined that the PGAB is back in compliance with specifications, operations may resume. Any mixture placed containing noncompliant PGAB shall be evaluated to determine the effect of the noncompliant material on the service life of the pavement. If it is determined that the mixture can remain in place, an appropriate pay adjustment shall be applied to all the placed mixture represented by the test.
- (5) **Temperature-Viscosity Relation Curves** – The Department representative at the hot-mix asphalt plant will compare the temperature-viscosity curves of the asphalt shipped to the temperature-viscosity curve received with the mix design. If the viscosity of the asphalt shipped changes by a factor of two (2) or more from that used in the mix design, a new design will be required.

2.1.9 HMA Producer Responsibilities

- (1) The HMA producer shall insure that all PGAB incorporated in the work conforms to the requirements of Section 2.1 of this manual, and is purchased from an MDOT Approved Supplier.
- (2) The HMA producer shall insure that the PGAB does not become mixed with other grades of binders or otherwise contaminated after delivery.
- (3) When the HMA producer owns and/or operates the transport vehicles, the HMA producer shall provide the transport vehicle inspection report required in Section 2.1.5.4(6).

2.1.10 MDOT Responsibilities

2.1.10.1 Approval, Sampling, and Reporting Requirements

- (1) MDOT shall verify that the Supplier's quality control plan is adequate. MDOT representatives may visit the shipping site when necessary.
- (2) When approved, MDOT shall notify the Supplier that the Supplier's application for ASC status has been granted. The notification shall include a list of the materials covered. When an application has been denied, MDOT shall provide such notification to the Supplier with reasons for denial.
- (3) MDOT shall determine approval status of the Supplier's testing laboratory.
- (4) MDOT may perform split sample testing for PGAB in accordance with Section 2.1.10.2.
- (5) MDOT personnel shall perform quality assurance sampling and testing in accordance with Section 2.1.8.
- (6) MDOT shall authorize shipment of each listed material under the ASC system only after all ASC requirements have been satisfied.
- (7) MDOT may inspect the operations of the Supplier's facility related to shipments of bituminous materials when necessary.
- (8) The Central Laboratory shall maintain a file of certified refinery test reports from each asphalt refinery furnishing asphalt under the certification program.
- (9) The Central Laboratory shall work to insure that asphalt refineries abide by the procedures herein stated. Refineries failing to abide by these procedures will not be permitted to ship asphalt for Department work until such time as the State Materials Engineer is satisfied that the refinery will abide by the provisions set forth herein.

2.1.10.2. Split Sample Testing Requirements for PGAB

MDOT shall test split samples that are obtained at random from the Supplier's

facility at a minimum frequency of one sample each ninety (90) days.

Note—Split samples shall be obtained from the same general points in the Supplier's shipping process that the Supplier's samples are taken; for example, from a storage tank at the refinery, from a holding tank at a terminal, or from a loading line down from the blending operation of an in-line blending process.

If the split sample data and the Supplier test data are not within the test tolerance specified in the applicable test standards, an immediate investigation shall be conducted to determine the reason for the difference between the data. Unless available facts indicate otherwise, the investigation shall include a review of sampling and testing procedures of both Supplier and MDOT. MDOT shall notify the Supplier when either split sample data versus Supplier sample data does not compare within the limits established in Sections 2.1.8 and 2.1.10.2.

The Supplier and/or the HMA producer may take a split sample of the PGAB quality assurance samples for verification of MDOT's results. If a split sample is taken, a third sample shall be taken as a referee. The referee sample shall be retained either by MDOT or by the HMA producer until the quality assurance sample test results are available. If the test results are not disputed, the referee sample may be discarded. However, if the test results are disputed, MDOT shall test the referee sample, and if requested the Supplier shall be allowed to witness the referee testing. The results of the referee sample testing shall be binding.

An MDOT representative at the HMA plant shall develop temperature-viscosity curve on samples taken at random at a minimum frequency of one sample per 100,000 gallons of PGAB incorporated in the work. The temperature-viscosity curve shall be compared to the applicable Supplier's curve for determination of uniformity. If the viscosity range at compaction and/or mixing temperature varies by more than 10°F, a sample shall be submitted to the Materials Division for complete analysis for determination of compliance to specifications.

2.1.11 Reporting

2.1.11.1 Supplier Reports - The Supplier shall prepare the reports as described herein

(Sections 2.1.5 and 2.1.6)

2.1.11.2 MDOT Reports

- (1) The Supplier may request copies of the split sample test results and field test data.
- (2) MDOT Project Engineers shall maintain a log of Certificates (“A” or “B”) on an Asphalt Certificate Summary. A copy of an example form may be obtained from the MDOT intranet website or the www.goMDOT.com website. A SiteManager Sample Record shall be completed with all applicable information and the appropriate template (FFO-617--“Report of Asphalt Shipped by Certificate”). The sample record and template should represent the total amount of certified Asphalt listed on the asphalt summary. A copy of the Summary Log shall be maintained by the project engineer.
- (3) County or LPA Project Engineers shall submit a Pretested Materials Shipment Report Request Form to the Central Lab for each project listing each Certificate “A” or Certificate “B” that was received from the Asphalt Binder Source. The form shall include:

The binder’s source name

The terminal location

The type material

The certificate number

The total number of gallons from the certification that were received during the reporting period.

The form may be forwarded as the project progresses, or at the end of construction. A copy of the form may be obtained from the www.goMDOT.com website under the *Business Section*, or by request to the Materials Division. Upon receipt of the form, the Materials Division will issue a SiteManager Report of the applicable material(s).

2.2 Cementitious Materials: Hydraulic Cement, Ground Granulated Blast Furnace Slag, and Fly Ash

2.2.1 Hydraulic Cement – The following section establishes uniform procedures for the sampling, testing, reporting of tests and evaluation of Hydraulic Cement.

2.2.1.1 General – Acceptance of hydraulic cement for use in concrete or soil-cement produced for the Mississippi Department of Transportation will usually be based on certification by the producer that the cement complies in all respects with the applicable specifications.

Check samples will be obtained from cement delivered to the concrete plant or project site and submitted to the Central Laboratory for testing in accordance with established sampling frequencies as set forth in this section (Section 2.2.1).

The operating procedure outlined herein is applicable to all hydraulic cement delivered to Mississippi Department of Transportation projects; to ready-mix concrete plants producing concrete for Department work; to plants producing precast units and prestressed or post-tensioned concrete members for Department work; and to districts for maintenance work. Section 2.2.1 is also applicable to cement delivered for work supervised by the Office of State Aid Road Construction.

It shall be the responsibility of the Contractor to ascertain that the cement company for whom he purchases cement complies with provisions of this standard operating procedure.

2.2.1.2 Requirements for Sampling, Testing, and Certification by Cement Producers

2.2.1.2.1 Each cement company proposing to furnish cement for Department work shall indicate agreement with, and acceptance of, the provisions of this standard operating procedure by a letter addressed to the State Materials Engineer. This letter will remain in effect until rescinded in writing by the cement company. A cement company is required to have a letter as described above, on file with the State Materials Engineer in order to qualify as a source of cement for Department work.

2.2.1.2.2 Each cement mill proposing to produce cement for Department work shall certify in a letter addressed to the State Materials Engineer that the rate of sampling and testing at the

cement mill is in accordance with the latest revision of AASHTO Designation: T 127 and referenced specifications. This letter will remain in effect until retracted by the cement mill. A cement mill is required to have a letter as described above, on file with the State Materials Engineer in order to qualify as a source of cement for Department work.

Each mill proposing to supply cement for Department work must provide 1 quart sized sample of the proposed cement at the time of application for source approval. Upon source approval an annual sample should be submitted during the first quarter of each year. In addition, if the composition of the cement is altered through the addition of Limestone after receiving notification of approval, then an additional sample is required for laboratory testing.

2.2.1.2.3 When testing cement for Department work, a cement mill shall comply with the "Normal Testing Rate" outlined in AASHTO Designation: T 127 unless it furnishes documentary evidence of its quality history as required by the reference. If the mill furnishes satisfactory evidence of quality, the mill may use the "Reduced Testing Rate". This evidence shall be furnished to the State Materials Engineer, and should consist of test reports by the mill over a period of approximately two years.

The above AASHTO designation gives the purchaser the option to specify the rate of testing for alkali content of the cement. Mississippi Department of Transportation specifications require low alkali cement, and it is required that each test sample be tested for alkali content.

It is not required that railroad cars or transports of cement be sealed at the mill or the terminal. However, the cement company shipping the cement may elect to seal the car or transport for its own protection.

2.2.1.2.4 Since there are several conditions under which cement is delivered, procedures for each condition are outlined separately as follows:

Case 1 – Cement delivered directly from a pretested storage silo to a project site, or a maintenance work order.

- a. Certified mill test reports shall be furnished to the State Materials Engineer, including all tests made on the stored cement. The test reports shall include the following data:

Brand Name	Test Results
Cement Mill Location	Kind and Type of Cement
Silo Number	Number of Barrels Represented
Laboratory Number	Certification of Compliance
Date Sampled	Amount of SO ₃ in Cement
Indication of Limestone Content and laboratory data*	

*When Limestone is present in the cement, the Mill test report should include the amount in percent (%) of Limestone, Carbon Dioxide (CO₂), and Calcium Carbonate (CaCO₃).

- b. The certificate of compliance shall contain the following or similar wording:

"The undersigned certifies that the sample (or samples) represented by this report was obtained from cement loaded into the bin (or silo) indicated above, that the tests were made in accordance with the latest AASHTO standard methods (if other methods were used, so designate), and that the cement complies with the MDOT specifications for (kind and type)."

The format of the test report may be the same as that normally used by the mill; the above certificate may be printed or stamped on the test report.

- c. The supplier shall submit Quarterly reports of the amount of SO₃ present in cement to be supplied for use on MDOT projects with a notification of compliance with ASTM C 1038. A copy of the certified test report for ASTM C 1038 should accompany the notification.

d.

- e. For each shipment of cement, a certificate shall be furnished with the following data:

Brand Name	Date Shipped
Cement Mill Location	Project, or Work Order, Number
Kind and Type of Cement	Name of Purchaser
Silo Number	Destination
Number of Barrels Shipped	Indication of Limestone Content

- f. The above certification shall contain the following or similar wording:

"The undersigned certifies that the cement in this shipment was loaded from the pretested bin (or silo) indicated above and it complies with MDOT specifications for (kind and type). The cement was tested under laboratory numbers (Lab ID), and no cement not covered by a certified test report has been added to the silo."

- g. When cement is delivered by truck transport, the certificate shall accompany each transport and shall be delivered to the appropriate MDOT representative,

except that the copies for the State Materials Engineer and the District Materials Engineer shall be mailed.

- h. This shipping certificate shall hereinafter be called "**Certificate A**"

Case 2 – Cement delivered directly from a pretested storage silo to a recognized commercial ready-mix concrete plant which produces concrete for Mississippi Department of Transportation work.

- a. Certified mill test reports shall be furnished to the ready-mix concrete plant and the State Materials Engineer. The reports are described under Case 1, above.
- b. A Certificate "A" (except the project number or work order number) is to be sent to the ready-mix concrete plant and the State Materials Engineer for each shipment of cement.
- c. A copy of Certificate "A" shall be furnished by the ready-mix concrete plant to the Project Engineer(s), County Engineer(s), or District personnel supervising projects, or work orders being furnished concrete.

Case 3 – Cement delivered from a pretested silo or by barge to an intermediate terminal for trans-shipments to projects, work orders, or ready-mix concrete plants.

Certified mill test reports shall be furnished to the State Materials Engineer. A Certificate "A," as described in Case 1, above (reworded as necessary) shall be furnished to the State Materials Engineer and the terminal management for each shipment to the terminal.

Case 4 – Cement delivered from an intermediate terminal to a project or work order.

- a. A certificate, hereafter called "**Certificate B**," shall be furnished for each shipment, with the original to a representative of the Project Engineer, County Engineer, or District Engineer, as applicable, and copies or prints mailed to the District Materials Engineer and to the State Materials Engineer. This certificate shall contain the following data:

Terminal Designation	Kind and Type of Cement
Terminal Silo Number	Number of Barrels Shipped
Brand Name	Project, or Work Order, Number
Name of Purchaser	Date Shipped
Destination	Cement Mill Location*
Indication of Limestone Content	
*(from which cement was obtained)	

- b. The certificate shall contain the following or similar wording:

"The undersigned certifies that the cement in this shipment was loaded from the terminal silo indicated above, that it is the same cement covered by certificate numbers (certificate no) issued by (cement mill), that no cement not covered by certified test reports has been added to the silo, and that the cement complies with MDOT specifications for the kind and type indicated above."

Case 5 – Cement delivered from an intermediate terminal to a recognized commercial ready-mix concrete plant which produces concrete for Mississippi Department of Transportation work.

A Certificate "B", as described above, reworded as necessary, shall be furnished with each shipment to the ready-mix plant and to the State Materials Engineer. A copy of Certificate "B" shall be furnished by the ready-mix plant to the Project Engineer(s), County Engineer(s) or District personnel supervising projects or work orders being furnished concrete.

2.2.1.2.5 Each cement mill shall number Certificates "A" consecutively. The certificates shall be signed by an authorized official of the cement company.

2.2.1.2.6 Each intermediate terminal shall number Certificates "B" consecutively. The certificates shall be signed by an authorized representative of the cement company owning or operating the terminal.

2.2.1.3 Responsibilities of Commercial Ready-Mix Concrete Plants – All cement purchased by a ready-mix concrete plant for use in concrete produced for any Mississippi Department of Transportation work shall be covered by certified mill test reports and Certificates "A," or Certificates "B," as applicable, and as described in Sections 2.2.1.2.

2.2.1.4 Responsibilities of Department Supervisor Personnel

2.2.1.4.1 Cement delivered to the project or work order site may be used provided a Certificate "A" or a Certificate "B," as applicable, has been received. Concrete produced by an approved commercial ready-mix concrete plant may be accepted, insofar as the cement is concerned, provided the concrete plant has furnished the required data as outlined in Sections 2.2.1.2.

2.2.1.4.2 In case a shipment is received without the proper certificate, the cement shall not be used until the required certificate has been furnished or until tests indicating compliance have been completed on samples submitted from the shipment.

2.2.1.4.3 Project Engineers shall enter all applicable information into a SiteManager Sample Record and complete Template CPE-901—"Project Engineer Certification" for all the cement received, prior to close of the project.

2.2.1.4.4 County or LPA Project Engineers shall retain copies of all applicable certificates for project clearance records.

2.2.1.4.4 Sampling of Cement

- (1)** Cement used in concrete and in soil-cement produced for Mississippi Department of Transportation work will be sampled by a representative of the Department at the approximate frequencies outlined below (Sections 2.2.1.4.3(4) and (5)). The frequencies shown apply to each source of cement and are the minimum; additional samples will be obtained if there is a question concerning the quality of the cement.
- (2)** Each sample will consist of approximately ten (10) pounds (approximately one gallon) and will be obtained in such a manner, and at such points, that the sample will: (1) be representative, (2) not be contaminated and (3) represent only one source and brand of cement.
- (3)** The samples will be placed in triple-seal metal cans or other moisture-proof containers that will insure the samples against contamination. The samples will be delivered, or will be mailed or shipped, prepaid. Consideration should be given to multiple sample

- shipments in order to take advantage of minimum shipping charges, but in no case will a sample be retained for longer than fourteen (14) days before submission to the Central Laboratory, Jackson, Mississippi.
- (4) Cement used by approved commercial ready-mix plants in production of concrete for Mississippi Department of Transportation work will be sampled at the rate of one (1) sample for each five hundred (500) cubic yards used, or a fraction thereof. Insofar as possible, at least one sample shall be obtained for each project except that a sample will not be required if the project contains less than approximately 200 cubic yards of concrete. Minor variations from this may be approved in writing by the State Materials Engineer.
 - (5) Cement delivered to a central concrete plant set up for a specific project, to be used in concrete paving will be sampled at the rate of one (1) sample for each one thousand (1000) cubic yards, or fraction thereof, used, except that at least one (1) sample will be obtained each week during which concrete is produced. On a project containing less than approximately 200 cubic yards of concrete, a sample will not be required. Minor variations from this may be approved in writing by the State Materials Engineer.
 - (6) Cement delivered to a project site for a specific project, to be used in soil-cement, will be sampled at the rate of one (1) sample for each one thousand (1000) barrels, or fraction thereof, received, except that at least one (1) sample will be obtained each week during which soil-cement is produced. Minor variations from this may be approved in writing by the State Materials Engineer.

2.2.1.5 Responsibility of Central Laboratory – The Central Laboratory may composite samples from each project, each source, and each type, forming test samples to be tested by the Central Laboratory, or at the discretion of the State Materials Engineer, a commercial laboratory. The Central Laboratory may composite individual samples from multiple projects provided the individual samples are from the same source and of the same type. Only individual samples having sampling dates from within thirty (30) days of each other will be utilized in a composite. Results of these tests will be reported to the parties concerned. The individual samples from which the composite test sample is obtained will be retained until satisfactory test results on the test samples are received.

If a composite test sample fails to comply with specification requirements, each individual sample represented by the composite test sample shall be tested for the failing requirement(s). Upon receipt of results of these tests, the State Materials Engineer shall evaluate the tests to determine action to be taken under Section 2.2.1.6.

A test sample, composites from individual samples, shall represent not more than four thousand (4000) cubic yards of concrete (or 4000 barrels of cement produced for soil-cement projects), except that the State Materials Engineer may decrease this maximum on any particular project if he deems it necessary or advisable due to lack of uniformity, borderline test results, or for other reasons.

2.2.1.6 Non-Complying Cement Samples – When a sample of cement fails to comply with the specification requirements, the State Materials Engineer will evaluate the failure and the probable effect of the failing requirement on the quality of the product produced with the cement.

If the State Materials Engineer deems the failure of sufficient seriousness to warrant such action, he may at his discretion order that the cement thus represented not be used in Department work, or he may proceed with the check tests on individual samples as specified in Section 2.2.1.6 for further evaluation.

In the event the check tests on individual samples confirm the failure, the State Materials Engineer will evaluate the failure and the probable effect on the quality of concrete produced with the cement. If he deems the confirmed failure of sufficient seriousness to warrant such action, the cement mill which produced the cement shall be required to suspend all shipments of cement for Department work until such time as the cause(s) of the failure have been corrected to the satisfaction of the State Materials Engineer.

2.2.1.7 Storage Capacity – In order to eliminate any possible delay in production because of nonconforming cement, it shall be the Contractor's responsibility to provide ample storage and shipments of cement to permit identification, sampling and testing, and appropriate actions as indicated above for failing samples.

2.2.2 Ground Granulated Blast Furnace Slag (GGBFS) – The following section establishes uniform procedures for the sampling, testing, reporting of tests and evaluation of Ground Granulated Blast Furnace Slag, hereinafter referred to as “GGBFS.”

2.2.2.1 General – Acceptance of GGBFS for use in concrete or soil-cement produced for the Mississippi Department of Transportation (MDOT) will usually be based on certification by the producer that the GGBFS complies in all respects with the applicable specifications. Check samples will be obtained from GGBFS delivered to the concrete plant or project site and submitted to the Central Laboratory for testing in accordance with established sampling frequencies as set forth in this section (Section 2.2.2).

These provisions apply to all GGBFS delivered to MDOT projects; to ready-mix concrete plants producing concrete for Department work; to plants producing precast units and prestressed or post-tensioned concrete members for Department work; and to districts for maintenance work. Section 2.2.2 is also applicable to GGBFS delivered for work supervised by the Office of State Aid Road Construction.

It shall be the responsibility of the Contractor to ascertain that the company from whom he purchases GGBFS complies with provisions herein.

2.2.2.2 Sampling, Testing, and Certification by GGBFS Producers - Following are MDOT requirements for Producers supplying GGBFS for Department Projects.

2.2.2.2.1 Each company proposing to furnish GGBFS for Department work shall indicate agreement with, and acceptance of, the provisions of Section 2.2.2 of this manual by letter addressed to the State Materials Engineer. This letter will remain in effect until rescinded in writing by the company furnishing GGBFS. A GGBFS company is required to have a letter, as above described, on file with the State Materials Engineer in order to qualify as a source of GGBFS for Department work.

2.2.2.2.2 Each GGBFS mill proposing to produce GGBFS for Department work shall certify in a letter addressed to the State Materials Engineer that the minimum rate of sampling and testing at the GGBFS mill, or processing facility, is in accordance with the latest revision of AASHTO Designation: T 127 and referenced specifications. This letter will remain in effect until retracted by the GGBFS mill. A GGBFS mill is required to have a letter, as above described, on file with

the State Materials Engineer in order to qualify as a source of GGBFS for Department work.

2.2.2.2.3 Testing Laboratories – Each testing laboratory performing any portion or all of the required tests under this procedure must be approved before a GGBFS mill, or processing facility, can be placed on the approved list. Such approval will be contingent upon the following:

- (1) Each testing laboratory must be regularly inspected by the Cement Concrete Reference Laboratory (CCRL). The testing laboratory shall authorize the Cement Concrete Reference Laboratory to send a copy of each inspection report directly to the State Materials Engineer of the Mississippi Department of Transportation. Frequency of these inspections shall be approximately once each 18 months according to CCRL scheduling.
- (2) Failure to participate in the CCRL inspection program on a regular basis will result in disapproval of the laboratory and removal of the GGBFS mill from the approved list.
- (3) Failure to authorize CCRL to send a copy of the inspection report to the Department will result in disapproval. If a copy of the latest inspection report is not received by the Department within any 24 months period, the laboratory will be disapproved and the GGBFS mill removed from the approved list.
- (4) The laboratory will be expected to correct all deficiencies found during the CCRL inspection. Documentation by the laboratory certifying to the correction of each deficiency on the inspection report must be furnished the State Materials Engineer. Failure to correct deficiencies found by the CCRL inspection will result in disapproval of the laboratory and removal of the GGBFS mill from the approved list.

2.2.2.2.4 Delivery Procedures – Since there are several conditions under which GGBFS is delivered, procedures for each condition are outlined separately as follows:

- (1) **Case 1** – GGBFS delivered directly from a pretested storage silo to a project site, or a maintenance work order.
 - a. Certified mill test reports shall be furnished to the State Materials Engineer, including all tests made on the stored GGBFS. The test reports shall include the following data:

Source Name	Test Results
GGBFS Mill Location	Grade of GGBFS
Silo Number	Quantity Represented
Laboratory Number	Date Sampled
Certification of Compliance	

- b. The certification of compliance shall contain the following or similar wording:

"The undersigned certifies that the sample (or samples) represented by this report was obtained from ground granulated blast furnace slag loaded into the bin (or silo) indicated above, that the tests were made in accordance with the latest AASHTO standard methods (if other methods were used, so designate), and that the ground granulated blast furnace slag complies with the Mississippi Department of Transportation specifications for (grade)."

- c. The format of the test report may be the same as that normally used by the mill; the above certificate may be printed or stamped on the test report.

- d. For each shipment of GGBFS, a certificate shall be furnished with the following data:

Source Name	Date Shipped
GGBFS Mill Location	Project or Work Order Number
Grade of GGBFS	Name of Purchaser
Silo Number	Destination
Quantity Shipped	

- e. The above shipping certification shall contain the following or similar wording:

"The undersigned certifies that the ground granulated blast furnace slag in this shipment was loaded from the pretested bin (or silo) indicated above and that it complies with Mississippi Department of Transportation specifications for (grade). The ground granulated blast furnace slag was tested under laboratory numbers (laboratory no.'s), and no ground granulated blast furnace slag not covered by a certified test report has been added to the silo."

- f. When GGBFS is delivered by truck transport, the shipping certificate shall accompany each transport and shall be delivered to the appropriate Mississippi Department of Transportation representative, except that the copies for the State Materials Engineer and the District Materials Engineer shall be mailed.

This shipping certificate shall hereinafter be called "**Certificate A.**"

(2) Case 2 – GGBFS delivered directly from a pretested storage silo to a recognized commercial ready-mix concrete plant which produces concrete for Mississippi Department of Transportation work.

- a. Certified mill test reports shall be furnished to the ready-mix concrete plant and the State Materials Engineer. The reports are described under **Case 1**.
- b. A Certificate "A" (except the project number or work order number) is to be furnished the ready-mix concrete plant and the State Materials Engineer for each shipment of GGBFS.
- c. A copy of Certificate "A" shall be furnished by the ready-mix concrete plant to the Project Engineer(s), the County Engineer(s) or District personnel supervising projects, or for work orders being furnished concrete.

(3) Case 3 – GGBFS delivered from a pretested silo to an intermediate terminal for transshipments to projects, work orders, or ready-mix concrete plants.

Certified mill test reports shall be furnished to the State Materials Engineer. A Certificate "A", as described in Case 1 above (reworded as necessary) shall be furnished to the State Materials Engineer and the terminal management for each shipment to the terminal.

(4) Case 4 – GGBFS delivered from an intermediate terminal to a project or work order.

- a. A certificate, hereafter called "**Certificate B,**" shall be furnished for each shipment, with the original to a representative of the Project Engineer, County Engineer, or District Engineer, as applicable, and copies or prints mailed to the

District Materials Engineer and to the State Materials Engineer. This certificate shall contain the following data:

Terminal Designation	Grade of GGBFS
Terminal Silo Number	Quantity Shipped
Source Name	Project, or Work Order, Number
Name of Purchaser	Destination
Date Shipped	
GGBFS Mill Location (from which GGBFS was obtained)	

- b. The certificate shall contain the following or similar wording:

“The undersigned certifies that the ground granulated blast furnace slag in this shipment was loaded from the terminal silo indicated above, that it is the same ground granulated blast furnace slag covered by certificate numbers (certificate no.’s), issued by (GGBFS mill), that no ground granulated blast furnace slag not covered by certified test reports has been added to the silo, and that the ground granulated blast furnace slag complies with MDOT specifications for the grade indicated above.”

- (5) **Case 5** – GGBFS delivered from an intermediate terminal to a recognized commercial ready-mix concrete plant which produces concrete for Mississippi Department of Transportation work.

A Certificate “B”, as described in Section Case 4 above, reworded as necessary, shall be furnished with each shipment to the ready-mix plant and to the State Materials Engineer. A copy of Certificate “B” shall be furnished by the ready-mix plant to the Project Engineer(s), the County Engineer(s) or District personnel supervising projects, or for work orders being furnished concrete.

2.2.2.2.5 Certificate “A” Numbering – Each GGBFS mill shall number Certificates “A” consecutively. The certificates shall be signed by an authorized official of the GGBFS mill.

2.2.2.2.6 Certificate “B” Numbering – Each intermediate terminal shall number the Certificates “B” consecutively. The certificates shall be signed by an authorized representative of the GGBFS Company owning or operating the terminal.

2.2.2.3 Responsibilities of Commercial Ready-Mix Concrete Plants – All GGBFS purchased

by a ready-mix concrete plant for use in concrete produced for any Mississippi Department of Transportation work shall be covered by certified mill test reports and Certificates “A,” or Certificates “B,” as applicable, and as described in Sections 2.2.2.2.4 above.

2.2.2.4 Responsibilities of Department Supervisory Personnel – Following are procedures for MDOT personnel.

2.2.2.4.1 Certificates “A” and “B” – GGBFS delivered to the project or work order site may be used provided a Certificate “A” or a Certificate “B”, as applicable, has been received. Concrete produced by an approved commercial ready-mix concrete plant may be accepted, insofar as the GGBFS is concerned, provided the concrete plant has furnished the required data as outlined in Section 2.2.2.2.

2.2.2.4.2 Shipments Received Without Proper Documentation – In case a shipment is received without the proper certificate, the GGBFS shall not be used until the required certificate has been furnished or until tests indicating compliance have been completed on samples submitted from the shipment.

2.2.2.4.3 Reporting -- Project Engineers shall enter all applicable information into a SiteManager Sample Record and complete Template CPE-901—“Project Engineer Certification” for all GGBFS received, prior to close of the project.

2.2.2.4.4 County or LPA Project Engineers shall retain copies of all applicable certificates for project clearance records.

2.2.2.4.4 Sampling – Following are procedures for sampling GGBFS by MDOT personnel.

- (1) GGBFS used in concrete and in soil-cement produced for Mississippi Department of Transportation work will be sampled by a representative of the Department at the approximate frequencies outlined in paragraphs 2.2.2.4.3(4) and (5) below. The frequencies shown apply to each source of GGBFS and are the minimum; additional samples will be obtained if there is a question concerning the quality of the GGBFS.
- (2) Each sample will consist of approximately ten (10) pounds (approximately one gallon) and will be obtained in such a manner, and at such points, that the sample will: (1) be

- representative, (2) not be contaminated and (3) represent only one source of GGBFS.
- (3) The samples will be placed in triple-seal metal cans or other moisture-proof containers that will insure the samples against contamination. The samples will be delivered, or will be mailed or shipped, prepaid. Consideration should be given to multiple sample shipments in order to take advantage of minimum shipping charges, but in no case will a sample be retained for longer than fourteen (14) days before submission to the Central Laboratory, Jackson, Mississippi.
 - (4) GGBFS used by approved commercial ready-mix plants in production of concrete for Mississippi Department of Transportation work will be sampled at the rate of one (1) sample for each one thousand (1000) cubic yards of concrete used, or a fraction thereof. Insofar as possible, at least one sample shall be obtained for each project except that a sample will not be required if the project contains less than approximately 200 cubic yards of concrete. Minor variations from this may be approved in writing by the State Materials Engineer.
 - (5) GGBFS delivered to a project site, or to a central concrete plant set up for a specific project, to be used in concrete paving will be sampled at the rate of one (1) sample for each two thousand (2000) cubic yards of concrete, or fraction thereof, received, except that at least one (1) sample will be obtained each week during which concrete or soil-cement is produced.
 - (6) On a project containing less than approximately 200 cubic yards of concrete, a sample will not be required. Minor variations from this may be approved in writing by the State Materials Engineer.

2.2.2.5 Responsibility of Central Laboratory – Following are procedures to be followed by Central Laboratory Personnel when testing GGBFS.

- (1) The Central Laboratory may composite samples from each project, each source, and each grade, forming test samples to be tested by the Central Laboratory, or at the discretion of the State Materials Engineer, a commercial laboratory. Only individual samples having sampling dates from within thirty (30) days of each other will be utilized in a composite. In no case will samples from more than one project, different sources, or

- different grades be used to compile a composite. Results of these tests will be reported to the parties concerned. The individual samples from which the composite test sample is obtained will be retained until satisfactory test results on the test samples are received.
- (2) The same cement will be used in both the control specimen containing only cement and the test specimen containing the GGBFS sample. This cement may be from the project from which the GGBFS sample was received if the cement meets the requirements of this section. The cement used in the control specimen and test specimen for determining the Strength Activity Index with Portland Cement must comply with AASHTO M 302, Subsection 10.1.2.
 - (3) If a test sample fails to comply with specification requirements, each individual sample represented by the composite test sample shall be tested for the failing requirement(s). Upon receipt of results of these tests, the State Materials Engineer shall evaluate the tests to determine action to be taken under Section 2.2.2.6.
 - (4) A test sample, composed from individual samples, shall represent not more than 8000 cubic yards of concrete, except that the State Materials Engineer may decrease this maximum on any particular project if he deems it necessary or advisable due to lack of uniformity, borderline test results, or for other reasons.

2.2.2.6 Non-Complying GGBFS Samples – Following are the steps to follow when a GGBFS sample fails to comply with MDOT specifications.

- (1) When a sample of GGBFS fails to comply with the specification requirements, the State Materials Engineer will evaluate the failure and the probable effect of the failing requirement on the quality of the product produced with the GGBFS.
- (2) If the State Materials Engineer deems the failure of sufficient seriousness to warrant such action, he may at his discretion order that the GGBFS thus represented not be used in Department work, or he may proceed with the check tests on individual samples as specified in Section 5 for further evaluation.
- (3) In the event the check tests on individual samples confirm the failure, the State Materials Engineer will evaluate the failure and the probable effect on the quality of concrete

produced with the GGBFS. If he deems the confirmed failure of sufficient seriousness to warrant such action, the GGBFS mill which produced the GGBFS shall be required to suspend all shipments of GGBFS for Department work until such time as the cause(s) of the failure have been corrected to the satisfaction of the State Materials Engineer.

2.2.2.7 Storage Capacity – In order to eliminate any possible delay in production because of nonconforming GGBFS, it shall be the Contractor's responsibility to provide ample storage and shipments of GGBFS to permit identification, sampling and testing, and appropriate actions as indicated above for failing samples.

2.2.3 Fly Ash – The following section establishes uniform procedures for the sampling, testing, reporting of tests and evaluation of fly ash for use in work under the supervision of the Mississippi Department of Transportation.

2.2.3.1 General – Acceptance of fly ash for use in work under the supervision of the Mississippi Department of Transportation will be based on source approval, certification by the fly ash supplier that the fly ash complies in all respects with the applicable specifications, and check samples obtained after delivery by Department representatives and tested by the Central Laboratory.

It shall be the Contractor's responsibility to ascertain that the fly ash supplier from whom he purchases fly ash complies with the provisions of this section.

2.2.3.2 Responsibility of Fly Ash Suppliers

2.2.3.2.1 Source Approval – Source approval is based upon fly ash produced by a specific plant utilizing specific equipment, materials, and processes. Any change in equipment, materials and processes, shipment of non-specification fly ash; or violation of any provision of the section will void any source approval and require that a new approval be obtained prior to further shipment(s). Each fly ash supplier proposing to furnish fly ash for Department work shall provide the following:

- (1) A formal request for source approval shall be submitted in writing to the State Materials Engineer containing the following information:
 - a. Name and address of Fly Ash Supplier
 - b. Class of Fly Ash: ***Class F fly ash is designated as material with a calcium oxide (CaO) content of less than 6.0%. Class C fly ash is materials with a CaO content of greater than or equal to 6.0%.***
 - c. Name and location of ash source
 - d. Name and location of coal source
 - e. Number of boilers at plant and tons of fly ash produced per hour by each boiler
 - f. Detailed quality control program. The quality control program must meet the minimum requirements of Section 2.2.3.3.
 - g. **Proof of a Beneficial Use Determination for the ash source as determined by**

the Mississippi Department of Environmental Quality

- h. A statement certifying agreement with, and acceptance of, all provisions of Section 2.2.3 on the Materials Manual; certifying that all information and data furnished with this request for source approval is accurate and any change in the information will be reported immediately; and further certifying that upon any change in equipment, materials, and/or processes used in the production of fly ash, shipments of fly ash to Department work will cease until re-approval of the source is obtained.
- (2) Submit test data verifying compliance to the specifications and compliance to the minimum quality control sampling and testing. This test data shall represent the material produced in the last one (1) year period.
- (3) Submit a sample of fly ash along with the complete analysis of the tests required by the specifications to the State Materials Engineer for verification testing. The sample must have been split and analyzed by the laboratory that is performing the quality control testing.
- (4) The fly ash source will be placed on the Department's "Approved Sources of Materials" list of fly ash suppliers, provided that the data submitted with the request and test results verifies that a uniform quality product conforming to the specifications is being produced, and that the fly ash supplier's quality control program provides reasonable assurance that only fly ash meeting the requirements of the specifications will be shipped.

2.2.3.3 Minimum Quality Control Program

2.2.3.3.1 The fly ash supplier shall provide a quality control program meeting at least the minimum sampling and testing frequencies established in ASTM Designation: C 311. The tonnage units expressed in this standard are interpreted to refer to as-marketed material.

2.2.3.3.2 Each sample representing 400 tons, or the sample representing the quantity sampled when this is less than 400 tons, shall be tested for the following:

- (1) Fineness (No. 325 sieve analysis)
- (2) Moisture Content
- (3) Loss on Ignition

All other physical and chemical tests required by the specifications shall be made on composite samples representing each 3200 tons. The composite sample for this purpose shall be prepared by combining equal parts of eight (8) consecutive samples, each representing 400 tons.

2.2.3.3.3 Quality Control Program Approval – The sampling, tests, and testing frequencies required may increase from the minimum depending on the particular production problems of the plant. In all cases the quality control program shall be submitted to the State Materials Engineer for approval.

The quality control program submitted for approval must be detailed and include at least the following:

- (1) Name and location of company or firm performing the quality control sampling.
- (2) Name and location of company or firm performing the quality control testing.
- (3) Name and title of the individual directly responsible for the quality control program at the source.
- (4) Sampling points, sampling frequency, and tests to be performed.
- (5) Procedures and equipment for handling, storage and shipment of fly ash.
- (6) Number of storage silos and capacity of each.
- (7) Action to be taken when quality control testing indicates borderline and non-specification fly ash has been produced.

2.2.3.3.4 Testing Laboratories – Each testing laboratory performing any portion or all of the required tests under this procedure must be approved before a fly ash source can be placed on the Department's "Approved Sources of Materials" list. Such approval will be contingent upon the following:

- (1) Each testing laboratory must be regularly inspected by the Cement Concrete Reference Laboratory (CCRL). The testing laboratory shall authorize the Cement Concrete

Reference Laboratory to send a copy of each inspection report directly to the State Materials Engineer of the Mississippi Department of Transportation. Frequency of these inspections shall be approximately once each 18 months according to CCRL scheduling.

- (2)** Failure to participate in the CCRL inspection program on a regular basis will result in disapproval of the laboratory and removal of the fly ash source from the approved list.
- (3)** Failure to authorize CCRL to send a copy of the inspection report to the Department will result in disapproval. If a copy of the latest inspection report is not received by the Department within any 24-month period, the laboratory will be disapproved and the fly ash source removed from the approved list.
- (4)** The laboratory will be expected to correct all deficiencies found during the CCRL inspection. Documentation by the laboratory certifying to the correction of each deficiency on the inspection report must be furnished the State Materials Engineer. Failure to correct deficiencies found by the CCRL inspection will result in disapproval of the laboratory and removal of the fly ash source from the approved list.
- (5)** Comparison tests will be performed at least once a year and more frequently if deemed necessary by the State Materials Engineer. Continued approval of the laboratory will depend on the comparison of its test results with the Central Laboratory. If major differences are found, an attempt to resolve them will be made as quickly as possible. Continued unresolved differences in test results will result in disapproval of the laboratory and removal of the fly ash source from the approved list.
- (6)** The fly ash supplier is totally responsible and will be accountable for the utilization of a qualified laboratory in the performance of the quality control program.
- (7)** All test reports shall be on letterhead paper identifying the laboratory performing the tests and shall contain the following information:
 - a. Date of Report
 - b. Fly Ash Source
 - c. Class of Fly Ash
 - d. Silo Number

- e. Boiler Unit Number(if plant is equipped with more than one boiler)
 - f. Sample Control Number
 - g. Test Report Number
 - h. Date Sampled
 - i. Test Results
 - j. A Statement certifying that the fly ash represented by the test results meets the requirements of the Mississippi Department of Transportation specifications. **NOTE:** If the test results do not meet specifications, in lieu of the certified statement, documentation of the disposition of the fly ash represented by the test report shall be submitted with the test report;
 - k. Signature and title of responsible official.
- (8) Sample test records shall be available for inspection by Department personnel for at least three (3) years after the fly ash has been tested.

2.2.3.4 Certification and Reporting by the Fly Ash Supplier

2.2.3.4.1 Distribution of Test Reports

- (1) After source approval, a copy of all test reports shall be submitted to the Central Laboratory.
- (2) When fly ash is delivered directly to a commercial ready mix concrete plant which produces concrete for Mississippi Department of Transportation work, a copy of the test report(s) covering the material shipped shall be furnished to the ready mix plant.

2.2.3.4.2 Certification of Shipments

- (1) For each shipment of fly ash, a certificate shall be furnished with the following data:

Fly Ash Source	Date Shipped
Class of Fly Ash	Project, or Work Order, Number
Silo Number	Name of Purchaser
Number of Tons Shipped	Destination

- (2) The certificate shall also contain the following or similar wording:

"The undersigned certifies that the fly ash in this shipment was loaded from the pretested

silos indicated above and that it complies with MDOT specifications for (Class Designation). The fly ash was tested under Lab No.'s.: (Laboratory ID Number), and no fly ash not covered by a certified test report has been added to the silos."

(3) Distribution of the certificate shall be made as follows:

- a. When fly ash is delivered directly to a project site, or a maintenance work order, the certificate shall accompany each transport and shall be delivered to the appropriate MDOT representative, except that the copies for the Materials Division and the District Materials Engineer shall be mailed.
- b. When fly ash is delivered directly to a commercial ready mix concrete plant which produces concrete for Mississippi Department of Transportation work, the certificate (except the project number or work order number) is to be furnished the ready mix plant with each transport and copy sent to the State Materials Engineer.
- c. A copy of the certificate shall be furnished by the ready mix concrete plant to the Project Engineer(s), County Engineer(s) or District personnel supervising projects or work orders being furnished concrete.

2.2.3.5 Responsibilities of MDOT Project Supervisor, Personnel

2.2.3.5.1 Certification of Shipment to Project Site – Fly ash delivered to the project or work order site may be used provided a certification has been received with each shipment. Concrete produced by an approved commercial ready mix concrete plant may be accepted, insofar as the fly ash is concerned, provided the concrete plant has furnished the required data as outlined in Section 2.2.3.4

In case a shipment is received without the proper certificate, the fly ash shall not be used until the required certificate has been furnished or until tests indicating compliance have been completed on samples submitted from the shipment.

2.2.3.5.2 Reporting:

Project Engineers shall enter all applicable information into a SiteManager Sample Record and complete Template CPE-901—"Project Engineer Certification" for all Fly Ash received, prior to close of the project.

County or LPA Project Engineers shall retain copies of all applicable certificates for project clearance records.

2.2.3.5.3 Sampling – Fly ash delivered for use in Department work will be sampled by a representative of the Department at the approximate frequencies outlined below. The frequencies shown apply to each source of fly ash and are the minimum requirements; additional samples will be obtained if there is a question concerning the quality of the fly ash.

- (1)** Each sample will consist of approximately eight (8) pounds (approximately one gallon) and will be obtained in such a manner, and at such points, that the sample will: (1) be representative, (2) not be contaminated, and (3) represent only one source and class of fly ash.

- (2) The samples will be placed in triple-seal metal cans or other moisture-proof containers that will insure the samples against contamination. The samples will be delivered, or will be mailed or shipped, prepaid to the Central Laboratory as soon as possible.
- (3) Fly ash used by approved commercial ready mix plants in production of concrete for Department work will be sampled at the rate of one (1) sample for each 2000 cubic yards of concrete production, or a fraction thereof. Insofar as possible, at least one (1) sample shall be obtained for each project except that a sample will not be required if the project contains less than 200 cubic yards of concrete. Minor variations from this frequency may be approved in writing by the State Materials Engineer.
- (4) When fly ash is delivered to a project site for soil stabilization, or to a central concrete plant set up for a specific project to be used in concrete paving, sampling shall be at the rate of one (1) sample for each 4000 cubic yards of concrete production for concrete paving and structural concrete and 4000 tons for soil stabilization, or fraction thereof, received. On concrete paving and structural concrete projects containing less than 2000 cubic yards or soil stabilization projects containing less than 2000 tons of fly ash, a sample will not be required. Minor variations from this may be approved in writing by the State Materials Engineer.

2.2.3.4 Responsibility of Central Laboratory – The Central Laboratory shall follow the procedures outlined below when processing and testing fly ash samples submitted for testing.

- (1) Except for the initial sample required under Section 2.2.3.2.1(4), the Central Laboratory may composite as many as four (4) consecutive samples from each project, forming test samples to be tested by the Central Laboratory. In no case will samples from more than one project, different sources, or different class fly ash be used to compile a composite. Only individual samples having sampling dates from within thirty (30) days of each other will be utilized in a composite. The individual samples from which the composite test sample is obtained will be retained until satisfactory test results on the test samples are obtained.
- (2) The same cement shall be used in both the control specimen containing only cement and the test specimen containing the fly ash sample. This cement may be from the project from which the fly ash sample was received if the cement meets the requirements of this section. The cement used in the control specimen and test specimen for determining the Strength Activity Index with Portland Cement must comply with ASTM C 311, Section 5.3.

- (3) If a composite test sample fails to comply with specification requirements, each individual sample represented by the composite test sample will be tested for the failing requirement(s). Upon receipt of test results on individual samples, the State Materials Engineer will evaluate the tests to determine action to be taken under Section 2.2.3.5.
- (4) Central Laboratory test results will be distributed to all concerned parties.
- (5) The Central Laboratory will maintain the Department's "Approved Sources of Materials" list of fly ash suppliers, and monitor the suppliers' quality control program.

2.2.3.5 Noncomplying Fly Ash Samples – When a sample of fly ash fails to comply with the specification requirements, the State Materials Engineer will evaluate the failure and the probable effect of the failing requirement on the quality of the product produced with the fly ash. If the State Materials Engineer deems the failure of sufficient seriousness to warrant such action, he may at his discretion order that the fly ash thus represented not be used in Department work and require the fly ash supplier to suspend all shipments for Department work until such time as the cause(s) of the failure has been corrected to his satisfaction. The shipment of non-specification fly ash will be cause for removal of the source from the Department's "Approved Sources of Materials". In order to eliminate any possible delay in production because of nonconforming fly ash, it shall be the Contractor's responsibility to provide ample moisture-proof storage and shipments of fly ash to permit identification, sampling and testing, and appropriate actions as indicated above for failing samples.

2.3 Steel Products: Reinforcing Steel and Steel Wire Fabric

2.3.1 Reinforcing Steel – The following section establishes uniform procedures for the sampling, testing, acceptance and reporting of reinforcing steel for use in Department work.

2.3.1.1 General – Reinforcing steel may be shipped to Department projects as pretested or untested materials. It shall be the responsibility of the Project Engineer to ascertain the tested status of each shipment of reinforcing steel.

Hereinafter, when company (or companies) is referred to, it shall be understood to mean the fabricator (or fabricator(s)) who supplies the reinforcing steel to the project. The fabricator may be categorized in one of the following:

- (1) Purchases all steel from various manufacturers of reinforcing steel.
- (2) Purchases part of the steel from other manufacturers and manufactures part of it himself.
- (3) Uses only the steel that he manufactures.

A company is further defined as the one who bends the steel to the shapes as shown on the plans and/or cuts straight steel to the exact length specified on the plans.

2.3.1.2 Pretested Reinforcing Steel – Reinforcing Steel shipped as pretested material shall meet all requirements as set forth herein.

2.3.1.2.1 List of Approved Sources – A company proposing to furnish pretested reinforcing steel for use in Department work shall have been approved and their name placed on the Department's "Approved Sources of Materials" list by the Central Laboratory.

In order for a company to have its name placed on the approved sources list, the company must state agreement with and acceptance of the provisions of this Section (Section 2.3) by letter addressed to the State Materials Engineer. The company must also certify in this letter that the steel furnished will meet all applicable requirements of the Mississippi Department of Transportation specifications and that only domestic steel will be used. This letter will remain in effect until rescinded in writing.

2.3.1.2.2 Certification of Domestic Origin - The Company shall provide a certification of domestic origin annually to the Central Laboratory. Such certification shall contain the following or similar wording:

(1) Certification from Manufacturers

"We hereby certify that any and all reinforcing steel supplied by (Name of Steel Mill) for use on Mississippi Department of Transportation projects will be manufactured in our plant located at (City & State) and will be made with domestic steel only."

(2) Certification from Companies Other Than Manufacturers

"We hereby certify that any and all reinforcing steel processed and supplied by (Name of Company) located at (City & State) for use on Mississippi Department of Transportation projects will be obtained from (Name & Location of Steel Mill) which is a MDOT approved manufacturer, and we further certify that only reinforcing steel made from domestic steel will be supplied."

2.3.1.2.3 Quality Control Program – The Company shall maintain a quality control program to detect and prevent the shipment of reinforcing steel having borderline or nonconforming characteristics.

It shall be understood that representatives of the Mississippi Department of Transportation shall have free entry on the premises to inspect the fabrication of reinforcing steel, to take samples of reinforcing bars in stock and to review records of quality control programs and tests.

The company shall take immediate action to correct irregularities reported by the Department.

2.3.1.2.4 Sampling of Pretested Reinforcing Steel – Following are guidelines for sampling of pretested reinforcing steel.

- (1)** Each bar size and grade of each manufacturer of reinforcing steel will be randomly sampled by representatives of the Mississippi Department of Transportation. The frequency of random samples will be at a predetermined rate as established by the State Materials Engineer, based on the quantity produced, quality of the steel, and the

frequency of shipments.

- (2) Representatives of the Central Laboratory will normally perform all sampling, but on occasion, due to the location of the fabrication plant, amount and frequency of shipments, the Districts may be requested to perform this task.
- (3) For manufactured reinforcing steel bars containing a registered mill marking, the sample will be saw cut or sheared to a length of approximately thirty (30) inches from material proposed to be used in Department work. The Mississippi Department of Transportation representative will observe the sample being cut, properly identify the sample, and prepare information card (TMD-320) or SiteManager sample record (as applicable) with all pertinent information. If it is necessary to cut the sample with a torch, the length shall be approximately forty-two (42) inches.
- (4) For manufactured welded fabric (deformed or plain) units the sample shall be one (1) square yard; or in the case of prefabricated bridge rail units, the sample shall be one (1) yard in length.

2.3.1.2.5 Testing – All acceptance testing of reinforcing steel will be performed by the Central Laboratory in accordance with established procedures of the specified test methods.

2.3.1.2.6 Shipping – It shall be the responsibility of the company to ascertain that the following provisions are complied with:

- (1) With each shipment, the company will furnish a copy of the shipping ticket designated for the Project Engineer. The shipping ticket shall include all pertinent information, such as project number, county, purchaser, number of pounds of each bar size or prefabricated unit, grade and manufacturer (if fabricator is different from manufacturer).
- (2) The shipping ticket shall also include the following statements or similar: "This material was shipped from Mississippi Department of Transportation pretested stock. The steel included on this ticket is of Domestic Origin and compliant with the Buy America Act." In addition, the ticket must be signed by an authorized representative of the company.
- (3) Mill Test Reports representative of the steel being shipped shall be attached to the

- shipping ticket when shipped to an MDOT job site. This includes steel shipped by the manufacturer to vendors, fabricators, and other applicable suppliers. Vendors, fabricators, and suppliers are also required to send copies of the manufacturer's mill test reports along with shipments to an MDOT job site. In any event, the mill test reports should be attached to the shipping ticket and should represent the steel that is being shipped.
- (4) Upon receipt of the company's completed shipping ticket and mill test reports, the Engineer will allow the steel to be used in construction unless visual inspection reveals questionable or inferior steel. If questionable or inferior steel is delivered to the project site, the Engineer shall immediately notify the Central Laboratory in order that corrective action can be taken. Questionable steel must be sampled, tested, and accepted prior to use. Inferior steel will be rejected without further testing.
 - (5) All aforementioned requirements must be fulfilled; otherwise, the steel will be considered untested and will be sampled and tested accordingly (See Section 2.3.1.3).

2.3.1.2.7 Reporting

- (1) The company shall mail to the Central Laboratory a copy of each shipping ticket and mill test reports at least once each calendar week. The mailing address is:

State Materials Engineer (72-01)
Mississippi Department of Transportation
P. O. Box 1850
Jackson, MS 39215-1850
- (2) MDOT Project Engineers shall enter the applicable information into a SiteManager Sample Record and complete the appropriate template (FFO-622--"Shipment of Pretested Reinforcing Steel"), upon receipt of a shipment of steel.
- (3) County or LPA Project Engineers shall submit a "Pretested Materials Shipment Report Request Form" for each project. The form may be forwarded as the project progresses, or at the end of construction. A copy of the form may be obtained from the www.goMDOT.com website or by request to the Materials Division. Upon receipt of the form, the Materials Division will issue a SiteManager Report of the applicable material.

2.3.1.3 Untested Reinforcing Steel – All untested steel shall be tested and accepted by the

Central Laboratory prior to use. If the requirements of Section 2 are not met, the steel will be considered untested. Upon determination that a shipment of steel is untested, the following conditions shall be met:

- (1) The Engineer, or his representative, will obtain one (1) sample in accordance with Section 2.3.1.2.4 for each 10 tons, or fraction thereof, of each size of mill-marked steel. Care must be exercised to insure that the manufacturer's identification markings are contained within the sample length. The steel should be sampled immediately after delivery to the project and submitted to the Central Laboratory without delay.
- (2) Unmarked deformed steel bar units shall be sampled at the rate of one (1) sample for each 10 tons, or fraction thereof, of each size. The grade, size and fabrication dimensions shall be as specified by the project's documents. The grade and size shall be shown on the invoice. Information listed on the identification tags tied on the units shall match the items listed on the shipping invoice.
- (3) Each sample must be accompanied by Form TMD-320 or the SiteManager Sample Identification (as applicable) properly completed.
- (4) As soon as possible after receipt of the samples, the Central Laboratory will test the bars and report the results.

2.3.1.4 Responsibilities of Project Engineer

2.3.1.4.1 Pretested Reinforcing Steel – The Project Engineer shall follow these guidelines when pretested reinforcing steel is shipped to a MDOT project.

- (1) Prior to allowing the use of a shipment of pretested reinforcing steel, obtain a copy of the shipping ticket and mill test reports to make sure the ticket meets all requirements set out in this Section (Section 2.3.1). Any irregularities must be corrected prior to allowing the use of the shipment; otherwise, the shipment will be considered as untested steel and its acceptance will be determined in accordance with Section 2.3.1.3 of this section.
- (2) Prior to allowing the use of a shipment of mill-marked pretested reinforcing steel, inspect the shipment, paying particular attention to the mill markings for proper grade, size and

MDOT's approved fabricator and/or manufacturer of the steel. Make sure the shipment is accurately identified on the shipping ticket by grade, size and manufacturer. The shipment will be rejected if it contains the wrong size, grade, or contains foreign steel. Other irregularities found during the inspection must be corrected prior to allowing the use of the shipment; otherwise, the shipment will be considered as untested steel, and its acceptance will be determined in accordance with Section 2.3.1.3 of this section.

Note: Most reinforcing steel manufacturers register their identification markings (mill markings) with the Concrete Reinforcing Steel Institute (CRSI) and are displayed in CRSI Manual of Standard Practice. Excerpts from the manual have been provided to each Project Office for use in making proper identification of steel in shipments with respect to manufacturer, grade, and size. Do not rely completely on tags attached to bundles of steel. Additional excerpts from the CRSI Manual are available from the Central Laboratory as needed.

- (3) Prior to allowing the use of a shipment of pretested welded fabric reinforcing steel, inspect the shipping invoice for a statement that the material was shipped from pretested stock. Each prefabricated unit will have a MDOT seal attached to it; otherwise, the shipment will be considered as untested steel and its acceptance will be determined in accordance with Section 2.3.1.3 of this section.
- (4) The Project Engineer shall notify the MDOT Independent Assurance Sampler as soon as possible of the arrival of steel shipments so that Independent Assurance Verification sampling and testing can be initiated at the earliest possible time.
- (5) The Central Laboratory will notify the Project Office immediately by telephone followed by a test report of all failing steel samples.
- (6) Upon receipt of notice of an Independent Assurance Sample failure, the Project Engineer will suspend operations and determine the acceptability of the steel as required in Section 2.3.1.3. The steel is rejected subject to retests in accordance with Section 2.3.1.5.
- (7) The Project Engineer will make a determination of the amount of steel, if any, represented by a failing test report(s) that has been incorporated into the work. The

acceptability of such steel to remain in-place will be determined in accordance with Section 105.03 of the Standard Specifications.

2.3.1.5 Retests –Retests for determining the acceptability of reinforcing steel represented by a failing test report will be permitted under the conditions set out in AASHTO M 31.

2.3.2 Steel Wire Fabric (Wire Mesh) – The following section establishes uniform procedures for the sampling, testing, acceptance, and reporting of steel wire fabric for use in Department work.

2.3.2.1 General – Steel wire fabric may be shipped to Department projects as a pretested or untested material. It shall be the responsibility of the Project Engineer to ascertain the tested status of each shipment of steel wire fabric. Steel wire fabric may be furnished by any supplier (Manufacturer, Wholesale Supplier or Broker) provided the material meets all applicable requirements of the specifications.

2.3.2.2 Pretested Wire Fabric – Wire Fabric shipped as pretested material shall meet all requirements as set forth herein.

2.3.2.2.1 Approved Sources – A company proposing to furnish pretested steel wire fabric for use in Department work shall have been approved and placed on approved suppliers list by the Central Laboratory. In order for a supplier to have his name placed on this approved list, the supplier must state agreement with and acceptance of the provisions of this Section (Section 2.3.2) by letter addressed to the State Materials Engineer. Also, in this letter, the supplier must certify that the steel wire fabric will meet all applicable requirements of the Mississippi Department of Transportation specifications, and that only domestic steel will be supplied. This letter will remain in effect until rescinded in writing.

2.3.2.2.2 Certification of Domestic Origin – The supplier of the wire fabric shall provide a certification of domestic origin at least annually to the Central Laboratory. Such certification shall contain the following or similar wording:

(1) Certification from Manufacturers

"We hereby certify that any and all steel wire fabric supplied by (Name of Steel Mill) for use on Mississippi Department of Transportation projects will be manufactured in our plant located at (City & State) and will be made with domestic steel only."

(2) Certification from Companies Other Than Manufacturers

"We hereby certify that any and all steel wire fabric supplied by (Name of Company) located at (City & State) for use on Mississippi Department of Transportation

projects will be obtained from (Name & Location of Steel Mill) which is a MDOT-approved manufacturer, and we further certify that only reinforcing steel made from domestic steel will be supplied."

2.3.2.2.3 Quality Control Program – The Company shall maintain a quality control program to detect and prevent the shipment of steel wire fabric having borderline or nonconforming characteristics.

It shall be understood that Department representatives shall have free entry on the supplier's premises for the purpose of inspection, sampling and tagging the steel wire fabric. It shall be further understood that the supplier will maintain a separate stock of accepted materials for each gauge and spacing, and that stock shall be physically separated from all unapproved stock.

2.3.2.2.4 Sampling of Pretested Wire Fabric – Following are guidelines for sampling of pretested wire fabric.

- (1) Prior to sampling, the steel wire fabric in each Lot shall be checked to determine if each roll or sheet has been tagged in accordance with AASHTO M 55.

NOTE: It is suggested that Wholesale Suppliers and Brokers specify that the steel wire fabric meet AASHTO M 55 or ASTM A 185 when ordering from the Manufacturer and be tagged accordingly. No lot will be inspected unless properly tagged.

- (2) A Lot shall consist of 40,000 pounds or fraction thereof, of each size and spacing. One sample (approximately 3' x 3'), shall be selected at random from each Lot. The Department Inspector will observe the sample being cut, properly identify the sample, and prepare an Information Card (Form TMD-320) or the SiteManager Identification with all pertinent information included thereon.
- (3) If the initial sample fails to meet the specifications, two (2) check samples will be taken at random from this Lot. The average of the three test results will be used to determine the acceptance of the Lot.

2.3.2.2.5 Testing and Tagging – All acceptance testing of steel wire fabric will be performed by the Central Laboratory in accordance with the specified test methods. Each roll or sheet of steel

wire fabric in each approved Lot will be tagged with a MDOT seal.

2.3.2.2.6 Shipping – It shall be the responsibility of the supplier to ascertain that the following provisions are complied with:

- (1) With each shipment, the supplier will furnish a copy of the shipping ticket designated for the Project Engineer. The shipping ticket shall include all pertinent information such as project number, county, purchaser, size and spacing, quantity (in pounds), and the MDOT seal number(s).
- (2) The shipping ticket shall include the following statements or similar: "This material was shipped from MDOT Pretested Stock. The steel included on this ticket is of Domestic Origin and compliant with the Buy America Act." In addition, the ticket must be signed by an authorized representative of the supplier.
- (3) Mill Test Reports representative of the steel being shipped shall be attached to the shipping ticket when shipped to an MDOT job site. The mill test reports should represent the steel being shipped.
- (4) All aforementioned requirements must be fulfilled; otherwise, the steel wire fabric will be considered untested and will be sampled and tested according to Section 2.3.2.3.
- (5) Upon receipt of the supplier's completed shipping ticket, mill test reports, and a favorable comparison of the MDOT seal numbers on the shipping ticket with the seals on the rolls, the Engineer will allow the steel wire fabric to be used in construction unless a visual inspection reveals questionable or inferior material. If questionable or inferior material is delivered to the project site, the Engineer shall immediately notify the Central Laboratory in order that corrective action can be taken. Questionable steel wire fabric must be sampled, tested, and accepted prior to use. Obviously inferior fabric will be rejected without further testing.
- (6) The company shall mail to the Central Laboratory a copy of each shipping ticket and mill test reports at least once each calendar week. The mailing address is:

State Materials Engineer (72-01)
Mississippi Department of Transportation
P. O. Box 1850

Jackson, MS 39215-1850

2.3.2.2.7 Reporting

- (1) The MDOT Project Engineer shall verify that the wire contains a MDOT metal seal denoting a seal number. The Project Engineer shall also enter the applicable information into a SiteManager Sample Record and complete the appropriate template (FFO623 – “Shipment of Pre-Tested Wire Mesh”), upon receipt of a shipment of steel wire mesh.

- (2) County or LPA Project Engineers shall submit a “Pretested Materials Shipment Report Request Form” for each project. The request form shall include a listing of each MDOT Seal Number attached to each roll or sheet. A copy of the form may be obtained from the www.goMDOT.com website or by request to the Materials Division. Upon receipt of the form, the Materials Division will issue a SiteManager Report of the applicable material.

2.3.2.3 Untested Steel Wire Fabric – All untested steel wire fabric shall be tested and accepted by the Central Laboratory prior to use. Failure to meet any of the requirements of Section 2.3.2.2 will require that the wire fabric be considered untested. Upon determination that the shipment of wire fabric is untested, the following conditions shall be met:

2.3.2.3.1 Identification of Rolls or Sheets– Each unit of wire fabric shall have attached thereto a suitable tag bearing the name of the manufacturer and description of the material.

2.3.2.3.2 Sampling of Untested Wire Fabric – A Lot shall consist of 40,000 pounds of material or fraction thereof of each size and spacing. The Engineer or his representative will obtain one sample (approximately 3' x 3') from a roll or sheet selected at random in each Lot. Samples submitted for State, Federal, or Maintenance projects must have the SiteManager Identification Number affixed to the sample. Samples submitted for State Aid or Urban Projects must be accompanied by Form TMD-320 properly completed.

2.4 Aggregates and Stone Rip Rap

2.4.1 Aggregates – The following section establishes uniform procedures for the sampling, testing, inspection, and reporting results of tests of all aggregates.

2.4.1.1 General – The sources of certain aggregates are required to be approved prior to shipping of the aggregates to a project. Upon source approval, these aggregates, as well as others not requiring source approval, are accepted, or rejected, on the basis of sampling, testing, and inspection procedures described in this section (Section 2.4.1) for the particular type of aggregate.

For Project Engineers, reporting of aggregate samples for Department projects shall be in accordance with this section and the policies and procedures established for entering a SiteManager Sample Record. Samples submitted for State, Federal, or Maintenance projects must have the SiteManager Identification Number and/or a copy of the sample record affixed to the sample. Samples submitted for State Aid or Urban Projects must be accompanied by Form TMD-320 properly completed.

2.4.1.1.1 Approval of Source – Following is the general procedure to be followed when an aggregate to be supplied for a MDOT project must be supplied from an approved source.

- (1) A proposed source of an aggregate is inspected by a representative of the Central Laboratory or appropriate District, when required by the specifications, MDOT QC/QA provisions, or as detailed in this section,
- (2) Source Deposits are analyzed for determination of the following:
 - a. the geological formation;
 - b. the extent of the deposit (the extent of the deposit shall be described in the inspection report);
 - c. whether or not the material to be obtained there from will be borderline uniformity of material;
 - d. the presence of strata of undesirable material, if any;
 - e. if considered necessary, a petrographic analysis is made of the deposit.
- (3) Samples of the material are obtained by either the Central Laboratory or District

- personnel. These samples are tested by the Central Laboratory for all quality requirements before approval of the source. In addition, the plant facilities are inspected by either the Central Laboratory or the District Laboratory for adequacy and ability to produce quality materials.
- (4) For Contractor furnished materials involving local material sources, it shall be the responsibility of the Contractor to arrange for sampling and testing necessary for source approval.
 - (5) Upon approval of a source by the State Materials Engineer, materials may be produced for Department projects subject to job control sampling, testing and inspection.
 - (6) Before any aggregates are produced from any source for Department work, it is the responsibility of the Materials Engineer of the District in which the work is located to ascertain that the source has been approved in accordance with all applicable specifications and Section 2.4.1 of this manual.
 - (7) If dredging or mining operations of an approved source are moved to a new location (beyond the limits of the deposit as described in the initial inspection report for source approval), the Central Laboratory shall be notified. A final determination as to whether the new location shall be treated as a new source will be made by the State Materials Engineer.

2.4.1.1.2 Quality Check Tests – Samples will be obtained by the District, on either a semiannual, annual, or biannual basis, as determined by the State Materials Engineer and the District Materials Engineer, from each active aggregate source in a District. An active source is defined as one which has produced materials for Department work within the preceding twelve (12) months or which has impending orders for aggregates to be furnished for Department work.

The frequency of quality check tests from any source shall be determined based on the history of the source, including past test results.

The Central Laboratory will advise the District when samples from any source should be obtained, so that samples will be tested within a reasonable period of time. The Central Laboratory and a representative of the District will take the samples for quality tests. The Central Laboratory and each District shall maintain records to insure that each source is sampled for quality check tests at the established frequency.

The Central or District Laboratory will perform required tests on each sample. Results of these tests will be shown on job control and independent assurance sample test reports distributed by the Central Laboratory.

2.4.1.1.3 Inspection of Aggregates –Materials are generally sampled and inspected at the job-site, or as directed by the District Materials Engineer. Please note that Rip Rap is inspected in accordance with the provisions of Section 2.4.2. It is the ultimate responsibility of the Project Engineer and the District Materials Engineer to ensure that only aggregates complying with the specifications be incorporated in work, in accordance with the provisions of this manual.

2.4.1.1.4 Independent Assurance Samples – Independent assurance samples will be obtained by representatives of the Central Laboratory and tested by the Central Laboratory. The frequencies for sampling are listed Section 5.2 of this manual.

2.4.1.1.5 Testing Procedures – Testing of aggregates for approval of a source will be conducted in accordance with the latest version of the applicable AASHTO test method for the specific material sampled, or as outlined individually in this manual. Aggregate Sampling shall be in accordance with AASHTO T2.

Provided the inspector is ACI Level II Certified in sampling and testing procedures, he is to take certain discretionary measures; i.e., if tests indicate a material to be well and uniformly within the specifications on certain sieves or for certain qualities, he may omit testing on such sieves or for such qualities to the extent indicated below.

EXAMPLE 1: If several initial tests indicate that a concrete gravel is uniformly well within the specifications for the 1-inch, 3/4-inch, and 1/2-inch sieves but borderline on other required sieves, the routine tests could be made on only the borderline sieve sizes.

EXAMPLE 2: If several initial tests and visual inspections indicate that a granular material (Group C) is friable, then Atterberg Limits tests may be waived in routine tests.

The above permissible "shortcuts" must be used with judgment and discretion. Approximately every tenth (10th) sample should be tested on all required sieves and for all required field tests.

2.4.1.2 Concrete Aggregates

2.4.1.2.1 Source Approval – Following are procedures to be followed to approve a concrete

aggregate source.

- (1) Each source must be approved by the State Materials Engineer prior to delivery of aggregate for use in Department work.
- (2) Each Approved Source will be assigned a plant number, upon approval, and a base Fineness Modulus will be established. The base F.M. may be subsequently changed by the State or District Materials Engineer if it is determined that an adjustment is required.
- (3) The Central Laboratory will maintain a current list of approved sources. Each District should maintain a current list of approved sources within the District and of out-of-state sources adjacent to the District.

2.4.1.2.2 Inspection of Aggregates for Structural Concrete and Paving Concrete

- (1) Aggregates from a specific source, or for a specific project, should be tested after delivery. The minimum frequency for testing after delivery shall be in accordance with the Department's QC/QA Provisions as referenced in S.O.P. No. TMD-20-04-00-000 and S.O.P. No. TMD 20-05-00-000. In these cases, the production of concrete should be delayed pending satisfactory test results.
- (2) An initial sample of each type of aggregate shall be submitted to the Central Laboratory for complete tests when shipment is begun to a project. The District representative will obtain the sample. The sample may be taken from the stockpile proposed for use on the project, the conveyer belt used in forming the stockpile. Regardless of the point sampled, it is essential that the sample be representative of the aggregate being shipped since the mix design for the concrete to be produced is usually based on test results of this sample.
- (3) It shall be the responsibility of the District Materials Engineer to have an inspection made of the aggregate stockpiles at least once per week. This inspection shall be made by a certified ACI Level II employee assigned by the District; he may be from either the District Laboratory or selected from project personnel.

- (4) The inspector should observe handling of the aggregates, the condition as to cleanliness, segregation, etc. The inspector should visually check the gradation and if there is a question concerning cleanliness or gradation, he shall obtain a sample(s) for submission to either the District Laboratory or the Central Laboratory. Each inspection should be made a matter of record.
- (5) Samples at concrete plants should be obtained from the conveyer belts feeding the hopper bins or from the bins, as practicable, in order that the samples will represent as nearly as possible the aggregate actually being used in the concrete. If the samples are obtained from stockpiles, particular care shall be exercised to obtain representative samples. Portions should be obtained from various locations in the perimeter of the stockpile and at various elevations. The portions should then be combined and quartered.
- (6) The testing of samples may be performed at the plant or at the District Laboratory as determined by the District Materials Engineer.
- (7) One sample of each kind of aggregate shall be taken at the point of use in accordance with PRECAST/PRESTRESSED CONCRETE INSTITUTE (PCI) Quality Control Manual, 4th Edition and at least one (1) per project. If the quantity of concrete required on a project is less than thirty (30) cubic yards a sample will not be required for testing unless deemed to be appropriate by the Engineer or Inspector.
- (8) Should a sample fail to meet the specifications, check tests shall be performed in sufficient number to verify or to disprove the failure. The number of check tests required would be dependent on the size of the stockpile, history of previous tests at the plant, and the reliability of the sampling procedure. If the average of the original failing test and all check tests is within the specification range, the aggregate may be considered as acceptable.
- (9) If the above tests indicate that the aggregate does not conform to the specifications, the plant will not be permitted to produce concrete for Department projects until the stockpile (in which the failure occurs) is

removed or reprocessed to the satisfaction of the District Materials Engineer. In addition, the plant shall take necessary steps to correct the causes of the failure prior to resuming production of concrete for Department work.

- (10) If the above noncompliance occurs during a pour, the District Materials Engineer shall determine whether the work shall be suspended or the pour should be completed before suspension. This decision shall be based on the extent of the failure, the amount of concrete involved, and the effect of suspension on the work.
- (11) If a weekly inspection is desired by the Office of State Aid Road Construction, it will be the responsibility of the County Engineer to perform same.

2.4.1.2.3 Frequencies – The frequencies of sampling and testing of aggregates outlined above, and as required by the Department’s QC/QA Procedures as referenced in S.O.P. Nos. TMD-20-04-00-000 and TMD-20-05-00-000 may be increased at the discretion of the District Materials Engineer. Increased frequencies may be necessary or desirable due to non-uniformity, borderline materials, substandard methods of production, or for other reasons.

2.4.1.3 Masonry Sand – Masonry sand is usually sampled at the job-site after delivery; the sample is submitted to the Central Laboratory for testing if the quantity involved justifies the cost of sampling and testing.

2.4.1.4 Aggregates for Bituminous Mixes

2.4.1.4.1 Approved Sources of Aggregates – Normally, aggregates for bituminous mixes are obtained from sources approved as outlined in the General section of 2.4.1. Aggregates obtained from local sources are sampled and tested prior to being approved for use. If the source has not been tested for abrasion and soundness as specified in Section 2.4.1.1.4 within the preceding twelve (12) months, samples shall be submitted for these tests.

2.4.1.4.2 Sampling from Contractor Stockpiles – Samples of each aggregate are obtained from the stockpiles of the Contractor and these samples are submitted to the Central Laboratory for the determination or approval of the job-mix formula.

During the progress of the work if the requirements for the mix are not being obtained or if the aggregate materials change in characteristics, additional samples shall be submitted for determination of a revised job mix formula. A change in the source of an aggregate requires a new job-mix formula.

During the progress of the work, the aggregates should be checked for gradation when it is apparent, or it is indicated, that there has been a change in the gradations. Such samples should be obtained from the cold bins and tested by the plant laboratory personnel. There is no requirement as to frequency of such tests.

2.4.1.4.3 Testing – Testing for conformance to crushing requirements will be performed in accordance with S.O.P. No. TMD-20-04-00-000, the Field Manual for Hot Mix Asphalt, and all applicable specifications.

The frequency for checking the characteristics of the mixture will be established in accordance with S.O.P. No. TMD-20-04-00-000 and the specifications.

2.4.1.5 Granular Materials

2.4.1.5.1 General – Granular materials are those materials used in subbases and bases (whether later chemically or mechanically stabilized or not), and in some cases are used as temporary gravel surface course material.

2.4.1.5.2 Testing and Inspection – Following are procedures to be followed for testing and inspection of Granular Materials.

(1) Source Inspection

- a. It is the Contractor's responsibility to make such investigation necessary to establish to the State's satisfaction that the proposed source(s) will furnish satisfactory material.
- b. Each source of granular material containing coarse aggregate must conform to the specification requirements for abrasion. It shall be the District's responsibility to submit a source sample(s) to the Central Laboratory for abrasion testing, and to insure that the source has been tested within the

past twelve (12) months prior to use. The source shall be retested annually.

(2) Job Control Acceptance Sampling and Testing

- a. A minimum of one (1) random sample shall be obtained for each 1000 cubic yards or 1400 tons of material placed for determining acceptance of the material for gradation, liquid limit, and plasticity index. The samples will be taken at the roadway. This frequency should be increased if the material is non-uniform, borderline or deficiencies have occurred.
- b. When a roadway sample fails to meet the requirements of the specifications, additional samples will be taken along the roadway until the limits of the inferior material is located. The Contractor will be required to correct or remove and replace the deficient material at his own expense.
- c. Extreme care must be taken in order to obtain samples representative of the material incorporated into the work. Roadway samples must be taken in such a manner as to avoid contamination with underlying or adjacent materials.
- d. Occasionally, and when requested, a sample shall be submitted to the Central Laboratory for check tests. Such samples should weigh approximately 100 pounds each and shall be accompanied by a Form TMD-320 or the SiteManager Sample Identification Number, as applicable, showing the class and the group the material represents, in addition to the usual information.

2.4.1.6 Mechanically Stabilized Course – The granular materials in place prior to stabilizing with stabilizer aggregate will be sampled, tested, and evaluated as outlined above in Section 2.4.1.5.2. The completed base after mechanical stabilization will be sampled, tested, and evaluated as outlined above in Section 2.4.1.5.2 except that the minimum frequency of sampling will be 1000 linear feet of 24-foot roadway.

2.4.1.7 Aggregate for Bituminous Surface Treatments – Following are procedures to be

followed for testing and inspection of aggregates for bituminous surface treatments.

(1) Approval of Source and Quality Tests

- a. The source(s) of aggregates for bituminous surface treatment must be approved prior to use as described in Section 2.4.1.1.1.
- b. The quality of the material from the source(s) will be based on the quality tests described in Section 2.4.1.1.2.
- c. If the aggregate for a project is to be obtained from a source not previously approved, approval samples will be required, and the Central Laboratory will make any investigation necessary in order that the State Materials Engineer may formally approve the source.

(2) Job Control

- a. The District Materials Engineer or Project Engineer shall sample and inspect the material after delivery to the project site.
- b. In either case, an initial sample for each type aggregate and from each source shall be submitted to the Central Laboratory accompanied by a Form TMD-320 or the SiteManager Sample Identification Number as applicable.
- c. A job control sample shall be obtained from each 300 cubic yards of each type of material delivered. These samples will be tested by the District Laboratory or the Project Laboratory.

2.4.1.8 Mineral Filler – Following are procedures to be followed for testing and inspection of mineral filler.

(1) Approval of Source

The source(s) of mineral filler shall have been approved by the State Materials Engineer

prior to delivery to a project. If not previously approved, samples from a new source shall be submitted to the Central Laboratory, and any required investigation will be made in order that the State Materials Engineer may approve the source.

(2) Job Control

After delivery to the project site, an initial sample shall be submitted to the Central Laboratory at the same time that samples of aggregates are submitted for determination of the job mix formula for testing. Thereafter, samples will be submitted whenever there is a change in the material, a change in source, or when there is a question as to whether or not the material complies with the specifications.

2.4.1.9 Bedding, or Filter Material – The material will be tested and inspected by the District or Project Laboratory, as required. Frequency for sampling and testing shall be in accordance with S.O.P. TMD-20-04-00-000.

2.4.1.10 Stabilizer Aggregate – Following are procedures to be followed for testing and inspection of stabilizer aggregate.

(1) Approval of Source

The source(s) of stabilizer aggregate shall have been approved by the State Materials Engineer. If the aggregate is to be obtained from a source not previously approved, samples of each type will be submitted to the Central Laboratory for approval tests. After testing of these samples and after investigation as necessary, the State Materials Engineer will advise whether or not the source is approved.

(2) Job Control

- a. An initial sample of each type aggregate from each source will be submitted to the Central Laboratory by the Plant Inspector from the materials proposed for use on the project.
- b. Job control sampling, testing, and inspection may be performed at the project or at the discretion of the District Materials Engineer.
- c. At least one (1) sample shall be obtained for each 300 cubic yards of each type

delivered, and tested by the District or Project Laboratory.

2.4.1.11 Borrow Excavation – This material will be sampled, tested, and inspected by the District or Project Laboratory, as required by the District Materials Engineer and in accordance with S.O.P. TMD-20-04-00-000 or TMD-20-05-00-000.

2.4.2 Stone Riprap – The following section establishes uniform procedures for the inspection and acceptance of stone riprap both prior to delivery and/or after delivery to a project.

2.4.2.1 General – The following procedures include the inspection of the stone riprap prior to delivery and/or after delivery to the project. Acceptance prior to delivery does not preclude rejection of the riprap at the job site.

In case of a dispute between the Producer (or Contractor) and the Department Inspector concerning the acceptability of the riprap, a sample of the stone shall be selected and each piece in the sample weighed. The provisions for such testing shall be the responsibility of the Producer (or Contractor).

The Department Inspectors shall have familiarized themselves with the appearance of stones of the weights stipulated in the specifications.

All riprap shall have been inspected and accepted prior to placement.

2.4.2.2 Inspection Prior to Delivery – If the Producer stockpiles riprap, the Inspector shall visually inspect this material periodically for conformity with the specifications. The Producer shall notify the Inspector when shipments will be made in order that the material may be observed during loading or prior to shipment. If an Inspector is not available, the Producer may ship the material without delay, provided the material is loaded in such a manner as to maintain the required gradation.

If the Producer loads the riprap directly into railroad cars or trucks, without stockpiling, the Inspector shall be present during loading to inspect the material prior to shipment. It shall be the responsibility of the Producer to contact the Inspector in order to establish a mutually convenient time for the inspection.

2.4.2.3 Inspection After Delivery – It shall be the responsibility of the Project Engineer to have the riprap visually inspected at the job site if the material has not been pretested. It is recommended that the Central Lab be contacted to perform the inspection.

The Project Engineer shall be responsible for completion of a Sample Record and Template (“Completion of Visual Inspection”) in the SiteManager Information System if the Engineer

performs the inspection at the project site. The source must be on the MDOT “Approved Sources of Materials” list.

State Aid and Private Entity Project Engineers may inspect and accept riprap by forwarding a letter to the State Materials Engineer stating the riprap was inspected and met the specification requirements. The source must be on the MDOT “Approved Sources of Materials” list.

2.4.2.4 Reporting

(1) Pretested Riprap by the Central Laboratory

- a. Pretested riprap shipped will be accompanied by the Producer's bill of lading, shipping invoice, etc., which will contain a statement to the effect that the material has been pretested. A copy of the shipping ticket shall be forwarded to the Central Lab by the producer.
- b. The MDOT Project Engineer shall enter the applicable information into a SiteManager Sample Record and complete the appropriate template (FFO633 – “Shipment of Pre-Tested Rip Rap”), upon verification that the riprap was shipped from pre-tested stock.
- c. County or LPA Project Engineers shall submit a “Pretested Materials Shipment Report Request Form” for each project, upon verification that the riprap was shipped from pre-tested stock. A copy of the form may be obtained from the www.goMDOT.com website or by request to the Materials Division. Upon receipt of the form, the Materials Division will issue a SiteManager Report of the applicable material.

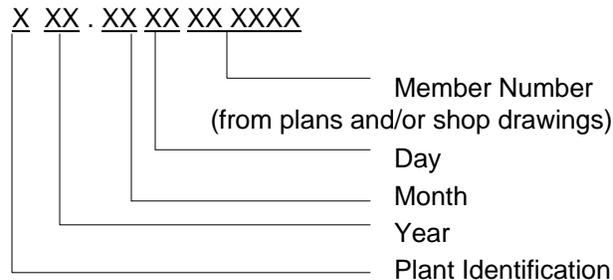
2.5 Prefabricated Concrete Products

2.5.1 Identification of Prestressed or Precast Concrete Bridge Members – The following section establishes a uniform numbering system for identification of pre-fabricated concrete bridge members and to indicate the location of the member in the structure.

2.5.1.1 Responsibility of the Department

2.5.1.1.1 Identification Numbering System – The Department shall assign a number to each member described as follows:

(1) Identification Number Format:



(2) Plant Identification – The plant identification shall be a one character letter. Plant letters shall be assigned by the District or Central Laboratory. The Central Laboratory shall approve and maintain a list of approved plant identification letters.

(3) Year, Month, Day

Example: 01.0512

01 is the year 2001

. is to break up the complexity of the number

05 is the month

12 is the day of the month

The date the member was cast is May 12, 2001.

(4) Member Number – The number assigned to each prestress or precast member represented on the plans and/or shop drawings.

2.5.1.1.2 Member Length – The length of the member shall be inscribed directly under the

member identification number.

2.5.1.1.3 Reporting – The member number shall be recorded on Form TMD-895. The member number shall also be recorded in the project field book and on the final plans indicating the exact location of each member.

2.5.1.2 Responsibility of the Producer – The producer shall inscribe the member number in the plastic concrete surface. The inscription shall be legible and located as follows:

- (1) **Pile:** Near both ends.
- (2) **Bridge Slab:** Near both ends on top right surface facing the member.
- (3) **Beams:** At both ends on the side, near the top of the beam.
- (4) **Other Members:** As required by the Department's contract documents, or as instructed by the Engineer responsible for production at the plant.

2.5.2 Inspection of Prestressed Concrete Bridge Members at the Prestressed Plant – The following section establishes uniform procedures and practices for quality assurance sampling, testing of materials, and auditing of documentation for fabrication of prestressed concrete bridge members.

2.5.2.1 General – All facilities involved in the production of prestressed concrete bridge members must be certified by the Precast/Prestressed Concrete Institute (PCI), as stated in the specifications.

These provisions provide instructions and procedures to Department personnel, for inspection and testing of prestressed concrete members under the Department's Quality Control/Quality Assurance (QC/QA) program, as required by the specifications. Sampling procedures and frequencies, tests, and frequencies for documentation review to be performed by the Department for the quality assurance of the members are detailed.

2.5.2.2 Testing

2.5.2.2.1 Plastic Concrete – Following are procedures to be followed when testing plastic concrete at the prestressed facility.

- (1) Frequency of sampling and testing of plastic concrete will be conducted as specified in Division VI of the PCI Quality Control Manual, 4th Edition.
- (2) The following plastic concrete tests shall be performed by an ACI Grade I or MDOT Class I Concrete Field Testing Technician:
 - a. AASHTO T 23: Making and Curing Concrete Test Specimens in the Field
 - b. AASHTO T 119: Slump of Hydraulic Cement Concrete
 - c. AASHTO T 141: Sampling Freshly Mixed Concrete
 - d. ASTM C 1064: Temperature of Freshly Mixed Portland Cement Concrete
- (3) The following concrete tests shall be performed by a MDOT Class III Concrete QC/QA

Technician, or an ACI Grade I or MDOT Class I Concrete Field Testing Technician under the direct supervision of a MDOT Class III Concrete QC/QA Technician:

- a. AASHTO T 22: Compressive Strength of Cylindrical Concrete Specimens
- b. AASHTO T 231: Capping Cylindrical Concrete Specimens

2.5.2.2.2 Aggregates – Following are procedures to be followed when sampling and testing aggregates at the prestressed facility.

(1) Sampling and testing of aggregates, consisting of fine aggregate gradation, coarse aggregate gradation, and fineness modulus (FM) of both fine and coarse aggregates, will be conducted as specified in Division VI of the PCI Quality Control Manual, 4th Edition.

(2)

(3) The following aggregate tests shall be performed by a MDOT Class II Concrete QC/QA Technician or a PCI Quality Control Technician/Inspector Level II:

- a. AASHTO T 2: Sampling Aggregates
- b. AASHTO T 27: Sieve Analysis of Fine and Coarse Aggregates
- c. AASHTO T 248: Reducing Field Samples of Aggregate to Testing Size
- d. AASHTO T 255: Total Moisture Content of Aggregate by Drying

2.5.2.2.3 Wire Rope, Cable, Spiral Wire, and Reinforcing Steel – Frequency of sampling and testing of wire rope or cable, spiral wire and reinforcing steel will be conducted according to Item No. 804 in SOP TMD-20-04-00-000.

2.5.2.2.4 Elastomeric Bearings – Frequency of sampling and testing of elastomeric bearings will be according to Item No. 804 in SOP TMD-20-04-00-000.

2.5.2.3 Quality Assurance of Concrete and Aggregates

2.5.2.3.1 Quality Assurance Testing – Quality assurance tests will be performed independently

of the samples taken by the Producer.

2.5.2.3.2 QC-QA Comparison of Aggregate – The Producer’s quality control and the Department’s quality assurance tests of aggregate gradations shall be in comparison if the results of both QC and QA meet the gradation and fineness modulus (FM) requirements of the specifications.

After it is determined that the Producer’s QC test results of aggregate gradations are comparative to that of the Department’s QA test results, then the Department’s QA testing frequency can be reduced to a frequency of no less than the frequency specified in the Standard Specifications for Road & Bridge Construction Section 804.02.13.

2.5.2.3.3 QC-QA Comparison of Concrete Compressive Strength – The quality control and quality assurance tests for compressive strength of cylinders will be compared using the FHWA “Data Test” statistical analysis computer program.

After it is determined that the Producer’s QC test results of concrete compressive strengths are comparative to that of the Department’s QA test results, then the Department’s QA testing frequency can be reduced to a frequency of no less than the frequency specified in the Standard Specifications for Road & Bridge Construction Section 804.02.13.

2.5.2.3.4 Non-Comparisons – If the Producer’s QC test results fail to compare to those of the Department’s QA test results, QA testing frequency will increase to the frequency specified in the Standard Specifications for Road & Bridge Construction Section 804.02.13 until the Producer’s and the Department’s test data again compare.

2.5.2.4 Review of Documentation – The following documentation shall be reviewed by the appropriate MDOT personnel at the prescribed frequency.

- (1) The documentation generated by the Producer shall meet the requirements necessary to retain PCI certification. The documentation shall be reviewed by the District or Central Laboratory by a PCI Quality Control Technician/Inspector Level I.
- (2) The following reports are to be reviewed, at a minimum, every two months:
 - a. Tensioning Report;

- b. Concrete Test Report;
- c. Inspection Report (Post-Pour & Pre-Pour);
- d. Steam and/or Concrete Maturity Report;
- e. Steel Test Report and/or Manufacturer Certification;
- f. Aggregate Gradation Report;
- g. Elastomeric Bearings Certificate (as applicable).

(3) The Contractor's Daily Steam Report, which shall contain a graphical representation of time versus the temperature of the steam throughout the duration of curing, will be reviewed on a monthly basis.

(4) After the above listed documentation has been verified, the inspector shall issue Form TMD-895 for the prestress members it represents. Form TMD-895 will be delivered along with the prestress member to the bridge construction site as proof of compliance to the specifications.

2.5.2.3.5 Non-Conforming Documentation – If the Producer's documentation does not conform to the requirements as stated in the contract specifications at the time of inspection, the District or Central Laboratory will place the Producer on probation until the next scheduled inspection. If the deficiency is not corrected by the time of the next inspection, the Producer will be instructed to halt all production of members intended for Department projects until all deficiencies are resolved.

2.5.2.5 Reporting – The following procedures shall be followed to document that Prestressed Concrete Bridge Members at the Prestressed Plant were sampled and tested in accordance with project specifications and the procedures set forth in these provisions.

(1) For QA sampling and testing, the Inspector at the Prestress Plant will enter the applicable information into a SiteManager Sample Record and complete the appropriate template for the material being tested.

(2) For member inspection, the Inspector at the Prestress Plant will enter the applicable information into a SiteManager Sample Record and complete the appropriate template for member inspection (CCL513 - Prestressed Units). These templates are identical to Form TMD-895.

- (3)** The completed Form TMD-895 listing the shipped member will be delivered along with the prestress member to the bridge construction site as proof of compliance to the specifications.
- (4)** When member is shipped, the District or Central Laboratory personnel will enter the applicable information into a SiteManager Sample Record and complete the appropriate template for member shipment (FCL516 - Prestressed Units).

2.5.3 Inspection of Prestressed Concrete Bridge Members at the Bridge Construction Site

– The following section establishes uniform procedures for the inspection of prestressed concrete bridge members at the bridge construction site.

2.5.3.1 General – An inspection will be performed on each prestressed concrete bridge member. A representative of the Project Office will perform the inspection.

2.5.3.2 Documentation – A completed copy of Form TMD-895 shall accompany the prestressed member when delivered to the bridge construction site, as required by the contract specifications. Refer to Appendix A for a copy of Form TMD-895. This form shall be reviewed upon arrival to the site by a representative of the Project Office.

2.5.3.3 Inspection – Upon arrival at the bridge construction site, the prestressed member shall be visually inspected by a representative of the Project Office for the following:

- (1) **Cracks** – Any cracks that may have occurred during transit, mainly near the middle of the member.
- (2) **Broken Corners** – Check for broken corners, on each end, at top and bottom of member that may have occurred during loading and unloading of the member.
- (3) **Identification Numbers** – The identification number should correspond to plans and/or shop drawings, as stated in Section 2.5.1 of this manual.
- (4) **Embedded Items** – Check for damage to inserts. Check for reinforcing steel extended from top and/or end of member. Check for damage to bearing plates.
- (5) **Coating of Strands** – Check for damage to the coating of the strands at beam ends.

2.5.3.4 Acceptance and Rejection Procedures – Following are guidelines for acceptance or rejection of a prestressed member upon inspection at the bridge site.

- (1) Prestressed members that have proper documentation and that pass visual inspection requirements may be incorporated into the work.

- (2) Members arriving at the bridge construction site without the proper documentation shall be rejected and not incorporated into the work until the Engineer receives the documentation.
- (3) Members with a visual crack across the width or depth are to be rejected.
- (4) Members with broken corners with exposed reinforcing steel shall be repaired at the expense of the Producer.
- (5) The Engineer may approve repairs of a prestressed member with damage to embedded items, made at the expense of the Producer.
- (6) Damaged prestressed members that cannot be repaired to the satisfaction of the Engineer will be rejected and not used on Department projects.

2.5.3.5 Reporting – The following procedures shall be followed to document that Prestressed Concrete Bridge Members at the Bridge Construction Site were sampled and tested in accordance with project specifications and the procedures set forth in these provisions.

For member acceptance at the bridge construction site, the Project Office will enter the applicable information into a SiteManager Sample Record and complete the appropriate template for Project Engineer certification (CPE901 – Engineer Certification).

2.5.3.6 County or LPA Project Engineers shall retain copies of all applicable certificates for project clearance records.

2.6 Precast Concrete Products

2.6.1 Non-Metal Pipe, Flared End Sections, and Cattlepasses – The following section outlines the standard procedures for the sampling, testing, inspection, and acceptance of non-metal pipe, flared-end sections and cattlepasses for use in Department work. All units must meet the requirements of the applicable AASHTO specifications and Section 708 of Mississippi Standard Specifications for Road and Bridge Construction.

Producers of precast products for use on department projects must be certified by the American Concrete Pipe Association (ACPA), the National Precast Concrete Association (NPCA), or the Prestressed Concrete Institute (PCI). The certification requirement is in addition to our standard specifications and testing requirements. All Precast-Prestressed Concrete Bridge Members must be certified by the Prestressed Concrete Institute (PCI). Suppliers of precast products are only required to be certified by one of the three above listed entities. Approved producers should submit proof of certification from one of the certifying entities annually.

2.6.1.1 General – Hereinafter, when “unit” or “units” is used, it shall be understood to mean unit or units of non-metal pipe, flared end sections and cattlepasses.

2.6.1.2 Notice of Completion of Units for Inspection – The Producer shall notify the Chief of the Inspection Section or the Field Operations Engineer of the Materials Division as far in advance as possible when the units will be ready for inspection.

All units shall be inspected by lots at the plant at which they were manufactured. A lot of pipe is defined as that portion of a continuous stack of pipe of one size and class which is offered for inspection. Only units which meet all requirements and conditions will be accepted for use in Department work.

2.6.1.3 Basis of Acceptance – The basis of acceptance of all units shall be as specified under **Option I (three-edge bearing)** or **Option II (cylinder test)**. The pipe producer shall advise the State Materials Engineer, in writing, the option (I or II) under which the thirty-six (36) inch diameter through sixty (60) inch diameter pipe will be manufactured. The option chosen will remain in effect until rescinded in writing.

(1) Option I – Under Option 1, acceptance shall be based on plant load-bearing tests, material tests and inspection of the manufactured units for visual defects and imperfections. Acceptability of the units of the specified size shall be determined by the

results as follows:

- a. The testing of the units by the three-edge bearing method up to the minimum D-load as specified in AASHTO M 170 for the 0.01 inch crack.
- b. The material tests as required on cement, aggregates and reinforcement.
- c. Measurements of the finished units to determine their conformance with the design.
- d. Visual inspection of the finished units to determine their freedom from defects.

(2) Option II – Under Option II, acceptance shall be based on compressive strength tests, materials tests, and inspection of the manufactured units for defects and imperfections. Acceptability of the units of the specified size shall be determined by the results as follows:

- a. Compressive strengths of the cured concrete cylinders as specified in the Tables in AASHTO M 170. One test shall be represented by the average of a minimum of two cylinder breaks of the same age cylinder.
- b. Material tests as required on cement, aggregates and reinforcement.
- c. Measurements of the finished units to determine their conformance with the design.
- d. Visual inspection of the finished units to determine their freedom from defects.

2.6.1.4 Sampling – Following are sampling procedures for the materials used in the production of precast concrete pipe, flared end sections, and cattlepasses.

2.6.1.4.1 Materials

(1) Aggregates – The aggregates shall be sampled and tested on a monthly basis. The Producer shall use aggregates from MDOT approved aggregate sources only.

(2) Cement – The cement shall be sampled and tested on a monthly basis. The Producer

shall use cement from a MDOT approved cement mill only.

(3) Water – The water shall be sampled and tested prior to production and as necessary thereafter.

(4) Reinforcement – Mesh or single strand rolls of reinforcement shall be sampled per shipment for each size. Bar reinforcement shall be sampled at the rate of one (1) sample for each 10 tons, or fraction thereof, of each size and grade.

2.6.1.4.2 Acceptance Option I Sampling – When pipe are to be tested under Option I, the Inspector will select the test specimen from the pipe offered for inspection. One (1) specimen shall be tested for the required minimum D-load for each one hundred (100) sections, or fraction thereof, of each size and class of pipe per one week's production.

2.6.1.4.3 Acceptance Option II Sampling – The following sampling procedures shall be followed when the Producer chooses Acceptance Option II.

(1) When machine-made or wet cast pipe are to be tested under Option II, a set of cylinders shall be made by the Producer for each compressive strength mix design of concrete used during each calendar day of production. One test shall be represented by the average of at least two cylinder breaks on the same age cylinder. A minimum of six cylinders shall be made per calendar day of production.

(2) The Producer shall inscribe into the top of each cylinder the following:

- a. Producer's identification;
- b. Date manufactured;
- c. Compressive strength.
- d. At the option of the Producer, the cylinders may be tested by the Central Laboratory (when shipped prepaid); by an approved commercial laboratory; or by the Producer (under conditions set forth in Section 2.7.1.5).

2.6.1.5 Testing – Unless otherwise specified, the applicable specifications shall be those specified in AASHTO M 170, AASHTO M 242, or AASHTO M 206.

2.6.1.5.1 All pipe, flared-end sections and cattlepasses will be tested under Option I (three-edge

bearing test) or Option II (cylinder test) as specified hereinafter.

2.6.1.5.2 All pipe having a diameter of thirty (30) inches or less shall be tested under Option I.

2.6.1.5.3 Pipe having a diameter in excess of thirty (30) inches up to and including sixty (60) inches shall be tested under Option I or Option II as specified in Section 2.6.1.3.

2.6.1.5.4 Pipe having a diameter in excess of sixty (60) inches, flared-end sections and cattlepasses shall be tested under Option II, unless otherwise authorized by the State Materials Engineer.

2.6.1.5.5 The testing of cylinders for compressive strength will be performed in accordance with the following procedure:

- (1) A minimum of 2 cylinders will be tested, initially. If the average compressive strength is satisfactory, no further testing is required. In the event the compressive strength is not satisfactory, additional cylinders may be tested, one at a time, until the average compressive strength of three consecutively broken cylinders is satisfactory.
- (2) If the compressive strength(s) of the cylinder(s) is not satisfactory, the Producer may request the pipe be tested by the three-edge bearing test, or cored. If coring is the test option selected, a minimum of two (2) cores averaged shall be used for analysis. The Producer shall make the request in writing to the State Materials Engineer.

2.6.1.6 Testing of Cylinders by the Producer – The producer may test their own cylinders under the conditions specified in the following provisions.

- (1) The Producer shall furnish a testing machine conforming to AASHTO T 22 located on the plant yard. The equipment must be calibrated and meet the requirements of all applicable AASHTO specifications. Calibration of the testing machine shall be repeated at intervals deemed necessary by the State Materials Engineer, and such intervals for calibration shall not exceed one (1) year. A copy of each calibration shall be furnished the State Materials Engineer.
- (2) The Producer shall have a qualified technician trained in the applicable procedures for

- testing concrete cylinders (AASHTO T 22).
- (3) The Producer shall furnish a cylinder capping apparatus that meets the requirements of AASHTO T 231 for cylinders and cores, or shall use neoprene caps for cylinders to meet the requirements of AASHTO T22.
 - (4) The Producer shall test the cylinders in the presence of the Laboratory Inspector. Each cylinder to be tested will first be observed by the Central Laboratory Inspector, capped and then tested in his presence.
 - (5) The Producer shall furnish the necessary forms, approved by the State Materials Engineer, and each form shall be signed by an authorized ACI certified technician employed by the Producer.
 - (6) The Producer will give a copy of the completed report to the Inspector, upon completion of the tests, for the Central Laboratory's records.

2.6.1.7 Inspection – All materials, process of manufacture, and the finished units shall be subject to inspection and approval by the Inspector. Such specimen(s), as needed, shall be furnished to the Department. The Inspector shall be furnished access to the facility and assistance for performing the tests and inspection.

- (1) The Inspector will visually inspect each unit of pipe, flared-end section and cattlepass for defects, workmanship and markings.
- (2) The Inspector will measure and record all the necessary dimensions to determine if the unit conforms to the design and is within the permissible variation limits.
- (3) If the lot is being tested under Option I, the Inspector will observe and record the results of the three-edge bearing test.
- (4) If the lot is being tested under Option II, the Producer will present to the Inspector a copy of the cylinder test report(s), prior to inspection, covering the lot offered for inspection.
- (5) If more than twenty percent (20%) of the lot is rejected, the entire lot shall be rejected

until the Producer culls and removes the unacceptable units.

2.6.1.8 Acceptance – Each acceptable unit will be stamped after all of the required conditions have been satisfied. The Inspector will record the number of units, by size and class. Each accepted and stamped unit will be placed in “**Stock**” for shipment to Department projects.

2.6.1.9 Reporting – The following procedures shall be followed to document that non-metal pipe, flared end sections, and cattlepasses were sampled and tested in accordance with project specifications and the procedures set forth in these provisions.

(1) The producer shall identify and mark the units as specified in the applicable AASHTO and MDOT Specifications and below.

- a. The Producer shall be responsible for sending a copy of the shipping invoice with each shipment designated for the Project (or County) Engineer. Each shipping ticket must indicate that the units were shipped from pre-tested stock.
- b. The shipping invoice shall contain all pertinent data; i.e., Purchaser, Project Number, County, Number of Units, Length, Size, Class, and Date of Shipment.
- c. The Producer shall mail to the Central Laboratory a copy of each shipping ticket. The mailing address is:

State Materials Engineer (72-01)
Mississippi Department of Transportation
P. O. Box 1850
Jackson, MS 39215-1850

(2) When a Producer is shipping units which were produced at another plant, the shipping invoice must indicate the plant at which the units were manufactured.

(3) For State, Federal, and Maintenance contracts, the Project Engineer shall verify the shipping ticket was stamped “Shipped from Pre-tested Stock”, and that each unit is stamped with a MDOT Inspector’s stamp. The engineer shall also inspect each unit for damage. The Project Engineer shall also enter the applicable information into a SiteManager Sample Record and complete the appropriate template (FFO624—“Shipment of Pre-tested Concrete Pipe”).

- (4) For State Aid and LPA contracts, the Project Engineer shall verify the shipping ticket was stamped “Shipped from Pre-tested Stock”, and that each unit is stamped with a MDOT Inspector’s stamp. The engineer shall also inspect each unit for damage. The engineer shall submit a “Pretested Materials Shipment Report Request Form” for each project to the Materials Division. The request form shall include the total number of feet used for each type of unit, and the length, size and class of the pipe. The form must also state that the material contained a MDOT inspector’s stamp. A copy of the form may be obtained from the www.goMDOT.com website or by request to the Materials Division. Upon receipt of the form, the Materials Division will issue a SiteManager Report of the applicable material.

2.6.2 Precast Concrete Box Culverts – The following section outlines the standard procedures for the sampling, testing, inspection and acceptance of precast box culverts for use in Department work. All units shall meet the specification requirements of the applicable AASHTO and MDOT specifications.

Producers of precast products for use on department projects must be certified by the American Concrete Pipe Association (ACPA), the National Precast Concrete Association (NPCA), or the Prestressed Concrete Institute (PCI). The certification requirement is in addition to our standard specifications and testing requirements. All Precast-Prestressed Concrete Bridge Members must be certified by the Prestressed Concrete Institute (PCI). Suppliers of precast products are only required to be certified by one of the three above listed entities. Approved producers should submit proof of certification from one of the certifying entities annually.

2.6.2.1 General – A **Group** will consist of the number of box sections produced during one (1) day's production from the same concrete strength mix.

2.6.2.2 Notice of Completion of Units for Inspection – The Producer shall notify the Chief of the Inspection Section or the Field Operations Engineer of the Materials Division as far in advance as possible as to when the units will be ready for inspection.

All units shall be inspected at the plant at which they are manufactured. Only units which meet all requirements and conditions will be accepted. Prior acceptance by the Materials Division will not preclude rejection of the units at the project site.

2.6.2.3 Basis of Acceptance – Acceptance of the units shall be determined by the results of the following:

- (1) The material tests as required on cement, aggregates and reinforcement.
- (2) Measurements of the finished units to determine conformance with the design dimensions.
- (3) Visual inspection of the finished units to determine freedom from defects.
- (4) Each group's compression tests performed on concrete cores or cylinders that meet the specified average strength requirement. Note, the average of a minimum of two (2)

cylinders will constitute one test. The concrete cylinders averaged must represent breaks on the same age cylinders.

2.6.2.4 Sampling – Following are sampling procedures for the materials used in the production of precast box culverts.

2.6.2.4.1 Materials

- (1) **Aggregates** – The aggregates shall be sampled and tested on a monthly basis. The Producer shall use aggregates from MDOT approved aggregate sources only.
- (2) **Cement** – The cement shall be sampled and tested on a monthly basis. The Producer shall use cement from a MDOT approved cement mill only.
- (3) **Water** – The water shall be sampled and tested prior to production and as necessary thereafter.
- (4) **Reinforcement** – The reinforcement shall be sampled at the rate of one (1) sample for each 75,000 sq. ft., or fraction thereof, of each size and spacing.

2.6.2.4.2 Cylinders

- (1) The Producer shall inscribe into the top of each cylinder: Producer's identification, plant, date made, and size of unit the cylinder represents.
- (2) At the option of the Producer, the cylinders may be tested by the Central Laboratory (when shipped prepaid); by a commercial laboratory; or, by the Producer (under conditions set forth in Section 2.6.2.6).
- (3) Testing for compressive strength of cylindrical concrete specimens shall be in accordance with AASHTO T 22.

2.6.2.5 Testing – Unless otherwise specified, the applicable specifications shall be those

specified in AASHTO M 259 and AASHTO M 273 for this section. All materials including cylinders or cores will be tested and approved prior to acceptance of the box sections.

Note: The minimum compressive strength of the concrete shall be 5,000 psi.

2.6.2.6 Testing Cylinders or Cores by the Producer – The producer may test their own cylinders or cores under the conditions specified in the following provisions.

- (1) The Producer shall furnish a testing machine conforming to AASHTO T 22 located on the plant yard. The equipment must be calibrated and meet the requirements of all applicable AASHTO specifications. Calibration of the testing machine shall be repeated at intervals deemed necessary by the State Materials Engineer, and such intervals for calibration shall not exceed one (1) year. A copy of each calibration shall be furnished the State Materials Engineer.
- (2) The Producer shall have a qualified technician trained in the applicable procedures for testing concrete cylinders (AASHTO T 22).
- (3) As applicable, the Producer shall furnish a specimen capping apparatus meeting the requirements of AASHTO T 231 for cylinders and cores, or shall use neoprene caps for cylinders meeting the requirements of AASHTO T22. Each specimen to be tested will first be observed by the Central Laboratory Inspector, capped and then tested in the presence of the inspector.
- (4) The Producer shall furnish the necessary forms, approved by the State Materials Engineer, and each form shall be signed by an ACI certified technician employed by the Producer.
- (5) Upon completion of the tests, the Producer will give a copy of the completed report to the Inspector for the Central Laboratory's records.

2.6.2.7 Inspection – All materials, process of manufacture, and the finished units shall be subject to inspection and approval of the Inspector. The Inspector shall be given access to the facility and assistance for performing the inspection.

- (1) Prior to inspection, the Producer will present to the Inspector a copy of the cylinder (or core) test report covering the group offered for inspection.
- (2) The Inspector will visually inspect each box section for defects, workmanship and markings.
- (3) The Inspector will measure and record all the necessary dimensions to determine if the unit conforms to the design and is within the permissible variation limits.

2.6.2.8 Acceptance – Each acceptable unit will be stamped after all of the required conditions have been satisfied. The Inspector will record the number of units, by size and specification designation, in each group. Each accepted and stamped unit may be placed in “**Stock**” for shipment to Department projects.

2.6.2.9 Reporting – The following procedures shall be followed to document that precast box culverts were sampled and tested in accordance with project specifications and the procedures set forth in these provisions.

- (1) The Producer shall identify and mark the units as specified in the applicable AASHTO and MDOT specifications and below.
 - a. The Producer shall be responsible for sending a copy of the shipping invoice with each shipment designated for the Project (or County) Engineer. Each shipping ticket must indicate that the units were shipped from pre-tested stock.
 - b. The shipping invoice shall contain all pertinent data; i.e., Purchaser, Project Number, County, Number of Units, Length, Size, Specification Designation, and Date of Shipment.
 - c. The company shall mail to the Central Laboratory a copy of each shipping ticket. The mailing address is:

State Materials Engineer (72-01)
Mississippi Department of Transportation
P. O. Box 1850
Jackson, MS 39215-1850

- (2) When a Producer is shipping units which were produced at another plant, the shipping ticket must indicate the plant at which the units were manufactured.
- (3) For State, Federal, and Maintenance contracts, the Project Engineer shall verify the shipping ticket was stamped “Shipped from Pre-tested Stock”, and that each unit is stamped with a MDOT Inspector’s stamp. The engineer shall also inspect each unit for damage. The Project Engineer shall enter the applicable information into a SiteManager Sample Record and complete the appropriate template (FFO626—“Shipment of Pre-tested Box Culverts”).
- (4) For State Aid and LPA contracts, the Project Engineer shall verify the shipping ticket was stamped “Shipped from Pre-tested Stock”, and that each unit is stamped with a MDOT Inspector’s stamp. The engineer shall also inspect each unit for damage. The engineer shall submit a “Pretested Materials Shipment Report Request Form” for each project to the Materials Division. The request form shall list the total number of feet used for each type of unit, the length, the size (including span and rise) and the specification designation(AASHTO M 259 or M 273).The form must also state that the material contained a MDOT inspector’s stamp. A copy of the form may be obtained from the www.goMDOT.com website or by request to the Materials Division. Upon receipt of the form, the Materials Division will issue a SiteManager Report of the applicable material.

2.6.3 Concrete Fence Posts and Right-of-Way Markers – The following section outlines the standard procedures for the sampling, testing, inspection and acceptance of concrete fence posts and right-of-way markers for use in Department work.

2.6.3.1 General – Hereinafter, when "unit" or "units" is used, it shall be understood to mean unit or units of concrete fence posts and right-of-way markers.

2.6.3.2 Notice of Completion of Units for Inspection – The Producer shall notify the Chief of the Inspection Section or the Field Operations Engineer of the Materials Division as far in advance as possible when the units will be ready for inspection.

All units shall be inspected at the plant at which they were manufactured. Only units which meet all requirements and conditions will be accepted for use in Department work. Acceptance will be on the basis of plant load-bearing tests, material tests, and inspection of the manufactured units for visual defects and imperfections.

2.6.3.3. Sampling – Following are sampling procedures for the materials used in the production of concrete fence posts and right-of-way Markers.

2.6.3.3.1 Materials

Aggregates: The aggregates shall be sampled and tested on a monthly basis. The Producer shall use aggregates from the Mississippi Department of Transportation's list of approved aggregate sources only.

Cement: The cement shall be sampled and tested on a monthly basis. The Producer shall use cement from the Mississippi Department of Transportation's list of approved cement mills only.

Water: The water shall be sampled and tested prior to production and as necessary thereafter.

Reinforcement: Bar reinforcement shall be sampled at the rate of one (1) sample for each ten (10) tons or fraction thereof.

2.6.3.4 Testing

- (1) The strength of the units shall be determined by the beam method. Under the beam method, a completed unit is loaded at the midpoint of an 18-inch span with three-edge bearing.
- (2) The unit shall develop not less than 6,000 pounds for a 4-inch by 4-inch unit or 12,000 pounds for a 6-inch by 6 inch unit.
- (3) The lot shall be tested at the rate of two (2) units for each 200 units, or increment thereof; one (1) to the ultimate load; and one (1) to destruction. The location, size and number of reinforcing bars will be checked on the unit loaded to destruction. The lot shall be rejected should both units fail.
- (4) Should one unit fail to meet the requirements of the specifications, two (2) additional units shall be tested. If either of the additional units fails to meet the requirements of the specifications, the lot shall be rejected.

2.6.3.5 Inspection – All materials, process of manufacture and the finished units shall be subject to inspection and approval by the Inspector. The Inspector shall be furnished with every facility and assistance for performing the tests and inspection. The Inspector will visually inspect each unit for defects in workmanship. The Inspector will measure and record all the necessary dimensions to determine if the unit conforms to the design and is within the permissible variation limits. If more than twenty percent (20%) of the lot is rejected, the entire lot shall be rejected until the Producer culls and removes the unacceptable units.

2.6.3.6 Acceptance – When all of the required conditions have been satisfied, each acceptable unit will be stamped. The Inspector will record the number of units, by size and length, in the lot. Each accepted and stamped unit will be placed in "STOCK" for shipment to Department projects.

2.6.3.7 Reporting – The following procedures shall be followed to document that concrete fence posts and right-of-way markers were sampled and tested in accordance with project specifications and the procedures set forth in these provisions.

- (1) For State, Federal, and Maintenance contracts, the Project Engineer shall verify the shipping ticket was stamped “Shipped from Pre-tested Stock”, and that each unit is stamped with a MDOT Inspector’s stamp. The engineer shall also inspect each unit for damage. The Project Engineer shall enter the applicable information into a SiteManager Sample Record and complete the appropriate template (FFO618—“Shipment of Pre-tested Concrete Fence Posts or FFO619—“Shipment of Concrete Right-of-Way Markers”).
- (2) For State Aid and LPA contracts, the Project Engineer shall verify the shipping ticket was stamped “Shipped from Pre-tested Stock”, and that each unit is stamped with a MDOT Inspector’s stamp. The engineer shall also inspect each unit for damage. The engineer shall submit a “Pretested Materials Shipment Report Request Form” for each project to the Materials Division. The request form shall state that the material contained a MDOT inspector’s stamp. A copy of the form may be obtained from the www.goMDOT.com website or by request to the Materials Division. Upon receipt of the form, the Materials Division will issue a SiteManager Report of the applicable material.

2.6.4 Precast Inlets, Junction Boxes, and Manholes – The following section outlines the standard procedures for the sampling, testing, inspection and acceptance of precast curb inlets, median inlets, junction boxes and manholes for use in Department work.

Producers of precast products for use on department projects must be certified by the American Concrete Pipe Association (ACPA), the National Precast Concrete Association (NPCA), or the Prestressed Concrete Institute (PCI). The certification requirement is in addition to our standard specifications and testing requirements. All Precast-Prestressed Concrete Bridge Members must be certified by the Prestressed Concrete Institute (PCI). Suppliers of precast products are only required to be certified by one of the three above listed entities. Approved producers should submit proof of certification from one of the certifying entities annually.

2.6.4.1 General –Precast units may be used in lieu of the cast-in-place inlets and junction boxes that are shown in Department plans and Standard Drawings. The Project Engineer shall decide whether or not precast units will be allowed on a particular project. The Project Engineer may decide to allow precast units for all inlets and junction boxes on a particular project or to require cast-in-place units at specific locations.

The Project Engineer may also allow precast units to be used that require certain segments of the precast units to be cast-in-place (i.e. tops). This condition may occur whenever the plans require the SS-2 curb inlet, for example. The precast units for SS-2 inlets usually come in more than a single segment. The bottom section, riser sections, extensions, wings and top are separate units.

Precast units will also require inspection by the Materials Division. This inspection will follow the procedures established by this section. The Project Engineer, should he allow precast units to be used on the project, should forward a letter of request for inspection to the Materials Division. This letter should include drawings prepared by the contractor of each station's unit stub-out angles and locations above the invert, if the unit is non-standard. (Note: Neither the Project Engineer nor Department Inspectors/personnel shall be responsible for accurate interpretation of the contractor's drawings for construction of the unit(s).)

2.6.4.2 Notice of Completion of Units for Inspection – The Producer shall notify the Chief of the Inspection Section or the Field Operations Engineer of the Materials Division as far in

advance as possible as to when the units will be ready for inspection.

All units shall be inspected at the plant at which they are manufactured. Only units which meet all requirements and conditions will be accepted. Prior acceptance by the Materials Division will not preclude rejection of the units at the project site.

In addition, a manufacturer's precast unit(s) must have prior approval from the Roadway Design Division of MDOT before the unit(s) may be used on a MDOT project. If the units are from a supplier that does not have prior approval from Roadway Design, then the appropriate shop drawings should be attached to the Project Engineer's request and a copy should be sent to Roadway Design. Upon approval of the shop drawings, Roadway Design will notify the Materials Division, so that the Materials Division can proceed with arrangements for inspection of the units. Approved shop drawings will be maintained on file in the Roadway Design Division and the Materials Division.

2.6.4.3 Basis of Acceptance – Acceptance of the units shall be determined by the results of the following:

- (1) The material tests as required on cement, aggregates and reinforcement.
- (2) Measurements of the finished units to determine conformance with the design dimensions.
- (3) Visual inspection of the finished units to determine freedom from defects.
- (4) Each group's compression tests performed on concrete cores or cylinders that meet the specified average strength requirement. Note, the average of a minimum of two (2) cylinders will constitute one test. The concrete cylinders averaged must represent breaks on the same age cylinders. A minimum of six (6) cylinders should be made.

2.6.4.4 Sampling – Following are sampling procedures for the materials used in the production of precast inlets and junction boxes. For this section, a **Group** will consist of the number of units produced during one (1) day's production from the same concrete strength mix.

2.6.4.4.1 Materials

- (1) **Aggregates** – The aggregates shall be sampled and tested on a monthly basis. The Producer shall use aggregates from MDOT approved aggregate sources only.
- (2) **Cement** – The cement shall be sampled and tested on a monthly basis. The Producer shall use cement from a MDOT approved cement mill only.
- (3) **Water** – The water shall be sampled and tested prior to production and as necessary thereafter.
- (4) **Reinforcement** – The reinforcement shall be sampled at the rate of one (1) sample for each 75,000 sq. ft., or fraction thereof, of each size and spacing. Steel may be sampled at the discretion of the inspector and represent a maximum of thirty (30) tons.

2.6.4.4.2 Cylinders

- (1) The Producer shall inscribe into the top of each cylinder: Producer's identification, plant, date made, and mix design identification.
- (2) At the option of the Producer, the cylinders may be tested by the Central Laboratory (when shipped prepaid); by a commercial laboratory; or, by the Producer (under conditions set forth in Section 2.6.4.5).
- (3) Testing for compressive strength of cylindrical concrete specimens shall be in accordance with AASHTO T 22.

2.6.4.5 Testing Cylinders or Cores by the Producer – The producer may test their own cylinders or cores under the conditions specified in the following provisions.

- (1) The Producer shall furnish a testing machine conforming to AASHTO T 22 located on the plant yard. The equipment must be calibrated and meet the requirements of all applicable AASHTO specifications. Calibration of the testing

machine shall be repeated at intervals deemed necessary by the State Materials Engineer, and such intervals for calibration shall not exceed one (1) year. A copy of each calibration shall be furnished the State Materials Engineer.

- (2) The Producer shall have a qualified technician trained in the applicable procedures for testing concrete cylinders (AASHTO T 22).
- (3) As applicable, the Producer shall furnish a specimen capping apparatus meeting the requirements of AASHTO T 231 for cylinders and cores, or shall use neoprene caps for cylinders meeting the requirements of AASHTO T22. Each specimen to be tested will first be observed by the Central Laboratory Inspector, capped and then tested in the presence of the inspector.
- (4) The Producer shall furnish the necessary forms, approved by the State Materials Engineer, and each form shall be signed by an ACI certified technician employed by the Producer.
- (5) Upon completion of the tests, the Producer will give a copy of the completed report to the Inspector for the Central Laboratory's records.

2.6.4.6 Inspection – All materials, process of manufacture, and the finished units shall be subject to inspection and approval of the Inspector. The Inspector shall be given access to the facility and assistance for performing the inspection.

- (1) Prior to inspection, the Producer will present to the Inspector a copy of the cylinder (or core) test report covering the group offered for inspection.
- (2) The Inspector will visually inspect each unit section for defects, workmanship and markings.
- (3) The Inspector will measure and record all the necessary dimensions to determine if the unit conforms to the design and is within the permissible variation limits.

2.6.4.7 Acceptance – Each acceptable unit will be stamped after all of the required conditions have been satisfied. The Inspector will record the number of units, by size and specification

designation, in each group. Each accepted and stamped unit may be placed in “**Stock**” for shipment to Department projects or held for supply to a specific project.

2.6.4.8 Reporting – The following procedures shall be followed to document that precast curb inlets, median inlets junction boxes and manholes were sampled and tested in accordance with project specifications and the procedures set forth in these provisions.

2.6.4.8.1—Producer’s Responsibility

(1) The Producer shall identify and mark the units as specified in the applicable AASHTO and MDOT specifications and below.

- a. The Producer shall be responsible for sending a copy of the shipping invoice with each shipment designated for the Project (or County) Engineer. Each shipping ticket must indicate that the units were shipped from pre-tested stock.
- b. The shipping invoice shall contain all pertinent data; i.e., Purchaser, Project Number, County, Number of Units, Size, and Date of Shipment.
- c. The company shall mail to the Central Laboratory a copy of each shipping ticket. The mailing address is:

State Materials Engineer (72-01)
Mississippi Department of Transportation
P. O. Box 1850
Jackson, MS 39215-1850

(2) When a Producer is shipping units which were produced at another plant, the shipping ticket must indicate the plant at which the units were manufactured.

2.6.4.8.2—Project Engineer and Department Responsibilities

(1) For State, Federal, and Maintenance contracts, the Project Engineer shall verify the shipping ticket was stamped “Shipped from Pre-tested Stock”, and that each unit is stamped with a MDOT Inspector’s stamp. The engineer shall also inspect each unit for damage. The Project Engineer shall enter the applicable

information into a SiteManager Sample Record and complete the appropriate template (FFO632—"Shipment of Pre-tested Inlets and Junction Boxes").

- (2)** For State Aid and LPA contracts, the Project Engineer shall verify the shipping ticket was stamped "Shipped from Pre-tested Stock", and that each unit is stamped with a MDOT Inspector's stamp. The engineer shall also inspect each unit for damage. The engineer shall submit a "Pretested Materials Shipment Report Request Form" for each project to the Materials Division. The form must state that the material contained a MDOT inspector's stamp. A copy of the form may be obtained from the www.goMDOT.com website or by request to the Materials Division. Upon receipt of the form, the Materials Division will issue a SiteManager Report of the applicable material.

2.7 Metal Pipe

2.7.1 Corrugated Metal Pipe and Arches – The following section outlines the uniform procedures for the sampling, testing, acceptance, and reporting of corrugated metal culvert pipe and pipe arches.

2.7.1.1 General – All corrugated metal pipe and pipe arches shipped to Department projects shall be pretested. Only material on order for a Department project or on order from other agencies (for which we have been authorized to inspect) will be inspected.

The producer shall notify the Central Laboratory when the pipe is ready for inspection.

2.7.1.2 Approved Fabricators – A fabricator proposing to furnish pretested corrugated metal pipe and pipe arches for use in MDOT work shall have been approved and their name placed on the list of approved fabricators by the Central Laboratory. The fabricator must follow the procedures outlined below to be placed on the list of approved fabricators.

(1) In order for a fabricator's name to be placed on the Department's "Approved Sources of Materials" list, the fabricator must state agreement with and acceptance of the provisions of this section (Materials Manual Section 2.7.1) by letter to the State Materials Engineer. In addition he shall certify that only domestic steel will be used in the fabrication of metal pipe, and that the pipe will be fabricated meeting the requirements of Section 709 of the Mississippi Standard Specifications. This letter will remain in effect until rescinded in writing.

(2) The fabricator shall provide a recertification of domestic origin at least annually to the Central Laboratory. Such certification shall contain the following or similar wording:

"We hereby certify that any and all corrugated metal pipe and pipe arches supplied by (Name of Company) for use on Mississippi Department of Transportation projects will be fabricated in our plant(s) located at (City & State) and will be fabricated with domestic steel only."

(3) The sheet metal from which the pipe is fabricated shall be from a MDOT "Approved Sources of Materials" listed source. The fabricator shall obtain copies of the mill test report on each heat of sheet steel purchased from the manufacturer. A copy of the mill

test report will be furnished to the Department upon request.

2.7.1.3 Sampling and Inspection – All materials, process of manufacture, and the finished units shall be subject to inspection and approval of the inspector. The inspector shall be given access to the facility and assistance for performing the inspection. Following are procedures to be followed during sampling and inspection of the facilities and materials.

- (1) The Inspector shall check the sheet metal manufacturer to determine if they are on the Department's "Approved Sources of Materials" list.
- (2) The spelter coating weight and metal thickness shall be tested at the fabricator's plant. If it becomes evident that the spelter is borderline, after testing the metal for spelter coating weight, a sample approximately seven inches long by the width of the sheet shall be cut. This sample shall be cut into three (3) equal sections, forming one (1) mid-section and two (2) end sections, and returned to the Central Laboratory for tests.
- (3) The Inspector shall make the necessary measurements and visual inspection of the fabricated pipe, then a metal seal shall be attached to each acceptable pipe.
- (4) If the pipe is to be coated and/or paved, a sample of the bituminous coating material shall be obtained. The metal sample shall be approximately ten inches long and four (4) corrugations wide. It shall be cupped in a half-moon shape, and shall receive the same coating as the fabricated pipe. One (1) sample, approximately 250 g of the coating material, shall be obtained from the coating vat.
- (5) After the pipe has been coated and/or paved, it will be inspected for coating thickness and the width of the paved invert. If all requirements for asphalt-coated pipe have been met, the inspector shall place another seal on each accepted pipe.

2.7.1.4 Reporting – The following procedures shall be followed to document that metal pipe is sampled and tested in accordance with project specifications and the procedures set forth in these provisions.

- (1) Pipe shall be inspected on an order basis only. After the pipe has been accepted a seal is placed on each pipe.

- (2)** The Materials Division inspector shall enter the applicable information into a SiteManager Sample Record and complete the applicable template (FFO604—"Inspection of Metal Pipe").

- (3)** A copy of SiteManager Report with Template FFO604, or an electronic notification that the report is available in SiteManager, should be received by the Project Engineer within three (3) weeks of the inspection.

- (4)** The project engineer is responsible for verification that the pipe contains a MDOT seal(s) and that the pipe has not been damaged.

2.7.2 Corrugated Metal Pipe for Maintenance – The following section outlines the uniform procedures for the acceptance of corrugated metal pipe for maintenance work.

2.7.2.1 General – All corrugated metal pipe used in maintenance work shall be furnished and accepted in accordance with this section (Materials Manual Section 2.7.2) and Section 709 of the Standard Specifications (also by reference AASHTO Designations: M 36, M 218, ASTM A 525 as well as other applicable specifications). A certification type program is established in this section (Materials Manual Section 2.7.2) for furnishing metal pipe to maintenance work.

Failure to comply with all applicable requirements will be cause to have a company's name removed from the Department's "Approved Sources of Materials" list.

2.7.2.2 List of Approved Suppliers of Corrugated Metal Pipe for Maintenance Work – A supplier may be a fabricator of metal pipe or a vendor who purchases metal pipe from a fabricator. The following procedures are to be followed by a vendor or supplier for placement on the Department's "Approved Sources of Materials" list.

(1) Corrugated Metal Pipe Vendors

- a. A vendor proposing to furnish corrugated metal pipe for maintenance work shall have been approved by the State Materials Engineer and their name placed on the Department's "Approved Sources of Materials" list.
- b. In order for a vendor to have the company's name placed on the Department's "Approved Sources of Materials" list, an authorized company official must state agreement with and acceptance of the provisions of this section (Materials Manual Section 2.7.2) by letter to the State Materials Engineer. In addition, he shall certify that only domestic steel will be furnished to the Department and that all pipe furnished to the Department will be obtained from an MDOT approved fabricator. This letter will remain in effect until rescinded in writing.
- c. The vendor shall provide a recertification of domestic origin at least annually to the Central Laboratory. Such certification shall contain the following or similar wording:

"We hereby certify that any and all corrugated metal pipe supplied by (Name of Company) located at (City & State) for use on Mississippi Department of

Transportation projects will be obtained from(Name & Location of Fabricating Plant(s)) which is an MDOT approved fabricator, and we further certify that only pipe made from domestic steel will be supplied."

- d. A list of approved fabricators will be maintained by the Central Laboratory and is available upon request.
- e. The vendor's delivery ticket will contain the following information on all metal pipe furnished to the Department: date delivered, size, length, quantity, gauge, purchase order number, the fabricator and a certified statement that the metal pipe meets the requirements of Section 709 of the Standard Specifications. A copy of the Mill Test Report on each Heat will be attached to the delivery ticket furnished to the Department.

(2) Corrugated Metal Pipe Fabricators

- a. In order for a corrugated metal pipe fabricator to have the company's name placed on the Department's "Approved Sources of Materials" list, the fabricator must conform to all requirements for approved fabricators set out in Materials Manual Section 2.7.1.
- b. The fabricator will furnish the vendor such mill test reports on each heat, delivery tickets with all pertinent information including statements certifying the fabrication of the pipe, domestic steel and other information as may be requested by the vendor. This information will be required on all pipe furnished to the Department.
- c. When the fabricator is supplying metal pipe directly to the Department, he will furnish delivery ticket and mill test report as outlined in Section 2.7.2.2(e).

2.7.2.3 Responsibilities of the Central Laboratory – The Central Laboratory will initiate and maintain lists of approved vendors, fabricators and sheet metal manufacturers on the Department's "Approved Sources of Materials" list. The list is available at the www.goMDOT.com website under the Business Section, or upon request to the Materials Division.

Any questionable pipe will be inspected by Central Laboratory inspectors, upon request by the Maintenance Engineer.

At the discretion of the State Materials Engineer or at the request of the District Maintenance Engineer, an inspection will be made at the vendor's and/or fabricator's premises. The inspection would include all metal pipe on the yard and the appropriate files concerning the pipe furnished to the Department.

2.7.2.4 Responsibilities of Maintenance Employees – Maintenance employees receiving the metal pipe will obtain a copy of the delivery ticket, check the ticket against the order, check for statement of certification, observe the pipe for obvious defects, and check the brand on the pipe to ascertain it is on the Department's "Approved Sources of Materials" list of Manufacturers of Sheet Metal for Corrugated Metal Pipe. The heat numbers on the pipe shall be checked against the heat numbers on the mill test report. No pipe will be accepted unless it meets all the above conditions.

2.8 Treated Timber Products

The following section outlines the standard procedures for the inspection, sampling, testing, acceptance, identification, and reporting of treated timber products.

2.8.1 General – Timber products to be used on MDOT projects shall follow the following procedures and be inspected as detailed below.

- (1) Timber products will not be accepted for use on Department projects unless the material has been inspected by an authorized representative of the Department and found to be satisfactory both before and after treatment. The procedure set out in Section 2.8.2 may, at the discretion of the State Materials Engineer, be performed after treatment, when timber products are to be treated with CCA or Pentachlorophenol preservative.
- (2) When material is manufactured at one plant and shipped to another for treatment, the inspection prior to and after treatment shall be made at the treating plant.
- (3) The treating plant shall notify the Chief of the Inspection Section or the Field Operations Engineer of the Materials Division as far in advance as possible when material will be ready for inspection.
- (4) Treated wood materials inspected for Stock will be inspected according to the current specifications.
- (5) Treated wood materials inspected on an order basis will be inspected under the applicable specifications for that specific order.
- (6) All piling and poles inspected for Department use shall be branded as set out in AWPA Specification M-1.
- (7) Certified guardrail blocks shall be branded as specified in Section 712.0.6.5 the Mississippi Standard Specifications for Road and Bridge Construction.

2.8.2 Inspection Prior to Treatment – All treated timber products to be incorporated into work for MDOT projects must be inspected prior to treatment according to the following procedures.

- (1) All materials shall have been processed, graded, and ready for treatment at the time of the inspection.
- (2) Piles, stringers, caps, sway braces and all other lumber which will be used in bridge superstructures shall receive 100% inspection. Poles shall receive 100% inspection.
- (3) Guard posts, guardrail posts, fence posts, sign posts, and all lumber which will not be placed in bridge superstructures shall be inspected as follows:
 - a. As the material is manufactured or received at the treating plant for treatment, it shall be stacked in lots easily accessible to the Inspector. A lot shall represent the amount of guard posts, guardrail posts, fence posts, sign posts, or lumber to be treated in one (1) charge in the treating cylinder.
 - b. The Inspector will select a representative sample from each lot. The sample will consist of twenty percent (20%) or more of the lot for a piece-by-piece inspection. (NOTE: The Department reserves the right to inspect any lot 100 percent.)
 - c. If twenty percent (20%) or less of the pieces in the sample fails to meet the specification requirements, the lot will be accepted subject to the provisions of 2.8.4 herein below.
 - d. If more than twenty percent (20%) of the sample selected by the Engineer or his designated Inspector for piece-by-piece inspection of any lot of material is rejected, the lot shall be rejected until the Producer culls and removes the pieces in the entire lot that do not meet the requirements of the specifications and replaces them with material that will allow the lot to be accepted. The lot may then be offered for re-inspection before treatment, in which case the lot shall be subject to the same sampling and inspection procedures as for the original inspection. Should the lot fail to be accepted on the second inspection, at the discretion of the Engineer or his designated Inspector, the producer may break open the bundles in the rejected lot and form a new lot by selecting the material that meets the requirements of the specifications.
- (4) Prior to acceptance of any lot for treatment, the Inspector will mark any pieces in the lot

which are unacceptable; such pieces shall be removed from the lot by the manufacturer prior to treatment. The Inspector will mark each acceptable piece in each acceptable lot with the hammer stamp prior to treatment, except that guardrail blocks need not be so stamped.

2.8.3 Preservative – The preservatives shall meet the applicable requirements of the Mississippi Standard Specifications for Road and Bridge Construction, or as amended by the contract.

2.8.4 Treatment – All timber products shall be treated in accordance with AWPA Treating Practices (*The USE CATEGORY SYSTEM for Highway Construction*) unless otherwise specified.

Acceptance of the treated material shall be by assay of the borings in accordance with AWPA. For timber and lumber, the length of the borings is determined by MDOT Standard Specifications for Road and Bridge Construction Section 718.

2.8.5 Inspection after Treatment – All treated timber products to be incorporated into work for MDOT projects must be inspected after treatment according to the following procedures.

(1) The Inspector shall be furnished a copy of the treating report on each charge of materials for Mississippi Department of Transportation use.

(2) Boring Treated Materials

- a. A borer core shall be taken from at least twenty (20) pieces selected at random in each charge for all materials except piling. Each piling in each charge shall be bored.
- b. The borings shall be made at approximately the midpoint of each piece and directed towards the pith. In the case of lumber, the borings shall be made at approximately the center of the edge and parallel with the face.
- c. In treated timber products, if less than twenty percent (20%) of the borings fail to meet the penetration requirements, the charge will be accepted, but all pieces failing to meet the penetration requirements shall be rejected and may be subjected to re-treatment.

- d. If more than the allowed percentage of the borings fails to meet the penetration requirements, the entire charge shall be rejected and may be subjected to re-treatment. If upon re-treatment the material meets the penetration requirements, it will be accepted. Only one (1) re-treatment will be permitted, and any apparent damage due to re-treatment shall be cause for rejection.
 - e. In addition to boring, each charge shall be inspected for cleanliness, treatment damage and mechanical damage.
- (3) Timber, lumber and piles shall have a one hundred percent (100%) sapwood penetration or a minimum penetration of four inches (4"). Guard posts, guardrail posts, fence posts and braces, and sign posts shall be penetrated according to the requirements of AWPA's **USE CATEGORY SYSTEM FOR HIGHWAY CONSTRUCTION.**
- (4) The amount of preservative retention shall be determined by assay. The borer cores shall be obtained in accordance with AWPA Standard M-2. The borings shall be taken from pieces having a sapwood depth of at least equal to the specified sampling zone. For timber and lumber, refer to MDOT Standard Specifications for Road and Bridge Construction Section 718 for sampling zone.
- (5) After inspection, each acceptable piece shall be hammer-stamped in the end opposite to the end stamped prior to treatment.

2.8.6 Care and Storage of Treated Material – Care and storage of treated material shall be in accordance with the current specifications.

2.8.7 Method of Plant Operation – The treating plant will operate under one of the methods hereafter described, the Order Basis Method or the Stock Operation Method.

(1) Order Basis Method—Lumber, Piling(s), Poles, and Structural Members

- a. Under this method of operation, only materials designated for MDOT Purchase Orders, State Projects, and Office of State Aid Road Construction Projects or other Agencies for which authorization to inspect has been given, will be inspected.

- b. At the beginning of each order, the Producer shall advise the Central Laboratory in accordance with Section 2.8.1. The project number (or purchase order number), the amount and type of materials will be given in the request for an inspection. If the project number can be verified as a current project, an Inspector will be sent to the plant. If the project number is not valid, the plant will be notified and an Inspector will not be sent to the plant.
- c. When emergency situations arise, the State Materials Engineer may give permission for material to be shipped from plant stock. When this permission is granted, the material will be bored as set out in Section 2.8.5(2), above. If requirements for penetration and assay requirements are met, the material will be branded as set out in AWWA Specification M-1. In no case will it be considered an emergency when a buyer fails to place an order in time to meet his production schedule.

(2) Stock Operations Method—Guardrail post(s)/block(s), guard post(s), and fence post(s), or as otherwise specified

- a. Under this method of operation, all material inspected and accepted by the Mississippi Department of Transportation will be placed in stock for shipment to Department projects only.
- b. Each Supplier proposing to furnish treated wood products for Department work under the Stock Operation Method must write the State Materials Engineer requesting permission to use this method of operation. A list of the plants approved under the Stock Operation Method will be maintained by the Central Laboratory.
- c. Approved materials in Stock on the plant yard which have received physical damage or otherwise rendered unsuitable for use, will be removed from Stock.
- d. Approved materials in Stock shall be shipped only to MDOT projects, Office of State Aid Road Construction projects or other projects for which authority has been granted.
- e. A treating plant that has received approval of the Stock Operation Method may have

their approval revoked by the State Materials Engineer for failure to abide by the provisions set forth in herein (Materials Manual Section 2.8). The plant may continue to furnish materials under the Order Basis Method. The plant will be considered for reinstatement for Stock when it has been demonstrated that they will abide by the section provisions.

- f. A treating plant that has received approval of the Stock Operation Method may have their approval revoked by the State Materials Engineer for failure to abide by these provisions. The plant may continue to furnish materials under the Order Basis Method. The plant will be considered for reinstatement for Stock when it has been demonstrated that they will abide by the section provisions.
- g. Treating plants may ship Stock materials to approved suppliers as defined in Section 2.8. Upon receipt of the shipping ticket, these materials will be removed from the treating plant's inventory and placed in the Supplier's inventory.

2.8.8 Department Stock Maintained by a Broker or Wholesale Supplier – A broker or wholesale supplier desiring to stock treated materials for Department work may request approval as set forth in Subsection 2.8.7(2). When approved, he shall operate under the provisions of Sections 2.8.7(2) and 2.8.9.

2.8.9 Time Limitation on Treated Material in Department Stock – Treated material which has been in stock for a period of two (2) years shall be re-treated or removed from the Mississippi Department of Transportation stock.

2.8.10 Inspection at Project Site – The Project Engineer or his representatives shall examine treated material shipped to the project. All material shipped shall be identified by an inspector's hammer mark in each end of each piece. Note, certified guardrail blocks are branded, not hammer stamped.

Any material shipped to the project without proper identification shall not be accepted. The Project Engineer will reject any obviously defective material, and any suspected or questionable deficiencies shall be reported to the State Materials Engineer. In the latter case, an Inspector from the Materials Division may re-inspect the material at the project site.

2.8.11 Reporting – The following procedures shall be followed to document that treated timber is sampled and tested in accordance with project specifications and the procedures set forth in these provisions.

2.8.11.1 Order Basis Materials

- (1) Upon notification of completion of an order, the Central Laboratory will perform an inspection and complete a SiteManager Sample Record and Template (Template FFO607 or FFO608). Shipments to each project will be accumulated and reported semimonthly.
- (2) For State, Federal, and Maintenance contracts, the Project Engineer shall verify the shipping ticket was stamped “Shipped from Pre-tested Stock”, and that each unit is stamped with a MDOT Inspector’s stamp. The engineer shall also inspect each unit for damage. The Project Engineer should confirm that the material’s inspection records have been entered into SiteManager. If the record is not entered into SiteManager, the Project Engineer should contact the Field Operations Section of the Materials Division for further information.
- (3) For State Aid and LPA contracts, the Project Engineer shall verify the shipping ticket was stamped “Shipped from Pre-tested Stock”, and that each unit is stamped with a MDOT Inspector’s stamp. The engineer shall also inspect each unit for damage. State Aid, and Private Entities will receive a report for each inspection conducted.

2.8.11.2 Stock Operations Materials

a. Producer’s Responsibilities

- (1) With each shipment, the Producer will furnish a copy of the shipping ticket designated for the Project Engineer. The shipping ticket shall include all pertinent information, such as project number, county, purchaser, size, length, quantity, the preservative type and retention.

- (2) At least once each calendar week, the Producer shall mail to the Central Laboratory a copy of each shipping ticket. The mailing address is:

State Materials Engineer (72-01)
Mississippi Department of Transportation
P.O. Box 1850
Jackson, MS 39215-1850

b. Department Responsibilities

- (1) For State, Federal, and Maintenance contracts, the Project Engineer shall verify the shipping ticket was stamped “Shipped from Pre-tested Stock”, and that each unit is stamped with a MDOT Inspector’s stamp. The engineer shall also inspect each unit for damage. The Project Engineer shall enter the applicable information into a SiteManager Sample Record and complete the appropriate template (FFO627—Shipment of Pre-tested Wood Posts)
- (2) For State Aid and LPA contracts, the Project Engineer shall verify the shipping ticket was stamped “Shipped from Pre-tested Stock”, and that each unit is stamped with a MDOT Inspector’s stamp. The engineer shall also inspect each unit for damage. The engineer shall submit a “Pretested Materials Shipment Report Request Form” for each project to the Materials Division. A copy of the form may be obtained from the www.goMDOT.com website or by request to the Materials Division. Upon receipt of the form, the Materials Division will issue a SiteManager Report of the applicable material.

2.9 Traffic Materials

2.9.1 Thermoplastic Traffic Stripe – The following section outlines the uniform procedures for the acceptance of thermoplastic traffic striping materials by certification.

2.9.1.1 General – Acceptance of thermoplastic traffic striping material produced for use in Department work will be based on certification by the producer.

Upon request of the State Materials Engineer, samples of the material shall be furnished to the Central Laboratory. Each container of thermoplastic material shall bear the following data:

- (1) The manufacturer's name;
- (2) Address of the plant;
- (3) Date of manufacture;
- (4) Batch number;
- (5) Color of the material.

2.9.1.2 Certification – A manufacturer's certification shall be issued on each batch of thermoplastic material to be used in Department work.

The certificate shall contain the following information:

- (1) Date of manufacture;
- (2) Batch number;
- (3) Number of pounds in the batch;
- (4) Color of the material;
- (5) Test results on all required tests;
A statement that the materials meet all applicable specifications (or cite specific specifications) of the Mississippi Department of Transportation;
- (6) Signed by an authorized representative of the company.

2.9.1.3 Certification Distribution – The following procedures shall be followed for Certificate Distribution.

- (1) The manufacturer shall furnish the Contractor copies of the certification on each batch of material.
- (2) The Contractor shall furnish the Project Engineer three (3) copies of the certification covering each batch to be used on the project. The certificate must show the project

number and the county in which the material is to be used.

- (3) After the Project Engineer has compared the batch number(s) on the certificate(s) with the batch number(s) on the material, the Contractor may proceed with his work.

2.9.1.4 Reporting--Upon completion of the work, the Project Engineer shall adhere to the provisions of Materials Manual Section 2.9.2, Glass Beads for reporting the number of pounds of pretested drop-on glass beads (by lot number) on the project. For State, Federal, and Maintenance contracts, the Project Engineer shall enter the applicable information into a SiteManager Sample Record and complete the appropriate template (CPE901—"Project Engineer Certification"). The Project Engineer will distribute copies as needed. For State Aid and LPA contracts, the Project Engineer shall maintain a record of certification in the Project File.

2.9.2 Glass Beads – The following section outlines the uniform procedures for the sampling, testing, and acceptance of glass beads used with traffic paint and thermoplastic.

2.9.2.1 General – The sampling, testing and acceptance of glass beads are the responsibility of the Central Laboratory; the proper handling and application of the beads after delivery are the responsibility of the Contractor, when applicable, District and/or Project personnel.

2.9.2.2 Sampling – The following sampling procedures shall be followed for glass beads to be used on MDOT Construction or Maintenance Projects.

- (1) Beads requiring sampling are Maintenance Beads (application under contract or by the Department) and Construction Beads.
- (2) At the discretion of the State Materials Engineer, all beads proposed for use by the MDOT shall be randomly sampled by personnel of the Central Laboratory at the manufacturer's plant or warehouse, supplier's or contractor's warehouse.
- (3) One (1) random sample for each lot (100,000 pounds maximum) shall be obtained as follows:
 - a. Randomly select the number of 50 pound bags obtained by taking the cube root of the number of 50 pound bags in the lot to be tested.
 - b. Reduce the material by passing each selected 50 pound bag through 16:1 splitter.
 - c. Using a 1:1 splitter, further reduce the material to sample size of one (1) quart minimum.
 - d. Bulk containers shall be sampled as arranged by the Central Laboratory.
- (4) Samples will be tested by the Central Laboratory.
- (5) Each container of accepted beads shall be stamped by the Central Laboratory Inspector. Maintenance beads to be applied by MDOT personnel; that are sampled, tested and accepted after delivery to MDOT facilities will not be stamped.
- (6) The bags of beads shall be palletized so that each bag is accessible for stamping

by the Central Laboratory Inspector.

2.9.2.3 Reporting – The following procedures shall be followed to document that glass beads were sampled and tested in accordance with project specifications and the procedures set forth in these provisions.

- (1) For State, Federal, and Maintenance contracts, the Project Engineer shall enter the applicable information into a SiteManager Sample Record and complete the appropriate template (FFO628—“Shipment of Glass Beads”).
- (2) For State Aid and LPA contracts, the Project Engineer shall submit a “Pretested Materials Shipment Report Request Form” for each project to the Materials Division. In order to prepare the reports, the following information submitted with the “Pretested Materials Shipment Report Request Form”:
 - a. Project number, when applicable;
 - b. Manufacturer of beads;
 - c. Central Laboratory Inspector's number(s);
 - d. Lot number(s) of Manufacturer;
 - e. Quantity of beads used by lot number(s).

A copy of the form may be obtained from the www.goMDOT.com website or by request to the Materials Division. Upon receipt of the form, the Materials Division will issue a SiteManager Report of the applicable material.

2.9.2.4 Testing and Acceptance – Testing of all beads shall be in accordance with Mississippi Test Method, MT-75. Final acceptance of all beads shall be based on results of tests performed by the Central Laboratory.

2.9.3 Raised Pavement Markers and Adhesive – The following section outlines the uniform procedures for the sampling and acceptance of raised pavement markers and adhesive.

2.9.3.1 General

Raised pavement markers shall be sampled on the project as required by the specifications, or at the Project Engineer's discretion, as applicable. Adhesive may be shipped to the project as pretested or untested materials. It shall be the responsibility of the Project Engineer to ascertain the sampling or testing status of the materials. Raised pavement markers shall be listed on the Department's Approved Sources of Materials List.

For **pretested adhesive**, prior to sampling, the supplier shall physically separate the adhesive to be sampled from other materials in the storage area. The boxes or containers shall be arranged in such a manner that the Inspector will have access to each one. Only boxes or containers that bear the manufacturer's batch number and the vendor's lot number will be considered for pretesting by the Department.

2.9.3.2 Sampling – At the time of sampling, the vendor or contractor shall furnish such assistance as necessary for obtaining the samples and shall furnish the Inspector a copy of the manufacturer's certified test results covering each lot of markers and adhesive. The Following are sampling procedures and frequencies for markers and bituminous adhesive. (Note: consult MDOT specifications for the sampling requirements of the various types of markers when necessary.)

(1) Markers: Ten (10) markers of each type and class, selected at random will constitute a representative sample for each lot regardless of lot size. A resample will consist of twice as many markers as originally sampled.

(2) Bituminous Adhesive: Obtain one (1) 10-lb. sample per lot.

2.9.3.3 Reporting – The following procedures shall be followed by vendors and MDOT project engineers to document the sampling and testing of raised pavement markers and bituminous adhesive.

(1) Vendor: The vendor shall furnish the required certification(s) and send a copy of the shipping invoice (designated for the Project Engineer) with each shipment. The shipping

invoice shall contain all pertinent data; i.e., purchaser, project number, county, quantities of adhesive identified by lot number, date shipped, and shall contain the statement: "This material was shipped from MDOT pretested stock." Also, a copy of the shipping invoice shall be sent to the Central Laboratory.

(2) Project Engineer:

- a. The project engineer shall verify that the markers and adhesive are on the Department's "Approved Sources of Materials" list, sample markers as needed, and get a copy of the proper certification with each lot.
- b. Adhesive materials may be pre-tested. If the adhesive is pre-tested the project engineer shall:

(1) For state, federal and maintenance contracts, verify that the boxes are stamped with a MDOT Inspector's stamp. In addition, the project engineer shall enter the applicable information into a SiteManager Sample Records and attach the appropriate template (CPE901—"Project Engineer Certification" and/or FFO630—"Shipment of Pre-tested Bituminous Marker Adhesive", as applicable).

(2) For State Aid and LPA contracts, the Project Engineer shall submit a "Pretested Materials Shipment Report Request Form" for each project to the Materials Division. In order to prepare the reports, the form should include the manufacturer, lot number, and quantity used from each lot of adhesive.

- (3)** For materials that have not been pre-tested, and require sampling, the project engineer shall sample the material as specified in Section 2.9.3.2. For state, federal and maintenance contracts, the sample shall be submitted with the applicable SiteManager Identification. For State Aid and Private Entity contracts, the sample shall be submitted with a complete TMD 320 card.

2.9.3.4 Manufacturer's Certified Test Reports – The Contractor shall furnish the Project Engineer the original and three (3) copies of the manufacturer's certified test reports covering all pavement markers and adhesive shipped to the project. The certified test reports shall show the results of each test specified in Test Method MT-17 for markers and in the Department's Standard Specifications for adhesive. The certifications shall state that the markers or adhesive

represented by the test results comply with MDOT specifications.

2.9.3.5 Acceptance

(1) *Tentative Acceptance:* The pavement markers and adhesive shall be tentatively accepted on the basis of the manufacturer's certified test reports and may be placed on the roadway at the Contractor's risk, pending results of testing for final acceptance.

(2) *Final acceptance:* Final acceptance shall be based on the results of the Project Engineer's check samples. These samples shall be obtained as set forth in Section 2.9.3.2 and submitted to the Central Laboratory for testing.

Note: Markers from any lot may be used with adhesive from any approved lot.

2.9.4 Traffic Paint – The following section outlines the uniform procedures for the sampling, testing, and acceptance of traffic paint for use in Department work.

2.9.4.1 General – The term “purchaser,” as referred to in these provisions, refers to striping contractors who apply traffic paint under contract (construction or maintenance) or the receiving District when traffic paint is purchased and applied by the Department.

2.9.4.2 Establishment of “List of Approved Traffic Paint Manufacturers”

- (1) Manufacturers with a proven history (within the past 24 months) of furnishing the Department a quality traffic paint that meets MDOT specifications are placed on the Department’s “Approved Sources of Materials” List.
- (2) For all other manufacturers, an evaluation will be made to determine that the proposed traffic paint consistently meets our specification requirements. For the purpose of this evaluation, manufacturers must submit the following to the State Materials Engineer, P.O. Box 1850, Jackson, MS, 39215-1850:
 - a. The manufacturers’ procedures for in-plant quality control of batch-to-batch production. The procedures must include tests performed, testing frequency, sampling procedures for raw materials and the finished traffic paint, and procedures used to correct deficiencies noted by the quality control testing.
 - b. A List of State DOTs that have approved and used manufacturer's traffic paint in the past twenty-four (24) months.
 - c. The manufacturer shall prepare a laboratory formulated batch of each color of paint meeting MDOT specifications and submit samples of each with a certified laboratory analysis to the MDOT Central Laboratory for a complete laboratory analysis on each batch to determine conformance with Department specifications. Samples shall be packaged in four (4) one (1) quart triple-sealed lined metal cans. Batch Formulation(s) meeting the specifications will be finger printed by X-Ray and infrared for future acceptance and reference. In addition, at the discretion of the State Materials Engineer, the sample may be tested using gas chromatography and/or ultraviolet spectral analysis. The manufacturer shall assign a formulation identification number

or code for each submittal. If the batch is approved, the formulation identification must be used for all shipments and related documents for that paint. Any changes to a formulation must be submitted for approval.

- d. If the evaluation is satisfactory, the paint manufacturer will be added to the Department's "Approved Sources of Materials" list. Such approval will be tentative until a proven history has been established.

- (3)** Furnishing non-specification traffic paint, misrepresentation and/or failure to follow the provisions of this section will be grounds for removal of a manufacturer from the Department's "Approved Sources of Materials" list.

2.9.4.3 Procedures for Purchase and Acceptance of Traffic Paint – Traffic paint must be purchased from a manufacturer on the Department's "List of Approved Traffic Paint Manufacturers."

2.9.4.4 Responsibilities of the Manufacturer – After receipt and manufacture of an order of traffic paint and the manufacture of the ordered paint, but prior to its delivery, the manufacturer shall furnish the MDOT Central Laboratory and the purchaser a copy of the shipping documents, and a certification that the batch(es) shipped conform to the approved laboratory sample formulation in composition and proportioning of all components. Note: any change in the formulation shall necessitate approval of the re-formulation as outlined in Section 2.9.4.2. The shipping document/certification should also include the following: manufacturer, purchaser, paint type, formulation identification number, destination, batch number(s), quantity in each batch and the date of manufacture and test results.

2.9.4.5 Responsibility of the Purchaser – The purchaser must notify the MDOT Central Laboratory upon receipt of a shipment of paint. Prior to placement, the paint will be sampled at random, tested and accepted by the Department at the following minimum frequency for each formulation:

- (1) Manufacturer with a proven history (within the past 24 months):** One (1) sample for every five (5) batches produced for the Department.

- (2) Manufacturer with no proven history:** One (1) sample for each of the first ten (10) batches produced for the Department. If test results for all batches are within (not

borderline) the required formulation, then one (1) sample for every five (5) batches produced thereafter.

Prior to sampling, the purchaser will be responsible for mixing the paint in accordance with the manufacturer's instructions.

2.9.4.6 Responsibilities of the Department

- (1) The MDOT Central Laboratory will be responsible for sampling and testing of the traffic paint after delivery to the purchaser or as arranged. When paint is sampled at the manufacturers or purchasers facility, the paint shall be stamped with a MDOT inspector's stamp. Stamping of the paint will not be required of paint sampled at a MDOT maintenance facility.
- (2) The random samples obtained from the delivered batches will be finger-printed for comparison with the finger-print from the original laboratory formulated batch. Acceptance or rejection of the paint will be based on an evaluation of the prints. When a comparative match of the print(s) is inconclusive, physical tests will be performed for acceptance or rejection.
- (3) For State, Federal, and Maintenance contracts or purchase orders, the Project Engineer shall verify that the paint is pre-tested. The Project Engineer shall enter the applicable information into a SiteManager Sample Record and complete the appropriate template (FFO631—"Shipment of Pre-Tested Traffic Paint").
- (4) For State Aid and LPA contracts, the Project Engineer shall submit a "Pretested Materials Shipment Report Request Form" for each project to the Materials Division. The form should include the following information: Project number, manufacturer, paint type, and the quantity of paint used by batch number(s). A copy of the form may be obtained from the www.goMDOT.com website or by request to the Materials Division. Upon receipt of the form, the Materials Division will issue a SiteManager Report of the applicable material.

2.9.4.7 Non-Specification Traffic Paint – Non-specification traffic paint on the roadway shall be removed or accepted for payment in accordance with the 2004 Edition of the Mississippi Standard Specifications for Road and Bridge Construction, Subsection 105.03, Conformity with

Plans and Specifications.

2.10 Seeding: Seed for Roadside Development

The following section outlines the standard procedure for acceptance of seed.

2.10.1 General – Seed will be sampled and tested for acceptance by the Mississippi Department of Agriculture and Commerce Seed Laboratory at:

The Mississippi State University Seed Laboratory
P.O. Drawer S
Mississippi State, MS 39762

Test reports shall be issued prior to planting. Bags of seed not properly labeled or tagged will not be permitted. In addition, seed damaged in storage or from handling will not be permitted.

When more than nine (9) months have elapsed between the germination test data and the time of planting, exclusive of the calendar month in which the test was completed, the seed will be resampled and retested by the Mississippi Department of Transportation.

2.10.2 Seed Initially Sampled and Tested by the Mississippi Department of Agriculture and Commerce or other Laboratories

- (1) The Project Engineer shall check the certified label/tag of the seed to see that it meets the requirements of the specifications (Mississippi Standard Specifications for Road and Bridge Construction Section 715.03) and the state seed law prior to granting permission for planting.
- (2) Seed labeled with a total germination of less than 60 percent shall not be used. However, if the label indicates a deficiency in the germination or purity, the Project Engineer may approve increasing the application of seed to address the deficiency at no additional cost to the Department.
- (3) The Project Engineer will indicate acceptance or rejection of the seed and retain at least one (1) label/tag for each lot of seed used on the project.

- (4) The Project Engineer shall sample the seeds in accordance with MDOT specifications and as noted below.

2.10.3 Seed Sampled and Tested by the Mississippi Department of Transportation

2.10.3.1 Sampling Apparatus

- (1) The sampling apparatus for sampling Bahiagrass, Fescue, and similar or larger size seed shall be either of the following samplers:
 - a. 39-inch trier, double tube, 7/8-inch outside diameter, or
 - b. Fertilizer probe, 24 inches long, 3/4 -inch diameter, single tube
- (2) An 18-inch trier, 1/2 -inch outside diameter, double tube, shall be used for sampling Bermuda grass, Lespedeza, Clovers, Carpet grass, and similar or smaller size seed.

2.10.3.2 Sample Containers—Seed Samples shall be stored and shipped to the State Seed Testing Laboratory in TMD-088 (Container for Seed Samples).

2.10.3.3 Lot Size—a lot is defined as all the seed of each species (kind and variety) from the same source and with the same lot identification as shown on the tag of each bag of seed in approved storage at the time of sampling. Each subsequent shipment of each species of seed from the same or a different source will constitute a new lot.

2.10.3.4 Sampling Procedure

- (1) All seed sampling shall be performed by the appropriate District Laboratory. Each District Laboratory shall have at least two (2) properly trained employees to perform all seed sampling in their respective District.
- (2) Each lot of seed as defined in Section 2.10.3.3 will be sampled and tested.
- (3) Tested and approved seed stored for a period longer than nine (9) months,

exclusive of the calendar month in which the test was completed, shall be resampled and retested for the percent germination.

- (4) Samples shall be drawn from unopened bags using the appropriate sampler (trier or probe) specified in Section 2.10.3.1.
- (5) Determine the lot identification and the number of bags in that lot actually in storage.
- (6) For lots of six (6) bags or less, each bag shall be sampled and a total of at least five (5) trierfuls shall be taken.
- (7) For lots of more than six (6) bags, five (5) bags plus ten percent (10%) of the number of bags in the lots shall be sampled at random. Regardless of the lot size, it is not necessary to sample more than thirty (30) bags.
- (8) Check the name of the seed and the lot number on the tag of each bag of seed before sampling to avoid mixing lots.
- (9) The sampler shall be fully inserted into the container so as to obtain a representative cross-section of its contents. Care shall be taken not to unduly tear the container when inserting the sampler. When possible, insert the sampler at a point where the seed exerts the least pressure on the container. Be careful when probing the width of a bag so as not to push the sampler through the opposite side. Holes made by the sampling instrument must be carefully resealed with pressure-sensitive tape to prevent loss and contamination of the seed.
- (10) The double tube trier sampler shall always be inserted in the closed position. After insertion, open the tube and allow seed to completely fill the sampler. Close the tube and extract the sample.
- (11) The open single tube probe sampler shall always be inserted with the slot down. After insertion, turn the slot up and allow seed to completely fill the sampler; then extract the sample.

(12) The seed extracted from each container sampled in the lot shall be combined, thoroughly mixed, and quartered until a test specimen weighing approximately one-quarter (1/4) pound is obtained.

(13) The test specimen shall be placed in the approved sample container (Section 2.10.3.2 above) and shipped immediately to the following address:

State Seed Testing Laboratory
P. O. Drawer S
Mississippi State, MS 39762

(14) The following information shall be submitted with each sample: project number, lot number, source, kind and variety, date sampled, place sampled, sampled by, sample number, quantity, test desired, and any other pertinent data.

2.10.3.5 Care of Samples

- (1) Seed are very sensitive and must be protected from rough handling and damage.
- (2) Seed shall be protected from high temperature, direct sunlight, dampness, and exposure to petroleum products as these factors can very quickly affect germination.
- (3) Samples shall be stored in a cool, dry place.

2.10.4 Acceptance and Reporting of Seed by Certified Test Report

2.10.4.1 Seed shipped to a project that is accompanied by a Certified Test Report from the State Seed Laboratory shall be accepted by the Project Engineer. Upon receipt of the Certified Test Report, the Project Engineer shall enter the applicable information into a SiteManager Sample Record and complete the appropriate template (CPE 901—“Project Engineer Certification”).

2.10.4.2 The State Seed Testing Laboratory will submit their test report on each sample of seed

to the Central Laboratory.

2.10.4.3 The Central Laboratory will check the test results for conformance with the specifications and distribute the test reports as follows:

Original copy: Central Laboratory File;

1 copy: District Materials Engineer;

1 copy: Project Engineer;

1 copy: Contractor (sent to Project Engineer for distribution).

2.11 Preformed Joint Filler

The following section establishes uniform policies and procedures for the sampling, inspection, and acceptance of joint materials, bituminous type, used in work under the supervision of the Department.

2.11.1 General – All joint material furnished for Department use shall have been sampled by Department personnel, tested by the Central Laboratory, and approved for use prior to shipment. All suppliers proposing to furnish joint material for Department use shall maintain a separate stock of no less than one (1) bundle (approximately 3000 sq. ft.) of each thickness that is proposed to be furnished.

2.11.2 Sampling Procedure – One (1) sample shall be taken at random from each bundle (approximately 3000 sq. ft.), and an identifying mark shall be placed on each bundle sampled. The samples shall be submitted to the Central Laboratory for testing. Upon receipt of satisfactory test results, the Inspector will stamp each sheet of the material represented by the test results with his MDOT stamp.

2.11.3 Non-complying Sample – When a sample of joint filler fails to comply with the specification requirements, two (2) check samples may be obtained at random from the failing bundle at the discretion of the Engineer. When the test results of these two (2) check samples indicate compliance with specification requirements, the lot will be accepted. When the test results of one (1) or both of the check samples indicate failure to meet specification requirements, the lot shall be rejected.

2.11.4 Reporting – The following procedures shall be followed to document the sampling and testing of preformed joint filler.

- (1) The Producer shall be responsible for sending a copy of the shipping ticket, with each shipment, designated for the Project Engineer. Then the Producer shall forward a copy of the shipping ticket to the Central Laboratory as soon as possible after shipment.
- (2) The shipping ticket shall contain all pertinent data; i.e., purchaser, project number, county, number of sheets of each size and thickness, and date of shipment.

- (3) Upon receipt of the Producer's shipping ticket, the Project Engineer shall enter the applicable information into a SiteManager Sample Record and complete the appropriate template (FFO621—"Expansion Joint Material")
- (4) For State Aid and LPA contracts, the Project Engineer shall submit a "Pretested Materials Shipment Report Request Form" for each project to the Materials Division. A copy of the form may be obtained from the www.goMDOT.com website or by request to the Materials Division. Upon receipt of the form, the Materials Division will issue a SiteManager Report of the applicable material.

2.12 Advanced Payment of Materials

2.12.1 Identification, Storage, and Inventory Control of Materials for Advanced Payment –

The following section details the procedure for advance payment of material stored or stockpiled for a particular Department project's use.

2.12.1.1 General – Only materials which have been inspected and tested in accordance with all applicable specifications and approved by the Mississippi Department of Transportation will be considered for advance payment. When a determination has been made to allow advance payment for materials, the Project Engineer or a verifier representing either the Central Laboratory, District Materials Engineer or an approved Department representative agency acting on behalf of the Project Engineer, shall make an inventory. Upon completion of the inventory, Form TMD 323, Certificate of Storage, shall be completed and distributed in time for an advance payment to be included on the monthly estimate. Refer to Appendix A of this manual to view Form TMD-323.

2.12.1.2 Responsibility of the Contractor – The contractor must make a written request for payment and furnish written consent of the Surety to the Project Engineer. The Contractor shall make arrangements through the Project Engineer for the satisfactory storage of materials as stipulated in the standard specifications and/or contract documents, and as addressed in the following provisions.

(1) Storage of Materials

- a. Each unit or bundle shall be handled and stored as specified in the Standard Specifications or as approved by the Department's representative if not specified otherwise.
- b. Materials to be inventoried for advance payment shall be physically separated (in a different storage area) from other materials in stock. These materials must be stored in such a manner that they may be easily inventoried. During inventory, a cursory inspection may be performed. While in storage, if the material is damaged, lost, destroyed or becomes unacceptable for any reason, it will be rejected and taken off the inventory until replaced.

- c. Each unit or bundle shall be clearly identified with a tag, Department stamp or other approved method. The method of identification shall designate the identification number of the material and other pertinent information. This method of identification shall be securely affixed on each unit or bundle.
- d. Once a unit or bundle of material has been designated for a specific project and for which advance payment is made, it shall be used on that particular project only, unless transferred by the Project Engineer to another project under contract by the same contractor.

(2) Invoices

- a. **Storage Invoices** – Each storage invoice shall contain the requirements of the contract and the following information:
 1. Project number and county;
 2. Purchaser;
 3. Date of Purchase;
 4. Number, size and/or length of each material;
 5. Costs or price to contractor at producer's plant or point of storage.
- b. **Shipping Invoices** – Each shipping invoice shall contain the following information:
 1. Project number and county;
 2. Purchaser;
 3. Date of shipment;
 4. Number, size and/or length of each material;
 5. A statement to the effect that this material was shipped from MDOT pretested stock;
 6. If shipped from project stock or general pretested stock, denote on invoice.

One copy of the shipping invoice shall accompany each shipment and be designated for MDOT personnel.

After shipment, the producer will forward a copy of the shipping invoice to the Central Laboratory, District Materials Engineer and designated inspection agency (if applicable).

2.12.1.3 Responsibility of the Department's Representative Agency – Inventory of the materials in each Project Stock should be made at the end of each month. Upon completion of the inventory, Form TMD-323 shall be completed and distributed.

2.13 Inspector Stamps

MDOT Inspector Identification – In order to assist in the identification of inspected and accepted materials that are shipped from producers' plant(s) the following system has been established. A Stamp Number is assigned to MDOT Central Laboratory and District Personnel along with other specified entities for identification when material is inspected. All currently assigned Stamps issued by the Mississippi Department of Transportation are listed below.

MDOT STAMP NUMBER	STAMP ASSIGNMENT
1 DOT	GEORGE R. WHITE
2 DOT	MELTON W. STUART
3 DOT	CARL W. CRAIG
4 DOT	JERRY E. ANDERSON
5 DOT	THOMAS M. SMITH
6 DOT	JAY A. WINDHAM
7 DOT	JAMES R. THORTON
8 DOT	NORTH CAROLINA DEPT. OF TRANSPORTATION
9 DOT	TEXAS STATE DEPT. OF HIGHWAYS & PUBLIC TRANSPORTATION
10 DOT	ROBERT W. HUNT COMPANY
11 DOT	CHARLES L. CANOY
12 DOT	TENNESSEE DEPT OF TRANSPORTATION
13 DOT	ALBERT G. CALLOWAY
14 DOT	<i>NOT ASSIGNED</i>
15 DOT	EVERETT E. CRAFT
16 DOT	CELINA M. SUMRALL
17 DOT	<i>NOT ASSIGNED</i>
18 DOT	<i>NOT ASSIGNED</i>
19 DOT	<i>NOT ASSIGNED</i>
20 DOT	GEORGIA DEPT. OF TRANSPORTATION
MDOT 1-1	DISTRICT 1
MDOT 1-2	DISTRICT 1
MDOT 2-1	DISTRICT 2
MDOT 2-2	DISTRICT 2

MDOT 3-1	DISTRICT 3
MDOT 5-1	DISTRICT 5
MDOT 5-2	DISTRICT 5
MDOT 6-1	DISTRICT 6
MDOT 6-2	DISTRICT 6
MDOT 6-3	DISTRICT 6
MDOT 6-4	DISTRICT 6
MDOT 6-5	DISTRICT 6
MDOT 7-1	DISTRICT 7

Section 3 – Mix Designs

3.1 Hot Mix Asphalt Mix Design Approval Process

3.1.1 Hot Mix Asphalt Mix Design Approvals – All requests for a new hot mix asphalt mix design must be submitted to the State Materials Engineer in writing for review. Requests will be forwarded to the Lab Operations Branch.

After an initial review, the mix parameters will be checked for compliance against the project specifications using the Departments mix design spreadsheet. Once the design parameters have been verified, the mix will be tested in the lab in accordance with MT-78 Volumetric Mix Design of Hot Mix Asphalt Mixtures Using the Superpave Gyratory Compactor.

Upon completion of the laboratory testing, the mix design parameters will be entered into a sample record within SiteManager and a copy of the approved mix design sent to the District Materials Engineer that submitted the mix design request.

3.1.2 Hot Mix Asphalt Mix Design Transfers – All requests to transfer a hot mix asphalt design from one project to another must be submitted to the State Materials Engineer in writing for review. Requests will be forwarded to the Lab Operations Branch.

Upon review of the request, a sample record will be entered into SiteManager and the sample record will be linked to the original test data using the “Link To” functionality within SiteManager.

3.1.3 Termination of a Hot Mix Asphalt Mix Design – In the event a hot mix asphalt mix design does not perform satisfactorily in the field in accordance with the project specifications, the District Materials Engineer may submit a request to terminate a mix design to the State Materials Engineer for review. If upon review, a mix design is deemed deficient due to field performance, a termination date will be entered into SiteManager and the mix design will not longer be valid.

3.2 Portland Cement Concrete Mix Design Approval Process

3.2.1 Portland Cement Concrete Mix Design Approvals – All requests Portland cement concrete mix designs must be submitted to the State Materials Engineer in writing for review. Requests will be forwarded to the Lab Operations Branch.

The mix design parameters will be checked for compliance against the project specifications using the Departments PCC Mix Design Spreadsheet. Once the design parameters have been verified, the mix will be given tentative approval pending field verification. The field verification process validated the producer/supplier's ability to supply the mix within the specified batching and field performance tolerances. Once the field verification of the mix is reviewed and approved by Materials Division, the mix will be given final approval.

Upon completion of the mix design review, the Laboratory Operations Branch will complete a sample record within SiteManager and attach the PCC Mix Design Spreadsheet.

3.2.2 Portland Cement Concrete Mix Design Transfers – A Portland cement concrete mix design that has undergone field verification and has final approval may be, upon written request to the State Materials Engineer, transferred to other projects. The District Materials Engineer is to certify that all of the component materials have not changed since the mix design received final approval.

3.2.2 Termination of a Portland Cement Concrete Mix Design – In the event Portland cement concrete mix design does not perform satisfactorily in the field in accordance with the project specifications, the Project Engineer or District Materials Engineer may submit a request to terminate a mix design to the State Materials Engineer for review. If upon review, a mix design is deemed deficient due to field performance, a termination date will be entered into SiteManager and the mix design will not longer be valid.

Section 4 – Job Control Testing and Acceptance of Materials

4.1 Evaluation, Certification, and Acceptance of Materials

4.1.1 Procedures to Certify Materials Used in a Project – Upon completion of a project, the State Materials Engineer is responsible for certifying that all sampling and testing requirements are satisfied for each material on a project. The following provisions establish a standard procedure for issuing a letter of Certification of Materials and Tests by the State Materials Engineer.

4.1.1.2 Guidelines

- (1)** The letter of Certification of Materials and Tests will be issued for a completed project by the State Materials Engineer upon determination that all construction materials are adequately covered by test reports and/or required certifications. The materials and quantities as submitted by the Project Engineer on Form TMD-725, STATEMENT OF ESTIMATED FINAL QUANTITIES AND CERTIFIED TESTS OF MATERIALS, will be used in this determination.
- (2)** Upon receipt of the Form TMD-725 by Materials Division, the subject project files are removed from the active status. All test reports and certifications are reviewed for compliance with specification requirements and for approximate frequency of sampling in order to determine if materials that were incorporated into the project have been adequately sampled and/or tested in accordance with S.O.P. TMD-20-04-00-000, Approximate Frequencies for Job Control Acceptance Sampling and Testing.
- (3)** If it is found in the above review of the test reports and certifications that there are shortages in test reports or samples that fail to meet specification requirements, then the material shortage or sample failures will be listed on a Materials and Tests Clearance memorandum. Each material deficient in test reports or certifications will be listed, along with the quantity not covered by test reports or certifications, on a Materials and Tests Clearance memorandum. Any acceptance sample failures will be listed on a separate sheet, and attached to the Materials and Tests Clearance memorandum. At the time these reports are issued for a project, a file will be established for all final documents. A flow sheet is then attached to this file showing status of finalization of the project.
- (4)** All sample variations will be documented in writing by the Project Engineer to the District Materials Engineer, listing the variations by type, sample I.D. and deficiencies, and giving the Project Engineer's recommendations as to the disposition of the materials and deficient samples. WHEN POSSIBLE, THE PROJECT ENGINEER, UPON RECEIPT OF TEST

REPORTS OF DEFICIENT MATERIAL, SHOULD PROCEED WITH DOCUMENTATION IMMEDIATELY, **BEFORE COMPLETION OF A PROJECT**. The District Materials Engineer will submit a Laboratory Tolerance letter (including a copy of the Project Engineer's letter of documentation) to the State Materials Engineer documenting his recommendations as to the disposition of the materials and deficient samples. The State Materials Engineer will issue a Laboratory Tolerance Letter with his recommendations for acceptance or rejection of the deficient material, and attach copies of letters of documentation received from the Project Engineer and the District Materials Engineer.

- (5) If a project is found to comply with the requirements as outlined above and upon receipt of documentation from the District Materials Engineer of comparison of Independent Assurance Samples with corresponding split job control samples, the State Materials Engineer will issue a letter of Certification of Materials and Tests, TMD-441 or TMD-442, with attachments TMD-444 and TMD-445. At the discretion of the State Materials Engineer, if after three months from the issuance of the Materials and Tests Clearance Memo, shortage of items, material certifications or samples, etc. exist, each material will be considered an exception. Exceptions will be listed as such on the Certification of Materials and Tests.
- (6) After receipt of the Letter of Final Acceptance, the Materials Division will place the project records in the inactive files for archiving.

4.1.2 General Procedures for Evaluation of Materials and Work – The proper evaluation for acceptance of materials or work should be based on the appropriate job control sampling and testing. The following provisions establish a general procedures acceptance or rejection of materials and work.

4.1.2.1 General – All rejected materials and work shall be addressed in accordance with the provisions of the Standard Specifications. Complete documentation is to be made as to the disposal, method of correction and later approval or rejection, as applicable, and complete cross-referencing of failing test(s) with acceptance test(s) if applicable. All unacceptable work shall be similarly documented.

- (1) The proper evaluation for acceptance or rejection of any material or work is based on proper sampling, testing and inspection by individual(s) or agency(ies). All of these functions should be performed in such a manner that: (1) no lot will be accepted unless it meets all requirements of the applicable specifications, and (2) no lot will be rejected unless it can be established that it does not comply with one or more contract requirements. As a matter of principle, a material or work should not be accepted or rejected on the basis of a single sample or a single test unless the nature of the material or work and the test is such as to render the test result conclusive. The more samples of a given material or work that are tested, the greater the assurance of the test results. All samples tested must be reported, however, and all results considered in an engineering determination of acceptance or rejection.
- (2) Under conventional testing for acceptance or rejection, the number of samples tested must necessarily be limited by practicality and economics, but regardless of the number tested all must be considered and reported.
- (3) The number of check samples tested before material rejection shall be in accordance with the applicable test method and/or Department standard operating procedures and contract specifications.

4.1.3 Acceptance of Materials Used in Certain Maintenance Projects by Certification of the Project Engineer

4.1.3.1 General – To establish a procedure whereby materials used in the construction of project offices, maintenance buildings, shops, and additions and alterations to existing buildings (including District buildings) may be accepted by certification.

4.1.3.2 Acceptance of Materials by Certification

- (1)** The normal procedures for acceptance of the materials used in the construction of the facilities as set out above may be waived and the materials accepted on the basis of a Letter of Certification stating all materials installed (structural, mechanical, electrical, plumbing, miscellaneous, etc.) had been approved by the Architectural Services Division and met the requirements of the specifications, plans, and shop drawings. The Letter of Certification shall be provided by the Project Engineer with copies to the District Materials Engineer and the State Materials Engineer.
- (2)** Upon receipt of this certification, the State Materials Engineer will issue the Letter of Certification of Materials and Tests (Form TMD 442) to the State Construction Engineer.
- (3)** Concrete aggregates, stabilizer aggregates, cementitious materials, water, and steel reinforcement are subject to normal job control sampling and record sampling testing procedures. However, where applicable, these materials may be accepted under the provisions of S.O.P. No. TMD-20-05-00-000, Sampling and Testing of Small Quantities of Miscellaneous Materials.

4.2 Job Control Sampling and Testing

4.2.1 Job Control Sampling and Testing

4.2.1.1 General – To outline uniform procedures for job control of materials and operations.

4.2.1.2 Purpose of Testing Materials

All testing of materials has several purposes, among which are:

- (1) To assure that materials comply with specifications.
- (2) To indicate corrective action necessary.
- (3) To improve materials and construction control.
- (4) To provide data for statistical analysis as a basis for revision of the specifications.
- (5) To promote awareness of the importance of optimum quality materials and proper methods of construction.

Job Control sampling and testing is that performed on a day-to-day basis during construction and after completion of any phase of construction. This sampling and testing may be performed by project personnel, district laboratory personnel, the Central Laboratory, commercial laboratories, and, in some cases, by manufacturers' laboratories.

Whenever a test indicates noncompliance with the specifications, several steps may be taken:

- (1) Retest the sample or obtain a check sample and test;
- (2) Notify the Contractor so that corrective action may be taken;
- (3) Notify the Project Engineer, District Materials Engineer, or State Materials Engineer.

All test results shall be retained. When a test indicates failure, the project records shall indicate the corrective action taken and shall include both the failing test data as well as the complying test data after corrections have been made.

It is required that all basic data, from which test results are computed, be retained in project files. This includes wet and dry weight in moisture determinations, retained weights in gradation tests, and similar data for other tests. It also includes both laboratory and field testing.

Job control sampling and testing is applicable to all materials, processes, construction operations, and includes field determinations of specification requirements, such as in-place densities, depth and width measurements, and other tests which inherently require testing in-place.

These provisions are applicable to all materials on all projects, except that, when the quantity of a material on a given project is insufficient to justify the expense of testing, the District Materials Engineer or the State Materials Engineer may determine that no job control samples will be required for these materials within the guidelines of documents sited in Section 4.2.2.2 of this document.

4.2.2 Standard Lot Sizes and Sampling and Testing Frequencies

4.2.2.1 General – Materials Division maintains Standard Operating Procedures (SOPs) that define standard lot sizes to assure conformity with specifications. The applicable materials are then sampled and tested at the required frequencies.

4.2.2.2 SOPs Related to Job Control Sampling and Testing of Materials

TMD-20-03-00-000 Schedule of Standard Lot Sizes for Conformity Determination

**TMD-20-04-00-000 Approximate Frequencies for Job Control Acceptance Sampling
And Testing**

**TMD-20-05-00-000 Sampling and Testing of Small Quantities of Miscellaneous
Materials**

Copies of these SOPs can be found in **Appendix C**.

Section 5 – Independent Assurance Program

5.1 General – The Materials Division is responsible for operation of an independent assurance sampling and testing program meeting the requirement of Federal-Aid Policy Guide, 23 CFR 637B. To accomplish this, the State Materials Engineer maintains a staff of Independent Assurance Samplers. The proper and efficient administration of this program requires cooperation between the Independent Assurance Section, the District Materials Laboratory, and the District Project Office. Independent Assurance sampling and testing will be conducted on all Federal Aid Projects on the National Highway System and any state funded project as directed by the State Materials Engineer.

The staff of the Independent Assurance Section consists of the following: a Chief of the Independent Assurance Sample Section and six Independent Assurance Samplers. One Independent Assurance Sampler will be located in each District.

5.2 Standard Operating Procedures Related to the Independent Assurance Program – Specific Policies that establish uniform procedures for the Independent Assurance Sampling and Testing Program are found in the following Department SOPs.

TMD-06-01-00-000 Independent Assurance Sampling and Testing

**TMD-06-02-00-000 Approximate Frequencies for Independent Assurance
Sampling and Testing**

Copies of these SOPs can be found in **Appendix C**.

Section 6 – Radiation Safety

6.1 Radiation Safety Procedures for Nuclear Gauges – These procedures establish MDOT’s standards that are established to comply with Federal and State regulations governing the minimum standards for the protection against radiation which apply to nuclear gauges used in testing.

6.1.1 Regulations

The standards for protection against radiation which govern the Department's use of nuclear gauges are set forth by the Mississippi State Board of Health in the publication, “Regulations for Control of Radiation in Mississippi.”

These regulations, with all revisions and additions, form a part of the requirements of this S.O.P. Copies may be obtained from the Central Laboratory.

These standards are enforced by the Mississippi State Board of Health by licensing and inspection. Violations could result in the suspension of licenses and/or a substantial fine.

6.1.2 Radioactive Material License

Each District will operate under the Radioactive Material License issued by the Mississippi State Board of Health to the Mississippi Department of Transportation. The license will state the radioactive material, the chemical and/or physical form, the source strength, manufacturer, and model number of the nuclear gauges that are approved for use. Under no circumstances will unapproved instruments be used on Mississippi Department of Transportation construction projects. Only personnel who have received the proper training may operate these instruments.

6.1.3 Procedures for the Use of Nuclear Gauges

This section provides a guide for personnel using and administering the use of nuclear gauges and regulates the use of these gauges containing radioactive materials. All personnel responsible for radioactive sources shall:

- (1) Be thoroughly familiar with the safe handling techniques for using radioactive materials.
- (2) Be fully informed of the hazards to health that exist near radioactive material.

- (3) Be completely familiar and shall comply with the procedures set forth in this S.O.P., and with the Mississippi State Board of Health "Regulations for Control of Radiation in Mississippi."
- (4) Read the manufacturer's instructions for the instrument being used.

6.1.4 Central Laboratory Responsibilities

6.1.4.1 MDOT Radiation Administrative Officer – The State Materials Engineer, as the MDOT Radiation Administrative Officer, has the direct responsibility for administering and controlling the use of radioactive material within the Mississippi Department of Transportation. His duties are as follows:

- (1) License and Inventory: Obtain the Department license and amendments as required. This includes the responsibility for the inventory of sources and to insure that the number, strength, and type of sources do not exceed those for which the Department is licensed.
- (2) Regulations: Insure statewide conformance to the regulations and procedures incorporated into this S.O.P.
- (3) Training: Provide the necessary training to qualify personnel as nuclear gauge operators.
- (4) Emergency Procedures: Assist in implementing any emergency procedures in any situation which could arise endangering the public from the use of radioactive material.
- (5) Appoints the MDOT Radiation Safety Officer and is responsible for his activities.

6.1.4.2 MDOT Radiation Safety Officer – The MDOT Radiation Safety Officer has the responsibility for radiation protection program with the Mississippi Department of Transportation. His Duties are as follows:

- (1) Records: Responsible for maintaining and inspection of the following records: (He may delegate the duties of record keeping to subordinates.)

- a. Radiological Exposure Records
- b. Gauge Location Records
- c. Wipe Test Records
- d. Radiation Survey Records
- e. Semiannual Inventory Records
- f. Utilization Logs
- g. All other records as required

(1) Radiation Detection Equipment: Responsible for obtaining and maintaining the following radiation detection equipment:

- a. Survey Equipment
- b. Film Badges

(2) Radiation Surveys: Perform radiation surveys as required.

(3) Wipe Tests: Witness or perform all wipe tests on radioactive sources once every six (6) months.

(4) Emergency Procedures: Responsible for the implementation of emergency procedures for any situation that may arise which endangers the public to exposure to radioactive materials.

(5) Safety Control: When in his judgment a situation exists that cannot be corrected quickly, and is a potential hazard to the operator or those working in the vicinity, the MDOT Radiation Safety Officer shall stop or suspend the operation until corrective action has been taken to eliminate the hazard and the operation complies with the current regulations and the requirements of this S.O.P.

(6) Personnel Monitoring:

- a. Assign all film badges in accordance with the regulations.
- b. See that all film is changed monthly and the old film is forwarded to the MDOT Radiation Safety Officer by those to whom the badge is assigned within two days after receiving the replacement film.

- c. Submit all old badges monthly to a qualified commercial laboratory for monitoring individual dosages.
 - d. See by practical inspection that all operators are properly using the film badges and that the badges are properly stored when not in use.
 - e. Inspect records and verify that radiation exposure records are on file as required.
- (7) Training: Assist the MDOT Radiation Administrative Officer in the training of gauge operators.
- (8) Gauge Repair: Responsible for the repair of only the electronics of all nuclear gauges.
- (9) Responsible for all nuclear gauges located in the Central Laboratory and the application of at least minimum standards for protection of individuals against radiation exposure in accordance with the regulations.

6.1.5 District Responsibilities

6.1.5.1 Application of Minimum Standards – The District Materials Engineer is responsible for the application of at least minimum standards for protection of individuals against radiation exposure in his District in accordance with the regulations and the requirements of this S.O.P. When in his judgment a situation exists that cannot be corrected quickly and is a potential hazard to the operator or those working in the vicinity, the District Materials Engineer shall stop or suspend the operations and notify the MDOT Radiation Safety Officer immediately for corrective action. The operation shall be permitted to continue after eliminating the hazard and the operation complies with the current regulations and the requirements of this S.O.P.

6.1.5.2 Inventory of District Nuclear Gauges – The District Materials Engineer shall keep the MDOT Radiation Safety Officer informed of the location of each nuclear gauge at all times. When a nuclear gauge is transferred from the District Laboratory to a Project Engineer, from one Project Engineer to another, or from a Project Engineer to District Laboratory, the District Materials Engineer shall advise the MDOT Radiation Safety Officer, in writing, of such transfer by gauge number. It is necessary that the MDOT Radiation Safety Officer knows at all times the location of each nuclear gauge.

6.1.5.3 Storage of Nuclear Gauges in the District Laboratory – When the nuclear gauge is stored in the District Laboratory and used by District personnel, the following requirements become the direct responsibility of the District Materials Engineer:

- (1) Storage of Nuclear Gauges (Section 8)
- (2) Posting of Regulations and Notices to Employees (Section 11)
- (3) Radiation Protection (Section 10)
- (4) Records and Reports (Section 16.3 and 16.4)
- (5) Transporting Nuclear Gauges (Section 9)
- (6) Emergency Procedures (Section 12)

6.1.6 Supervision at Project Level

All field operations involving the use of radioactive materials shall be under the direct supervision of the Project Engineer. The Project Engineer is directly responsible to the MDOT Radiation Safety Officer for the use of the nuclear gauges in the field. The Project Engineer is responsible for the application of at least the minimum standards for protection of individuals against radiation exposure in accordance with the requirements of the regulations and this S.O.P. His duties include the following:

- (1) Storage of Nuclear Gauges: Provide adequate storage and insure conformance to the minimum requirements set out in Section 8 of this method.
- (2) Transporting Nuclear Gauges: Insure conformance to the minimum requirements set out in Section 9 of this method.
- (3) Radiation Protection: Insure conformance to the minimum requirements for protection against radiation exposure as set out in Section 10 of this method.
- (4) Security Requirements: See that all security measures for storage and transporting nuclear gauges meet the requirements set out in this method.
- (5) Posting of Regulations and Notices to Employees: See that all regulations, notices to employees and this S.O.P are posted in accordance with the requirements of Section 11 of this method.

- (6) Emergency Procedures: Comply with the requirements of Section 12 should such an emergency arise.
- (7) Training: Insure that only trained qualified personnel are permitted to handle or operate nuclear gauges.
- (8) Reports: The law clearly places responsibility for public safety upon the user and the following reports are legal documents for the protection of the Project Engineer and the State. These reports are as follows:
 - a. Utilization Log for Nuclear Gauges (TMD-801): This report is to be filled out daily by the nuclear gauge operator or other responsible person checking the gauge out of storage. The Project Engineer shall see that this report is properly maintained in accordance with Section 16.3 and submit one (1) copy of the complete report monthly to the MDOT Radiation Safety Officer.
 - b. Report of Accumulated Dosage: This report shall be prepared and submitted annually by the MDOT Radiation Safety Officer for each employee assigned a film badge. The Project Engineer shall see that the individual concerned receives a copy of this report.
 - c. The Project Engineer shall notify, in writing, the MDOT Radiation Safety Officer when an employee who is assigned a film badge assumes new duties or leaves the Department. Upon receipt of this notice a report showing the total dosage accumulated during employment with the Department will be sent to the individual for his record.
 - d. Storage Radiation Monitoring Report (TMD-738): See Section 16.4 of this method.

6.1.7 Obligations of Test Operator

The test operator on a project must notify the Project Engineer immediately whenever difficulties arise and will be responsible for the following items:

- (1) Shutter Device: The test operator must know how the shutter device for shielding the radioactive material works. He should continuously check the operation of the shutter device and report any malfunction to the MDOT Radiation Safety Officer immediately.
- (2) Storage: When not in use, the shutter device will be locked and the gauge locked in an adequate storage facility.
- (3) Safety: When operating the nuclear gauges (i.e., when the handle is in the "USE" position) unauthorized personnel are to be kept at a distance greater than fifteen feet (15') from the probe. If it becomes necessary to recharge the nuclear gauge batteries when away from the regular storage area, the operator shall be in attendance at all times taking the necessary precautions to prevent access to the nuclear gauge by unauthorized personnel.
- (4) Radiation Signs: The test operator will insure that the proper radiation signs are used in the work area and storage area. (Note: The radiation signs placed on the nuclear gauges by the manufacturer only meet the requirements for the work area.)
- (5) Utilization Log for Nuclear Gauges (TMD-801): The test operator is responsible for making the daily entries on this form in accordance with Section 16.3 of this method.

6.1.8 Storage of Nuclear Gauges

6.1.8.1 General Requirements – The following requirements must be complied with for all storage facilities used:

- (1) The storage area shall prevent exposure of persons in the immediate vicinity to a radiation field greater than 0.5 mr/hr.
- (2) Notification of the existence of ionizing radiation to the parties responsible for the premises and approval of storage by the parties. (Storage location must be a minimum of fifteen feet (15') from any permanent work station.)
- (3) The premises shall be inspected and the responsible State employee shall satisfy himself that the area has adequate locks. The State employee shall have keys to the locked

area.

- (4) Radiation signs, provided by the Central Laboratory, shall be conspicuously posted on the storage facility so as to notify the public of the existence of ionizing radiation. The signs shall be clearly legible magenta-on-yellow containing the words "CAUTION! RADIOACTIVE MATERIAL."
- (5) When a nuclear gauge is placed in storage, its probe shall be padlock in the safe position. The gauge and case shall then be locked in the storage facility.
- (6) Each time the nuclear gauge is placed in a storage facility, a reading shall be taken with the CD-V-700 Survey Meter immediately outside the storage at the closest point to the nuclear gauge. These readings shall be maintained as a permanent record to insure that no individual in the immediate vicinity is exposed to a radiation field of more than 0.5 mr/hr.

6.1.8.2 District Office and Central Laboratory Storage – When the gauges are not in field use, the normal storage will be in the District Office or the Central Laboratory. The District Materials Engineer is responsible for the storage facilities at the District Office.

6.1.8.3 Field Storage Sites – The Project Engineer is responsible for storage of nuclear gauges in the field. The nuclear gauges may be stored in the following area provided the facility meets the requirements of Section 6.1.8.1 of this method:

- (1) State Vehicle on State Property Within a Fenced Enclosure or Building with a Locked Gate or Door: The vehicle must be locked and the keys retained by the responsible State employee.
- (2) MDOT Maintenance Yard: A locked room or building not available to the public.
- (3) Resident Engineer's Office: In a closet or special area.
- (4) Other State-owned facilities if required.

6.1.9 Transportation of Radioactive Materials – The nuclear gauge shall be transported in the shipping container provided by the manufacturer with the nuclear probe padlocked in the safe position. In addition, the following rules for the various modes of transportation shall be complied with as well as all applicable M.D.O.T. regulations.

6.1.9.1 Exposure Rate – The exposure rate on the outside of the vehicle shall not exceed 2 mr/hr.

6.1.9.2 Placement in Vehicles

- (1) Passenger Car: The box containing the nuclear gauge shall be kept locked in the trunk and secured in the trunk to prevent damage during transportation.
- (2) Station Wagon or Panel Truck: The nuclear gauge shall be placed at the back of the vehicle in the shipping container and secured to the vehicle in such a manner as to prevent them from sliding around. When the driver is not in attendance, the vehicle shall be locked to prevent access to the gauge.
- (3) Pickup Trucks: When pickup-type vehicles are used, the box containing the nuclear gauge shall be secured to the bed of the vehicle to prevent movement and in such a way as not to be easily removed by a passer-by. In addition, when the driver is not in attendance, the container shall be locked or the gauge shall be placed in the cab of the vehicle with its doors locked.

6.1.9.3 Overnight Nuclear Gauge Storage – For enroute overnight storage at a motel, hotel, or other lodging place, the locked gauge may be left in the locked vehicle. In the case of pickup trucks, the locked gauge shall be locked in the cab of the vehicle or locked in a box which is bolted to the truck bed. The vehicle when used as a storage area shall be posted with signs in accordance with [Subsection 8.1.4](#). Permission to have the source on the premises must be obtained from the owner or the manager of the property.

6.1.9.4 Transporting Vehicle Accident – In case of collision when transporting the nuclear gauges, which results in radiation danger, notify the local civil authorities and the MDOT Radiation Safety Officer by phone. He will then notify the proper authorities to take action. The emergency procedures set out in Section 12 of this method shall be followed. A copy of this method shall be located in the glove compartment of the vehicle.

6.1.9.5 Commercial Carriers – Commercial carriers are to be used only by the Central Laboratory in returning nuclear gauges to the manufacturer for service or repair.

- (1) Carriers: Suggested carriers to be used in order of preference:
 - a. Air Freight
 - b. Truck Freight

- (2) Container: Always use the supplied shipping container which shall be sealed with metal shipping bands or equal. The container shall contain all of the required markings to identify the contents as radioactive.

- (3) The shipper shall be given two (2) copies of the restricted article statement prepared by the MDOT Radiation Safety Officer and two (2) copies of the latest wipe test results.

- (4) Information for Receiver: Notify the receiver of the date shipped, carrier, and when to expect delivery.

6.1.10 Radiation Protection

6.1.10.1 Personnel Restriction – Only those employees directly involved in the use of the gauges containing radioactive materials shall be permitted access to radiation of greater intensity than two (2) milliroentgen per hour (mr/hr). **No one under 18 years of age shall be authorized to use nuclear equipment or frequent areas where nuclear equipment is located.**

6.1.10.2 Occasional Exposure – Personnel that are within a 2-mr/hr. field two (2) hours or more per day shall wear a film badge. Personnel not regularly within a 2-mr/hr. field will not be required to wear film badges.

6.1.10.3 Maximum Radiation Dosage – The maximum allowable radiation dosage to the test operator is established at 50 milliroentgen per week. This dosage shall be calculated from the monthly film-badge reading by dividing the total days represented by the monthly film badge by seven (7), and then by dividing the monthly exposure reading by this quotient.

6.1.10.4 Restricted Radiation Field – No one shall be permitted to enter a radiation field of greater than 5 mr/hr.

6.1.10.5 Use of Radioactive Materials – The nuclear gauges shall not be used for any other purpose than the determination of soil or aggregate moisture, soil or aggregate density, asphalt cement content, and pavement density.

6.1.10.6 Film Badges – Personnel monitoring of radiation received from nuclear gauges is one of the major items in the health safety program. The following items shall be conformed to:

- (1) Any State employee, using or transporting a nuclear gauge, must wear personal dosimeter (film badge).
- (2) When an employee is to be assigned a film badge, the Project Engineer or District Materials Engineer, as applicable, shall obtain a signed statement from the employee stating the total radiation accumulated during previous employment while working with or in the presence of radioactive sources. This statement, along with a written request giving the employee's name and social security number, shall be sent to the MDOT Radiation Safety Officer.

Prior to the assignment of a nuclear gauge to an employee, the Central Laboratory shall train the individual in radiation safety.

6.1.10.7 Radiation Survey Instrumentation – A CD-V-700 Survey Meter will be assigned with each nuclear gauge. This meter shall be used as follows:

- (1) Storage Facilities: The Project Engineer or District Materials Engineer, as applicable, shall maintain a permanent record of the daily readings immediately outside the storage facility at the closest point to insure that no individual in the immediate vicinity becomes exposed to a radiation field greater than mr/hr. These readings may be taken by the nuclear gauge operator each day at the time the gauge is placed in storage.
- (2) Transportation Facilities: The survey meter shall be used to insure against a radiation field greater than 520 $\mu\text{C/g/h}$ at the closest point outside the vehicle.
- (3) Emergencies: The survey meter shall be used to isolate a contaminated area due to accident with the nuclear gauge.

6.1.11 Posting of Regulations, Procedures, and Notices to Employees – The following documents shall be posted in conspicuous places in the District Laboratory, the Central Laboratory, and Project Offices to permit individuals working in or frequenting any portion of a controlled (radiation) area to observe a copy of the documents.

6.1.11.1 Regulations and Procedures

- (1) Mississippi State Board of Public Health Regulations:

Regulations for Control of Radiation in Mississippi

- (2) MDOT Standard Procedures and Test Methods:

MT-6, MT-16, and *Materials Division Inspection, Testing, and Certifications Manual*, Section 6

6.1.11.2 Radioactive Material License – A copy of the Department's license or certificate of registration shall be posted in each storage area.

6.1.11.3 "Notice to Employees" Mississippi State Board of Public Health, Form No. RH-5 – The "Notice to Employees" may be obtained from the Central Laboratory.

6.1.11.4 "Notice to Employees," (TMD-523) – In lieu of posting the lengthy documents set out in Section 6.1.11.2 and 6.1.11.3, this notice shall be posted advising personnel of the location of these documents. A copy of the documents set out in Section 6.1.11.1 shall be located at the District Laboratory, Central Laboratory, and the Project Engineer's Office and made readily available.

6.1.12 Emergency Procedures

6.1.12.1 Emergency Contact Procedures – In an emergency where damage or possible damage has occurred to the radioactive source, notify the following immediately:

- (1) The local law enforcement agency and/or Highway Patrol
- (2) Division of Radiological Health, Mississippi State Board of Health

- (3) The manufacturer of the gauge

6.1.12.2 MDOT Radiation Safety Officer – The MDOT Radiation Safety Officer will then carry out the requirements of the regulations. All personnel responsible for nuclear gauges are required to have the names, addresses, and telephone numbers of all officials to be notified in an emergency.

6.1.12.3 Action to Take for Different Types of Emergencies

- (1) In the event of an accident involving the nuclear gauges, the responsible State employee at that time shall rope off an exclusion area with a radius of fifteen feet (15') around the gauge until the civil authorities and/or the MDOT Radiation Safety Officer arrive.
- (2) The area of the collision must be marked and a radiation survey made of this area.
- (3) In case of theft or loss of radioactive material, the responsible person at the time of discovery shall notify the MDOT Radiation Safety Officer or the MDOT Radiation Administrative Officer who will notify the State Board of Health.
- (4) In case the handle which operates the shielding shutter device sticks in the "USE" Position, notify the MDOT Radiation Safety Officer immediately, and:
 - a. Place sacks of wet soil around and above the gauge, and
 - b. Place radiation signs and rope off an area fifteen feet (15') from the gauge.

6.1.13 Procedure for Wipe Tests – Wipe tests or leak testing is required by law and is simply a swabbing of the sealed source to ascertain that no radioactive contamination has occurred from the nuclear source.

6.1.13.1 Wipe Test Frequency – Each source must be wiped every six (6) months. A label indicating the date of this wipe test is required on each gauge.

6.1.13.2 Performance of Wipe Test – The wipe tests are to be performed by personnel from the Central Laboratory. The MDOT Radiation Safety Officer will arrange for these tests and keep the required records on the results. The Central Laboratory will report all wipe tests to the State

Board of Health.

6.1.14 Maintenance of Nuclear Gauges – No maintenance will be performed by District or Project personnel. Instruments requiring maintenance will be returned to the Central Laboratory for repair. The MDOT Radiation Administrative Officer will arrange for the manufacturer of the instrument to make any repairs that are needed.

6.1.15 Radiation Safety Training of Gauge Operators

6.1.15.1 Frequency of Training – The MDOT Radiation Safety Officer or his representative will conduct a radiation safety training class on an annual basis at each District Headquarters.

6.1.15.2 Attendees – All gauge operators must attend a radiation safety training class annually.

- (1) All new employees (prospective gauge operators) must attend a radiation safety training class prior to receiving instructions for operation of gauges. (Pursuant to certain conditions, arrangements for a special training class may be made by the MDOT Radiation Safety Officer.)
- (2) Employees who previously were gauge operators, but have not attended a radiation safety training class within the last twelve (12) months, must attend such a class before resuming duties as a gauge operator. (Pursuant to certain conditions, arrangements for a special training class may be made by the MDOT Radiation Safety Officer.)

6.1.16 Records and Reports

6.1.16.1 Radiation Survey Report – The MDOT Radiation Safety Officer shall make periodic field inspections to evaluate radiation hazards incident to the production, use, release, or presence of sources of radiation. This valuation includes a physical survey of the location of materials, equipment and facilities, and the measurements of levels of radiation or concentrations of radioactive material present.

A written report of the survey shall be prepared and distributed as follows:

Original to: MDOT Radiation Administrative Officer

Copies to: Deputy Executive Director/Chief Engineer
District Materials Engineer
Project Engineer
File

6.1.16.2 Semiannual Inventory – The MDOT Radiation Safety Officer shall conduct a semiannual inventory to account for all sealed sources. A record of this inventory shall be maintained on file in the Central Laboratory.

6.1.16.3 Utilization Log for Nuclear Gauges (TMD-801) – This is a monthly report showing the daily usage of the nuclear gauge. The District Materials Engineer or the Project Engineer, as applicable, shall submit this report to the MDOT Radiation Safety Officer at the end of each month. This report is to be submitted even though the nuclear gauge may not have been used during the reporting period. The report shall contain the following information:

- (1) Make and Model Number of nuclear gauge.
- (2) Name of responsible employee to whom the nuclear gauge is assigned.
- (3) Location where used and dates of use. The project number will suffice for location.
- (4) Name of nuclear gauge operator.

6.1.16.4 Storage Radiation Monitoring Report (TMD-738) – Each time the nuclear gauge is placed in a storage facility, a reading shall be taken with the CD-V-700 Survey Meter immediately outside the storage area at the closest point to the nuclear gauge. These readings shall be maintained as a permanent record by the District Materials Engineer or the Project Engineer, as applicable, to insure that no individual in the immediate vicinity is exposed to a radiation field of more than 0.5 mar/hr. When a nuclear gauge is in storage for a period of one week or more, readings with a survey meter shall be taken, as set out above, weekly and entered on Form TMD-738. A copy of this report shall be submitted monthly to the MDOT Radiation Safety Officer.

6.1.16.5 Report of Accumulated Dosage – Section 801 J 13(b) of the Mississippi State Board of Health Regulations for Control of Radiation requires that each licensee advise each worker annually of the worker's exposure to radiation in writing. The report will contain the following statement followed by a signature-date block.

"This report is furnished to you under the provisions of the Mississippi State Board of Health Regulations for Control of Radiation, Part 801, Section J. You should preserve

this report for further reference.”

In conformance to this regulation, the MDOT Radiation Safety Officer will send the original and one (1) copy of the annual report to the employee’s supervisor (District Materials Engineer or Project Engineer, as applicable). The employee’s supervisor will have each employee complete the signature-block on their respective report, give the original to the employee with instruction to retain the report for his/her future reference, and return the signed copy to the MDOT Radiation Safety Officer.

A report of accumulated dosage of a film badge holder will be sent at any time requested by the employee.

**Section 7 – Producers and Suppliers and List of “Approved Sources of
Materials**

7.1 Organization and Function of the MDOT Product Evaluation Committee

The following section provides guidelines for establishment of, and to outline organization, functions and procedures for a committee to conduct the Department's product evaluation function.

7.1.1 General – There shall be established in the Mississippi Department of Transportation a Committee which conducts the product evaluation function. This committee will be a non-policy making body of technical and administrative advisors to the Chief Engineer who will review and evaluate new materials, new products and new procedures proposed to the Department, and make appropriate recommendations.

7.1.2 Organization of the Committee – The name of the Committee shall be the Mississippi Department of Transportation Product Evaluation Committee.

Members of the Committee:

Assistant Chief Engineer - Operations
Assistant Chief Engineer - Preconstruction
Bridge Engineer
State Construction Engineer
Roadway Design Engineer
Support Services Director
Procurement Director
State Maintenance Engineer
Research Engineer
State Materials Engineer
State Traffic Engineer
Planning Engineer
Information Systems Director
District Engineer (Yearly Rotation)

Non-Voting Member(s):

Planning and Research Engineer
FHWA Division Office
State Aid Division Representative

The Chairman of the Committee shall be the State Materials Engineer. The Secretary shall be the person designated by the Chairman. The Secretary shall have no vote.

The District Engineers and other Division Heads shall be called upon for advice as the need arises.

Regular meetings shall be held on the third Thursday of January, April, July, and October. Special meetings may be held as deemed necessary.

The District Engineer shall serve on a rotational basis for an entire calendar year from the January meeting, (third Thursday of January) through the October meeting. The annual District Engineer appointment to the Product Evaluation Committee shall be as listed in Table 7.1.

TABLE 7.1: Product Evaluation Committee District Engineer Assignments

NOMINEE	CALENDAR YEAR
DISTRICT ENGINEER 7	2005
DISTRICT ENGINEER 1	2006
DISTRICT ENGINEER 2	2007
DISTRICT ENGINEER 3	2008
DISTRICT ENGINEER 5	2009
DISTRICT ENGINEER 6	2010
DISTRICT ENGINEER 7	2011
DISTRICT ENGINEER 1	2013

Note: The schedule will start repeating in calendar year 2014 and nominees thereafter will be in the sequential numerical order as shown above.

7.1.3 Duties of the Committee – Following are the duties assigned to the Product Evaluation Committee.

Review and evaluate new materials, new products, and new procedures that are proposed to the Mississippi Department of Transportation for use in the highway program.

Recommend on the basis of review and evaluation of new items appropriate action to be taken by

the Department, including:(a) immediate adoption;(b) trial usage for further evaluation or trial usage on a project tested basis;(c) additional review, development, or research by the Department;(d) reference back to initiator for additional information; and(e) rejection. The appropriate Assistant Chief Engineer will ultimately determine whether or not an evaluation will be performed on a project tested basis.

It is understood that specifications and/or plan modifications must be developed before some approved products can be incorporated into general use. For this reason, the Committee will, as a part of the product approval process, make a determination as to the necessary documents which must be developed to implement the use of an approved product. A listing of the necessary implementation documents will accompany the approval recommendation submitted to the Deputy Executive Director/Chief Engineer. Upon concurrence of the Committee's recommendation by the Deputy Executive Director/Chief Engineer, the appropriate Assistant Chief Engineer will notify the affected Division(s) by memorandum of the product's approval and will determine the letting date in which the new material, product or procedure is to be incorporated in the contract documents after consulting the applicable Division Head. The Division Head will advise the Committee Chairman of this target date.

After the Deputy Executive Director/Chief Engineer's approval of the Committee's recommendation, the submitter of the product will be notified by letter from the Committee Chairman that the product has received approval or that final approval would await preparation of the necessary documents. When these documents are completed and approved, the Chairman will be notified and he will in turn issue final approval notice to the submitter.

MDOT correspondence disregarded for at least six months during the product evaluation process will terminate the evaluation. A letter to the supplier will state: (a) MDOT correspondence has not been answered within the last six months; (b) Evaluation has been terminated due to supplier lack of interest; and (c) Two years after the date of this letter is the earliest allowable product resubmission date.

Encourage development and introduction into the highway field of new and improved products, materials, and processes.

Review and evaluate new equipment proposed to be purchased by a Division, when requested.

The Secretary shall screen and furnish the Committee with information on the various proposals received. When deemed desirable by the Committee, representatives of manufacturers or producers may be asked to appear to clarify or amplify their proposals. Outside experts and members of the Mississippi Department of Transportation with first hand knowledge of the proposals being considered may be requested to appear before the Committee.

The Chairman may assign a specific proposal to a member of the Committee who will serve as Chairman of the subcommittee to study the proposal. This member shall report the findings and his Recommendation(s) to the Chairman for further action by the Committee. A written report shall be furnished to the Committee Chairman at each scheduled meeting giving the status of each product and his recommendation for Committee action if needed.

When determination of a proposal is urgent, the Chairman may informally poll the members of the Committee and the result of the poll shall constitute an official vote. Unless there is such urgency, however, final action on a proposal shall await the next regular meeting of the Committee.

7.1.4 Application Submittal – The Product Evaluation Committee reviews new materials, new products, and new procedures for which the Department has no standard specification, that are proposed for the Mississippi Department of Transportation for use in the highway program.

Material Suppliers who wish to have a product evaluated by the Committee must complete and submit for review the most current version of Form ADM-361. A copy of Form ADM-361 is available in the appendix of this manual. In addition, a copy can be obtained from the www.goMDOT.com website under the *Business Section* or by contacting the Materials Division for more information.

7.2 Approved Product and Producer/Supplier Categories on the MDOT “Approved Sources of Materials” List

Listed below is a table of all of the categories for which the Mississippi Department of Transportation currently maintains a list of approved products and/or producers/suppliers. The Department’s “Approved Sources of Materials” list is available at the www.goMDOT.com website under the *Business Section, MDOT Approved Sources of Materials*, or by contacting the Materials Division Quality Assurance Engineer. The approved products are also listed in the SiteManager Information System under the Approved Lists Icon in the Producer/Supplier and the Approved Products Sections.

TABLE 7.2: “Approved Sources of Materials” — Categories & References

CATEGORY	REFERENCE
Admixtures, Concrete	Standard Specifications for Road & Bridge Construction Section 713.02
Aggregate Sources	Standard Specifications for Road & Bridge Construction Section 703
Asphalt Pavement Restoration Seal	Standard Specifications for Road & Bridge Construction Section 401.02.6.7
Backer Rods (Sec. 707.02.15)	Standard Specifications for Road & Bridge Construction Section 707.02.1.5
Bituminous Material Suppliers—Certified (Also Refer to SHRP)	Standard Specifications for Road & Bridge Construction Section 702
Bituminous Mixtures, Commercial Cold Mix	Standard Specifications for Road & Bridge Construction Section 404.02
Cement Suppliers	Standard Specifications for Road & Bridge Construction Section 701
Coating Systems, Bridge Structural Steel	Standard Specifications for Road & Bridge Construction Section 710.03 and 710.04
Coating Systems, for Upgrading Existing Coatings by Maintenance Forces	Standard Specifications for Road & Bridge Construction Section 710.03 and 710.04
Concrete Pipe Suppliers	Standard Specifications for Road & Bridge Construction Section 708

Concrete Texture Spray Coatings Suppliers	Standard Specifications for Road & Bridge Construction Section 714.12
Corrugated Metal Pipe for Maintenance Work (Vendors)	Standard Specifications for Road & Bridge Construction Section 709
Corrugated Metal Pipe Fabricators	Standard Specifications for Road & Bridge Construction Section 709
Corrugated Metal Pipe, Sheet Steel Manufacturers	Standard Specifications for Road & Bridge Construction Section 709
Dowel Tie Bar Anchor Systems (in Concrete)	Standard Specifications for Road & Bridge Construction Section 714.11.7
Fly Ash, Sulfate and Non-Sulfate Areas	Standard Specifications for Road & Bridge Construction Section 714.05
Geocomposite Edge Drains	Standard Specifications for Road & Bridge Construction Section 605
Geogrids	Standard Specifications for Road & Bridge Construction Section 714.15
Ground Granulated Blast-Furnace Slag, Grade 100 & 120	Standard Specifications for Road & Bridge Construction Section 714.06
Grouts & Patching Compounds (Rapid Setting Commercial)	Standard Specifications for Road & Bridge Construction Section 714.11.6
Guard Rail Suppliers	Standard Specifications for Road & Bridge Construction Section 712
Impact Attenuators	Standard Specifications for Road & Bridge Construction Section 619.02
Joint Repair Materials (Sec. 714.11.8)	Standard Specifications for Road & Bridge Construction Section 714.11.8
Manhole Risers	Standard Specifications for Road & Bridge Construction Section 604
Pavement Marking Materials, Inverted Profile Thermoplastic	Standard Specifications for Road & Bridge Construction Section 626
Prestressed and Precast Plants	Standard Specifications for Road & Bridge Construction Section 804.03.22
Reinforcing Steel Suppliers, Pre-tested	Standard Specifications for Road & Bridge Construction Section 711

Retroreflective Sign Sheeting Material(s)	Standard Specifications for Road & Bridge Construction Section 721.06
SHRP Superpave Performance Graded Asphalt Binder(s)	Standard Specifications for Road & Bridge Construction Section 702
Silicone Joint Sealing Compounds	Standard Specifications for Road & Bridge Construction Section 707.02.1.4
Soil Reinforcing Mats	Standard Specifications for Road & Bridge Construction Section 224
Steel Wire Fabric (Wire Mesh) Suppliers	Standard Specifications for Road & Bridge Construction Section 711.02.3
Substitute Materials	Standard Specifications for Road & Bridge Construction Section 106.12
Traffic Control Devices, Miscellaneous	Standard Specifications for Road & Bridge Construction Section 619.02
Traffic Control Materials	Standard Specifications for Road & Bridge Construction Section 619 and 720
Traffic Paint Manufacturers	Standard Specifications for Road & Bridge Construction Section 710
Treated Wood Products Suppliers	Standard Specifications for Road & Bridge Construction Section 712, 718, 719, and 722

Appendix A – Materials Division Standard Forms

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Note: The Standard Operating Procedures listed below were referenced in this manual and are included for convenience. To review additional Materials Division SOPs or check for the latest version, please see the Official Standard Operating Procedures section of MDOT@Work (MDOT's Intranet Site).

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